Universities ramp up efforts to improve faculty gender balance and work climate in STEM

Small actions can cumulatively lead to big advances.

Calls for increased gender balance and diversity in academia are intensifying in many parts of the world. At the national government level, for example, the US NSF has since 2001 funded competitive initiatives in STEM (science, technology, engineering, and mathematics). And starting next year, the European Commission is amping up its push by requiring grant proposals to include plans related to gender equality.

Other high-level initiatives offer funding to institutions to improve their gender balance or, like the UK's Athena SWAN program, bestow recognition to academic departments that are doing well in recruiting and retaining female faculty members. Increasingly, universities are taking on the challenge themselves.

"Despite its very best intentions, the academy is not a perfect meritocracy," Cornelis Storm, a professor of theoretical biophysics at the Eindhoven University of Technology in the Netherlands, wrote in *Europhysics News* in 2019. "For decades, appointment and promotion committees have based their decision making on noisy, biased measurements and the results are the staff compositions we see today." With about 13% female full professors in 2017, Eindhoven had the smallest representation of any Dutch university. It stepped up its efforts in 2019 with what became a sensationalized sprint to hire female researchers; by late 2020 the proportion was nearly 20%.

Also in 2019 Chalmers University of Technology in Gothenburg, Sweden, launched its ambitious Gender Initiative for Excellence, known as Genie. The aim is to boost representation of women faculty to 40% at all levels and across all the university's 13 academic departments in 10 years. Women currently make up about 17% of full professors university-wide.

But Genie and the other initiatives are not only about numbers: "The most important aspect is to create a work environment that lets the women in the system, and all faculty, thrive," says Genie leader Pernilla Wittung-Stafshede, a professor of biology and biological engineering at Chalmers. The motivation for Genie, she says, is to enhance excellence in research, education, and innovation. "For future success and maintaining Chalmers's top reputation, we cannot miss out on 50% of the available talent in society."

LISA TUNE

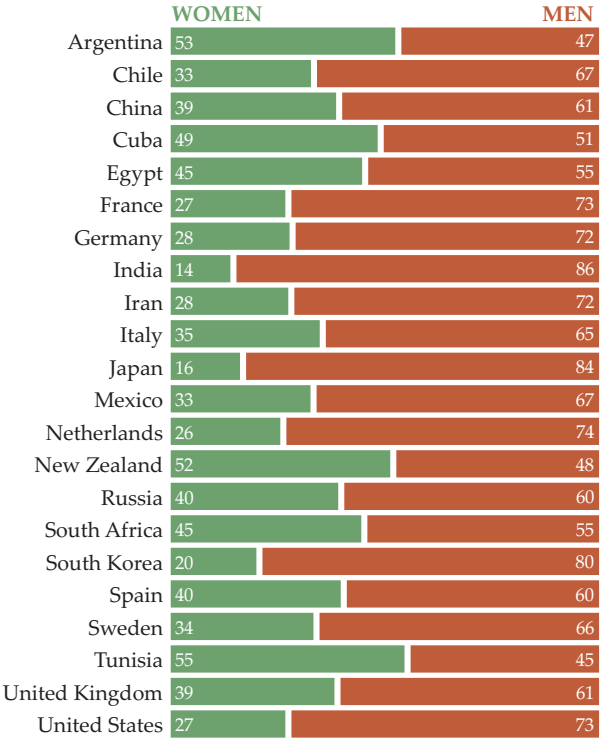
THEATER SKETCHES are one tool employed at the University of Michigan to advance equitable educational and professional practices. This scene is from a 2019 workshop for academic leadership teams that focused on creating work climates resistant to sexual harassment. Eamann Al-Azem (standing) portrays a professor working with her therapist to process Islamophobic incidents and sexual harassment that she and her students have experienced. The role play is followed by guided audience discussion. This and other professional development events are organized and run by the university's Center for Research on Learning and Teaching.

Out of the bottle

Genie grew out of an internal call for the Chalmers community to come up with transformative proposals. Genie won 300 million Swedish krona (about $36 million) over 10 years; two other proposals, in artificial intelligence and project-based teaching pedagogy, received similar awards. Genie's annual funding is about 0.75% of the university's budget.

Genie has three main goals: increase the proportion of female faculty; remove structural and cultural barriers that hamper women's careers; and create a diverse, inclusive working environment that is "supportive of excellence in research and teaching," according to the project's white paper.

Paul Walton, a chemistry professor at the University of York in the UK, has been involved in gender-equity issues in academia for two decades and serves as an adviser to Genie. "It has set itself ambitious goals to rebalance faculty," he says. "Part of its solution is to throw money at the problem. The program also has thought, expertise, and strategy." Genie bears watching from the rest of the world, he adds. "Gender inequality is a problem at all universities."



PERCENTAGES OF FEMALE and male researchers in STEM fields for a sampling of countries. Data are from UNESCO and are from 2017 or the latest year available. The US figures, from 2019, are from the US Census Bureau. (Data compiled by Madison Brewer.)

Walton was instrumental in his department's receiving the first Athena SWAN Gold award, in 2007. To achieve that recognition, the department began successfully responding to its own gender-equity problems. One of the department's "greatest triumphs," he says, was in 2015 when it eliminated the median gender pay gap for professors. (See PHYSICS TODAY, November 2017, page 24.)

Improving gender equality requires raising awareness and then changing behavior, Walton says. Studies by social scientists show that a diverse workforce is associated with improved outcomes. For example, he says, companies with gender-balanced boards perform better. "And strong evidence is emerging that equity is correlated with better academic performance measures." (See the box below.)

Now in its third year, Genie crafts guidelines for recruiting, helps departments implement equity-promoting activities, and proffers advice to the university, departments, and individuals. It has also broadened the university's survey of researchers; one finding across all fields is that females are less likely than males to picture themselves now or in the future as "a successful researcher in academia." Genie also analyzed data on time to promotion, pay, and other metrics. It found, for example, that the mean pay gap is shrinking, from men earning 11.1% more than women in 2018 to 9.1% in 2021.

Other Genie activities and actions to date include funding visiting female scientists, awarding funds to individuals for gender-equity activities, and giving each department 2 million Swedish krona over five years for such activities. Proposals have been funded, for example, to start summer schools, update course curricula, create a department family room, and investigate differences in the aging of vehicle batteries when the main driver was female versus male. Each department has its own culture and needs, says Wittung-Stafshede. "We at Genie can suggest ideas and provide advice, but the departments need to come up with activities and do their own work."

The Genie crew is setting up a group with representatives from each department to liaise with each other and Genie. Wittung-Stafshede is working with the university's senior management to count participants' time toward a percentage of their salary. "There is no silver bullet for building equity," says Genie project coordinator Maria Saline, whose background is in biophysics. "You have to do a lot of small things—mentorship, networking, making people aware, . . ."

Before the disruptions caused by COVID-19, the university organized a workshop on leadership and gender equality. Several PhD students from each department met in one- or two-day sessions over several months. Filippa Lundin, a physics graduate student who works on batteries, participated in the workshop. "One of the eye-openers was learning to observe and notice instances of unconscious bias," she says. Imagine switching the men and women in a scenario, she suggests. "If it seems ridiculous, something is wrong. That is a tool you can use to check for biases."

Chalmers physics chair Thomas Nilsson is planning a similar workshop for PhD students and their advisers in his department, for which he is applying for Genie funding. "I'm not 100% sure we are succeeding in changing the culture yet," he says, but the department members are talking about diversity and inclusion and about biases in hiring and judging merits. "We have to do this, even if it's slow," he says. "The environment in physics is hypercompetitive and masculine. There are lots of men who don't like that either." (See "Why does biophysics attract a disproportionate number of women?," PHYSICS TODAY online, 7 June 2021.)

Perhaps Genie's boldest move so far was to hire five women on short notice. Every second year, the university opens a search for excellent researchers in any field. In 2018 more than 1000 people applied for 10 positions. The top-ranked candidates were a mix of men and women. But when Wittung-Stafshede

Further reading

The articles listed below are part of a growing body of work showing that a diverse workforce and a welcoming climate in academia and other research sectors lead to better performance and improved conditions for everyone.

- M. W. Nielsen et al., "Gender diversity leads to better science," *Proc. Natl. Acad. Sci. USA* **114**, 1740 (2017).
- T. C. Dennehy, N. Dasgupta, "Female peer mentors early in college increase women's positive academic experiences and retention in engineering," *Proc. Natl. Acad. Sci. USA* **114**, 5964 (2017).
- S. Dixon-Fyle et al., *Diversity Wins: How Inclusion Matters*, McKinsey & Company (May 2020).
- V. Hunt et al., *Delivering Through Diversity*, McKinsey & Company (January 2018).
- S. E. Page, "Making the difference: Applying a logic of diversity," *Acad. Manag. Perspect.* **21**, 6 (2007).

CHALMERS UNIVERSITY OF TECHNOLOGY

PERNILLA WITTUNG-STAFSHEDE spearheads the Gender Initiative for Excellence, or Genie, at Sweden's Chalmers University of Technology.

and her Genie colleagues saw the caliber of the women who were ranked second, they decided to cover the cost of five additional positions for five years and to contribute to startup funds. One of those women is an assistant professor in the physics department.

The target of 40% female representation by 2028 is ambitious, especially given that the university is not growing. And, says Wittung-Stafshede, Genie cannot pay for enough new hires. "We need to use our funding to create movement and initiate change. The university will have to spend other money as well to reach our goals."

Genie is giving carrots to departments, says Julie Gold, a professor in the physics department and chair of Chalmers's faculty appointment and promotion committee. People hear "money" and "female" and say, "Let's go for it." Now, two and a half years into the initiative, the attitude is starting to change, she says. "It is no longer just money. Deans and recruitment committee members are starting to couple diverse environments with excellence. I think Genie has something to do with that."

Global efforts

One of the most successful US gender-equality programs is at the University of Michigan. The program goes back to 2001 and the first round of NSF ADVANCE awards, which were established to increase the representation of women in academic STEM careers. When the external funding expired, the university continued the program and later expanded it to include all faculty. The program supports recruitment and retention, an inclusive work climate, leadership training, and more. Over time, the percentage of women on the faculty has increased. In natural sciences, for example, the percentage of women faculty at all ranks grew from 12% in 2003 to 28% in 2018.

Introduced in 2012, Michigan's mentoring approach is notable for its strength. New assistant professors in participating university units meet monthly with a team of mentors. "It can feel intimidating," says Isis Settles, associate director of the university's ADVANCE program and a professor of psychology and Afro-American and African studies. "But the formality is outweighed by the insider information they get, and the program is highly rated by new faculty."

Michigan astronomy professor Ted Bergin has long been involved in the university's ADVANCE program. To change the culture, he says, "you need full professors, particularly white men, to play a role, to stick out their necks and be active in this space—working toward equity." One challenge is that tenured professors are bosses, Bergin says. "If someone wants to resist things, what leverage do you have? Culture change in this environment requires time, effort, and buy-in from the department members."

In Japan, which has among the world's lowest representation of women in STEM fields (see the chart on page 21), efforts toward gender balance are spotty. But recently the Okinawa Institute of Science and Technology (OIST) got a boost: On 19 May a New York–based foundation launched the Rita R. Colwell Impact Fund for the Advancement of Women in Science. The $50 000 fund will be used for outreach activities to attract local Okinawa schoolgirls to STEM fields and to foster gender equality and diversity at OIST. "We want to do small things that have impact," says OIST provost Mary Collins. "We should try to plug gaps." Covering childcare when faculty members travel is an example, she says.

Myriad measures

At the University of Groningen in the Netherlands, the faculty of science and engineering increased the proportion of female full professors from 4% in 2002 to 19% in 2019. Condensed-matter experimentalist Petra Rudolf became the first full physics professor in 2003—and was one of only three in the country at the time. "I got a lot of visibility and used it to push women's issues along with my science issues," she says.

The university initiated the Rosalind Franklin Fellowships in 2003, through which it has hired 130 female faculty members across the sciences and engineering. "There is no question that there are enough highly qualified female candidates," she says. "It's just a matter of getting them and then helping them along in their careers." The climate has completely changed, she says. "We have lots of very good women. And now when we have a job opening and not enough women apply, everyone worries. That is wonderful to see."

In terms of recruiting female scientists, Groningen and other places have found success by tweaking both their advertisements and their approaches to interviewing. In general, wide calls are better than narrow ones, says Rudolf. For example, it's better to advertise for "an ambitious scientist who can contribute to our research" than for a laser physicist. "The more criteria you list, the fewer women apply." In the interview process, Rudolf adds, potential bias is mitigated when each committee member individually ranks candidates before discussing them with others. York's chemistry department goes further, says Walton: It

now invites trained observers to keep an eye out for bias during interviews.

When female physicists arrive at Groningen from other countries, Rudolf helps them navigate the Dutch research and funding landscape; for new arrivals in other fields, she taps colleagues. Rudolf has helped in practical ways, too, by finding tax advisers, nannies, and real estate agents. She is especially proud of Groningen's commitment to making offers to faculty spouses who are also in academia. "That is unusual in Europe," she says.

Eindhoven's Storm says the university had reached the point where it had to do something drastic. And the only thing that could guarantee increasing the proportion of women was to hire more of them. The Eindhoven sprint as originally cast opened jobs exclusively to women for six months, with men eligible after that. A lawsuit claiming discrimination forced the university to loosen the rules: For the duration of the five-year initiative, the delay in considering men applies to 30–50% of positions, depending on each department's current female-to-male ratio.

At the start, the dean collected names of top female scientists from every staff member, says Storm. "It didn't matter if they were on the market or didn't fit a profile for a subdiscipline. The dean looked for good people. We got people who ordinarily would not have applied." The university also padded startup packages and arranged mentors for women hired under the program. Offering startup packages is new and "has a major impact," says Storm. "We are becoming a better department, and that makes us more attractive to anyone who comes knocking."

Since Eindhoven began its efforts in 2019, it has hired 65 female faculty members: 6 are full professors, 3 are associate professors, and 56 are assistant professors. Internal promotions also contributed to increasing the proportion of females to 20% of the university's 170 full professors.

One of the new female hires at Eindhoven is Janne-Mieke Meijer, who studies self-organization of colloidal particles. People want to be recognized for their capabilities, she says, so women don't want to be hired based on their gender. "But I decided not to let that stop me. The further I got in my career, the fewer women I saw. So although I am ambivalent about discriminating against men, we need to do this now, and hopefully it will later sustain itself."

Culture change is hard work

Whether top-down or bottom-up, university initiatives require buy-in from both the administration and faculty members. The approaches that universities and individual departments take vary in scale, detail, and degree of success; they overlap but are also tailored to specific contexts. Often a single person or a small group is the driving force behind efforts to improve gender balance.

Among the widely shared challenges is initial resistance. Another is dual hires. In the US, available and affordable childcare can be a major obstacle to hiring female faculty members; in Sweden, childcare is not a problem, but accommodating dual-academic couples is. But the biggest challenge, says Walton, "is stamina. It's hard work, and you need committed people for a long time."

Toni Feder