

# MAKING MEETINGS MORE EQUAL

**N**ancy Amato didn't want to go to Las Vegas. In 2015, it was the chosen venue for one of the main events in her field — the International Conference on Robotics and Automation (ICRA). But she and other women involved in organizing it felt that the city, famed for its strip clubs, was unsuitable. Among the first achievements of the organizing committee — which that year was all-female — was moving the conference to Seattle in Washington.

The committee had even bigger ambitions for the male-skewed meeting.

"Often, people say there aren't any women speaking because there aren't any out there, so we thought, 'Let's show them a tonne of women and that might change things,'" she says.

Keen for attendees to focus on the agenda of the event, rather than on the gender of its coordinators, Amato and the committee set out to create the best possible version of the conference. They came up with new features to foster greater diversity and inclusion, including an advice forum for PhD students and a careers fair. They invited roughly an equal number of male and female speakers, in contrast to the 100% male line-up of the 2014 meeting. The event also broke records for submissions and attendance, and sold out of space for exhibitors and sponsors for the first time in its history. "Overall, it was a success on any measure," she says.

"But if you look at the follow-on years, it doesn't seem like it has changed the story on diversity much," says Amato, a computer scientist at the University of Illinois at Urbana-Champaign. Over the

***Several fields of science are moving away from male-dominated conferences, finds a Nature analysis. But maintaining a balance takes work.***

**BY HOLLY ELSE**

years, ICRA has slipped in and out of being a 'manference' — a conference heavily dominated by male speakers.

It's a common problem for scientific fields. A new analysis by *Nature* suggests that meetings are able to correct a pronounced gender bias at the podium, but that it takes persistent and constant effort to banish the manference.

Our investigation looked at the line-up of invited speakers at key meetings in five disciplines — neuroscience, artificial intelligence (AI), chemistry, geology and microbiology

— over the past nine years. Four of the five fields seem to have made progress in diversifying the speakers at their key meetings, and in all five fields the ratio of women to men among invited speakers exceeded the overall ratio of senior women in those fields. Those with farthest to go have made the biggest gains: at the 11 machine-learning and AI meetings *Nature* examined, for example, the proportion of female speakers increased from 7% in 2011 to 38% in 2019. Neuroscience, geology and microbiology also show positive trends. But chemists are struggling to move the needle on diversity; across 13 chemistry conferences in the *Nature* analysis, the proportion of women among invited speakers rose by just one percentage point.

Good intentions are not enough, say some conference organizers. Instead, firm gender quotas or policies that compel diversity seem to reap the most success. And the effort must be repeated every year. "The conferences that are doing well should see that as a first step to asking

ILLUSTRATION BY THE PROJECT TWINS

themselves what they can do next,” says Anne Churchland, a systems neuroscientist at Cold Spring Harbor Laboratory in New York.

## PANEL POLICE

The manference and its sibling — the ‘manel’, or male-only panel — have yet to reach the pages of dictionaries but first took off as hashtags on social media in the early 2010s. In 2012, microbiologist Jonathan Eisen began using his blog to flag male-dominated meetings in his field. The same year, Churchland started posting details of potential female speakers online, in a bid to highlight overlooked women in neuroscience. The list now features more than 600 female systems neuroscientists. And in 2015, Finnish political scientist Saara Särnä set up a Tumblr site to post photographs and screenshots of manels under the tagline: ‘Congrats, you have an all male panel!’ The site has since documented more than 2,000 manels. Several researchers have publicly stated that they will turn down invitations to appear at conferences at which the schedule is male-dominated. These efforts have blossomed into an ecosystem of blogs, Tumblr and Twitter accounts documenting manferences and manels. (Organizers of several of the meetings investigated by *Nature* started trying to increase diversity before this social-media buzz.)

There is more at stake than just the accolade of being asked to speak. The administrator of the Australia-based Twitter account @ManelWatchAU, a biomedical scientist who wishes to remain anonymous for fear of retaliation, says that passing over women for speaking engagements harms their careers. “In grant applications, you have to explain how you have a national or international profile. If women are not invited to talk at these events, they don’t have that.”

To assess the extent of manferences across five disciplines, *Nature* selected at least nine influential meetings in each community and recorded, as far as possible, the presumed gender of all invited speakers — those hand-picked by conference organizers, rather than scientists who put themselves forward to give talks or present posters (*Nature* did not ask about non-binary people in the analysis). Adding together the number of male and female invited speakers across each field’s meetings reveals some trends, despite the small sample size (see ‘A changing balance’). In neuroscience, the proportion of female speakers almost doubled, rising from 24% in 2011 to 42% in 2019. Microbiology has shown similar improvement, with the proportion of female invited speakers increasing from 28% to 40% across the same time period. Geology has seen more rapid progress, but from a lower starting position: women took the podium for 38% of invited talks in 2019, up from 13% in 2011. And in AI, the needle moved 31 percentage points from a lowly 7% in 2011. Not every discipline saw an increase, however: across 8 years of 13 chemistry events, female representation has remained below 24%.

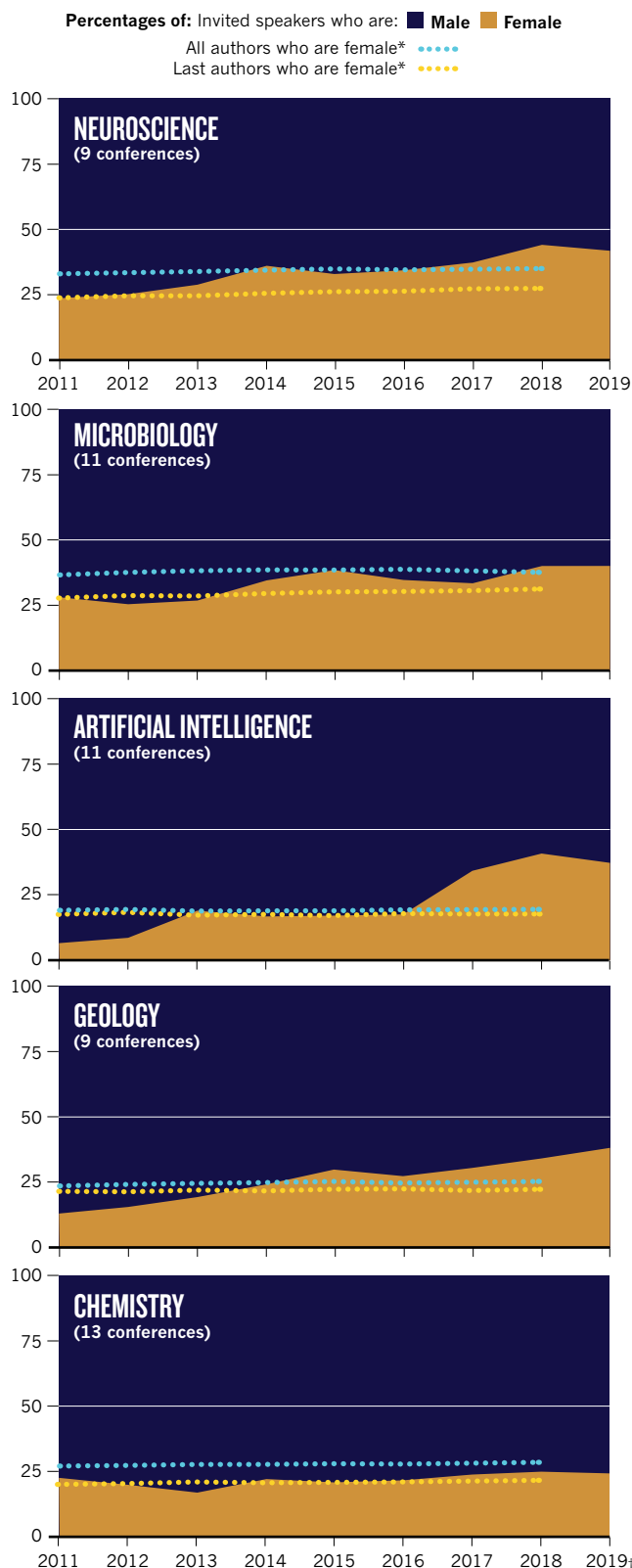
But these trends mask sometimes dramatic swings in the number of female speakers, depending on which conference and year is under scrutiny (see full data at [go.nature.com/2jumtdx](https://go.nature.com/2jumtdx)). For example, in 2013, more than 40% of invited speakers at the Japanese Neuroscience Society’s annual meeting were women. But in 2016, they were all men, despite a diversity and inclusion committee having been established in 2005. Meanwhile, in AI, the International Conference on Learning Representations has gone from an all-male line-up to a 50:50 split over the past four years.

To estimate the overall proportion of female researchers in each field, and the proportion of female senior authors — those who might be invited to speak at conferences most often — *Nature* examined data on the gender of authors of research papers, approximated using gender-analysis software by informaticians Vincent Larivière, at the University of Montreal in Canada, and Cassidy Sugimoto at Indiana University Bloomington. Others have used different methods with similar results: the website BiasWatchNeuro estimates the underlying proportion of senior women in various neuroscience disciplines by looking at the gender balance among those securing grants from the US National Institutes of Health or, where available, conference attendance records.

Some researchers are disappointed not to see a more consistent upward trend for the meetings in their fields. Churchland says that the number of female speakers is an indicator of the extent to which organizers have reached out beyond the usual invitees. “If the line-up is all-male, you

# A CHANGING BALANCE

*Nature*’s analysis of the gender of people invited to speak at conferences in five disciplines suggests the balance is shifting — in some fields. To give an idea of each discipline’s gender ratio, we looked at research publications and approximated the gender of all authors and of last authors, whom we presumed to be senior researchers.



See [go.nature.com/2jumtdx](https://go.nature.com/2jumtdx) for full data.

\*Data from Vincent Larivière and Cassidy Sugimoto, who used automated gender analysis software to examine more than 14 million papers over 2008–18, divided into disciplinary classifications adopted by the US National Science Foundation. †2019 data missing for five conferences across all disciplines (see [go.nature.com/2jumtdx](https://go.nature.com/2jumtdx)).

know the conference organizers invited their friends from grad school and did not put much effort in to create the best programme,” she says.

Angeline Pendergrass, an atmospheric scientist at the US National Center for Atmospheric Research in Boulder, Colorado, was pleasantly surprised at the changes in the geosciences. “It’s better than I expected. I’m not mentally tallying this up when I’m at a meeting, but some of these are getting close to 50%.” She thinks that heightened awareness of the importance of diversity in science has probably played a part in the trend.

Such sea changes in science are having an impact on conferences. Raia Hadsell, a machine-learning researcher who has helped to organize several of the conferences analysed by *Nature*, says that the drive for diversity has coincided with increased public scrutiny of AI and a rash of headlines about bias in algorithms themselves. But conferences influence each other, too, says Hadsell, who works at the Google-owned AI company DeepMind in London. For example, when the Neural Information Processing Systems conference introduced a code of conduct to improve inclusivity in 2018, several others followed suit, and most events now offer child care.

Hadsell says *Nature*’s data suggest that the efforts made in AI over the past decade have led to real change. “It wasn’t just a blip; we aren’t going to go back,” she says. But *Nature*’s data on robotics meetings show that gains are not always steady. After the 2015 ICRA meeting, which Amato and colleagues worked hard to balance, the invited speaker line-up ricocheted back to more than 80% male. Only in 2017 did the ratio come close to parity again.

This informal approach is giving some positive results in AI, but it has not always had the desired effect in chemistry. Frustrated by the lack of progress, several chemists say they are now considering installing more formal policies — or even quotas — for conferences they organize.

At the International Union of Pure and Applied Chemistry (IUPAC), which endorses a large number of conferences and which has held an annual world congress for almost 50 years, organizers must report the anticipated speaker line-up for plenary sessions and keynote talks. The hope is to raise awareness by specifying the male-to-female ratio. Chemist and IUPAC secretary-general Richard Hartshorn, at the University of Canterbury in Christchurch, New Zealand, says that alarm bells ring if the reported proportion of female speakers falls below 30%. “There is no official policy on this; possibly there should be, and this is something that I will look at. Regrettably, I have still had to intercede on rather too many occasions,” he says.

Finding women to fill these slots can be tricky, says chemist Varinder Aggarwal at the University of Bristol, UK, who runs the Bristol Synthesis Meeting. “We are fishing in a smaller pool; the people we target are heavily in demand. Women are pulled in all directions because we want them on committees, as speakers and on interview panels,” he says. Having seen *Nature*’s data, he suggests that tougher action is needed. “There needs to be a stronger policy about it. But what is the right number?” he asks.

Plenty of conference organizers still dodge this question, and have no formal policy on gender balance. The scientist behind @ManelWatchAU says that a perceived lack of women in a field is no excuse for skewed slots: “Even in fields where the percentage of women is low, there are more excellent women speakers than the number of speaking slots.” In June she posted a series of tweets calling out the skewed gender balance at a series of events organized by Nature Research (Nature Research is part of Springer Nature, which publishes *Nature*). *Nature*’s editor-in-chief, Magdalena Skipper, who is also chief editorial adviser for Nature Research, says that Nature Conferences is in the process of formalizing a code of conduct for meeting organizers. “We want to foster diversity at our conferences and other events, focusing on gender diversity but also recognizing that there are many axes of diversity,” she says.

Many scientists would welcome a code of conduct holding organizers accountable. Heather Carson, a PhD student at the University of Sheffield, UK, was disappointed on attending a theoretical-chemistry event for

early-career scientists this year to find only men talking about their work. It is easy for conference organizers to say they are trying, but until there are consequences, she says, they won’t go out of their comfort zone to find female speakers. “In theoretical chemistry, we are not being heard,” she adds. Spurred by her experience, Carson is now planning to organize her own event for female junior researchers.

## PROGRAMME OF IMPROVEMENT

Even meetings that have made strides in gender balancing find it is all too easy to slip into skewed territory. In 2016, BiasWatchNeuro highlighted the computational neuroscience meeting Cosyne as a poster child for diversity. Cosyne had reversed years of male-skewed programmes by requiring a 50:50 gender split among invited speakers. At its 2019 event in Lisbon, it complied with the rule, and included seven male and six female invited speakers. But the story was different for the individuals who gave the 30 or so contributed talks, and who were chosen from a pool of applications rather than being invited by the committee. Cosyne’s informal target is to give around 30% of the slots to women.

An unexpected dip in the number of women giving contributed talks — from 45% in 2018 to 23% this year — meant that women were at the low end of the expected range given the number of applications they made. For Stephanie Palmer, a theoretical neuroscientist who joined the conference’s committee in 2017, this year’s event was the most stressful of her career. Angry attendees turned to Twitter to call out the meeting’s lack of diversity using the hashtag #Brosyne. Palmer says she felt responsible and upset. With a background in the heavily male-skewed discipline of theoretical physics, she knows what it is like to encounter bias. “You care

about people not having that same uphill battle,” she says. For the 2020 conference, organizers are trialling blind reviews of proposals to make sure that the selection process for posters and contributed talks isn’t biased.

The Cosyne example shows that quotas can add complications. Amato says she is hesitant to mandate gender quotas because the body that oversees ICRA — the IEEE Robotics and Automation Society in New Jersey — already has requirements for geographical diversity at its events. “In Asia, it is hard to find the senior women, and you don’t want the same people speaking all the time.” Indeed, the 2015 meeting achieved gender parity only because it did away with the geographical requirement, she says.

As far as forms of diversity go, ethnicity and race, country of origin and language are important, yet are harder to monitor than gender, says DeepMind’s Hadsell, who is conscious of the broad impact of machine learning. “The owners of this technology have to be global, and that means having representation at conferences,” she adds. Efforts to broaden diversity at the International Conference on Learning Representations, for instance, mean that the 2020 event will be held in Ethiopia for the first time.

Several high-profile figures have taken a stand to ensure that meetings strike a good balance. In June, Francis Collins, the head of the US National Institutes of Health, vowed to decline speaking invitations at events that did not have sufficient speaker diversity. Jeremy Farrar, head of London-based biomedical charity Wellcome, quickly followed suit, and Skipper pledged not to chair all-male panels.

Those actions go some way towards changing the status quo, but many scientists still feel they have a battle ahead. “People have a very mistaken idea that once you take gender or race into account you are lowering the quality,” says Yael Niv, a neuroscientist at Princeton University in New Jersey and a member of BiasWatchNeuro. “That is completely false and demonstrably false, but that’s the zeitgeist.”

Even for meetings that have achieved equality by inviting women to speak, Pendergrass says there is a more important task to remember: listen to what they have to say. ■

**“WOMEN ARE PULLED IN ALL DIRECTIONS BECAUSE WE WANT THEM ON COMMITTEES, AS SPEAKERS AND ON INTERVIEW PANELS.”**

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