

## Women in science

### *Toward a more equitable workplace*

Spring 2017 | By **Jenny Peek**

**YOU DON'T BELONG HERE.  
WE DON'T HAVE  
WOMEN FACULTY IN  
THIS DEPARTMENT.  
YOU'RE TAKING UP SPACE  
THAT A MAN SHOULD HAVE.**



These are some of the comments Cathy Middlecamp remembers hearing during her career in science at UW-Madison, where she was hired as a lecturer in 1979.

“People told me I didn’t belong here, at this university. ‘I want you to know, Cathy, we’re never going to have a woman on this faculty.’ People pointed this out to me, and I never forgot it,” Middlecamp recalls.

As Middlecamp reflects on her professional path, she realizes that what she was experiencing was not unique.

“There were women like me all across the country who had been knocking on doors, looking for better opportunities,” says Middlecamp. “It wasn’t about me, it was about all of us.”

While the gender gap in science has slowly been decreasing, data shows equally qualified women still lag behind their male counterparts in terms of pay, being offered leadership positions, getting nominated for and winning awards, and securing research grants.

According to a National Science Foundation (NSF) 2015 special report, *Women, Minorities, and Persons with Disabilities in Science and Engineering*, men make up **71 percent** of the entire workforce in science and engineering occupations.

In addition to fewer opportunities, women also consistently face overt and implicit sexism in their day-to-day work. From not being taken seriously to experiencing sexual assault, the work environment for many women scientists is unwelcoming, unsafe and toxic.

## THE ONLY WOMAN IN THE ROOM

“It was lonely,” says Middlecamp, who is now a full-time, tenured professor in the Nelson Institute. “I never saw a female professor in a science or math class, because there weren’t any.”

Forty years later, women remain seriously underrepresented in these fields. The **NSF reports** that while women’s share of full professorships has more than doubled since the 1990s, women currently occupy merely one-fourth of senior faculty positions in science, technology, engineering and math (STEM) fields.

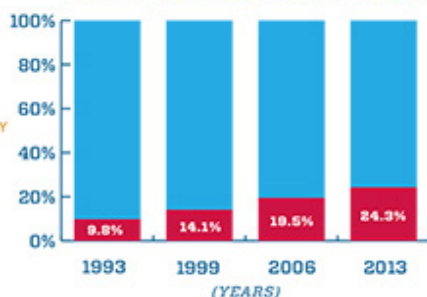
# BY THE NUMBERS

■ WOMEN  
■ MEN

WOMEN'S SHARE OF FULL-TIME, FULL PROFESSORSHIPS HAS MORE THAN DOUBLED SINCE 1993. DESPITE THIS INCREASE, WOMEN CURRENTLY OCCUPY ONLY ABOUT ONE-FOURTH OF THESE SENIOR FACULTY POSITIONS.

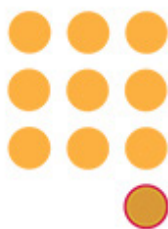
(NSF, WOMEN, MINORITIES, AND PEOPLE WITH DISABILITIES IN SCIENCE AND ENGINEERING, 2015)

SENIOR FACULTY POSITIONS IN THE U.S.



WOMEN EARN NEARLY ONE-THIRD LESS THAN MEN WITHIN ONE YEAR OF COMPLETING A PH.D. IN A STEM FIELD.

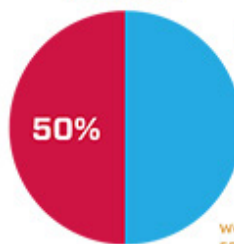
(NATURE, 2016)



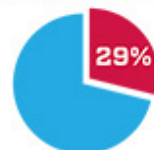
MINORITY WOMEN COMPRISE FEWER THAN 1 IN 10 EMPLOYED SCIENTISTS AND ENGINEERS (U.S.).

(NSF, WOMEN, MINORITIES, AND PEOPLE WITH DISABILITIES IN SCIENCE AND ENGINEERING, 2015)

U.S. COLLEGE-EDUCATED WORKFORCE



U.S. SCIENCE AND ENGINEERING WORKFORCE



WOMEN MAKE UP HALF OF THE TOTAL U.S. COLLEGE-EDUCATED WORKFORCE, BUT ONLY 29% OF THE SCIENCE AND ENGINEERING WORKFORCE.

(NSF, SCIENCE & ENGINEERING INDICATORS, 2016)

SEXUAL HARRASSMENT OR ASSAULT DURING FIELD RESEARCH



SEVENTY-ONE PERCENT OF FEMALE FIELD SCIENTISTS SURVEYED REPORTED EXPERIENCING SEXUAL HARRASSMENT DURING FIELD RESEARCH, AND 26% SAID THEY WERE THE VICTIM OF SEXUAL ASSAULT (AS COMPARED TO 41% AND 6%, RESPECTIVELY, OF MALE RESPONDENTS).

(SURVEY OF ACADEMIC FIELD EXPERIENCES (SAFE), TRAINEES REPORT HARRASSMENT AND ASSAULT, PLOS ONE, 2014)

Women are much more likely to hold associate or assistant professorships because older cohorts of full professors in science, engineering and health are disproportionately male.

But the issue of a more diverse workforce and classroom doesn't stop at gender. The statistics are even more dismal for people of color.

As of 2013, minority women made up only **nine percent** of scientists and engineers working in those fields. And the numbers extend to academia as well. The NSF found that only **eight percent** of senior faculty positions at four-year colleges were held by people of color – both male and female.

Middlecamp empathizes with the emotional difficulties of having few colleagues to relate to. She sees it in the students she mentors in the Nelson Institute's **Community Environmental Scholars Program** – a scholarship program designed to help students from underrepresented communities.

"I think that students of color, male or female, are facing the same loneliness, the same anger and the same feeling of competition, that I, as a white woman amidst a male-dominated faculty in the 1960s, 70s and 80s felt," says Middlecamp. "I cannot claim to know what people today are experiencing, but I know some of the loneliness, some of the anger, some of the shortage of role models, and definitely some of the discrimination."

Nora Savage, a Nelson Institute alumna and program director for NSF's Division of Chemical, Bioengineering, Environmental, and Transport Systems, has also felt the discrimination often faced by women of color.

The challenges became abundantly clear when she came to UW-Madison for her master's degree in 1992. She noticed that students of color – especially women – were struggling to find a place where they felt they belonged.

"I saw that the undergrads in STEM fields were having a really difficult time," Savage recalls. "So I

became a counselor in the **McNair Scholars program** to help undergrads in engineering feel more positive and get a better, more comprehensive experience.”

In addition to serving as a mentor, Savage worked with the former dean of the Graduate School and vice chancellor for research, Virginia Hinshaw, to create a more welcoming culture for minority students in the engineering department.

“We were all sort of ‘outsiders’ in our field, so by example we were showing them that yes, you can do this,” Savage says. “We also provided a safe space. One student who got a lot of flack for being a female in civil engineering would come into my office, close the door and just vent.”

This type of support can be the difference between a student changing majors or dropping out, versus graduating with the degree they set out to get.

Savage says the lowest point of her education involved a meeting with a professor about an exam in her first year of graduate studies. She says she went to him in confidence and was met with blatant discrimination.

“I went to discuss a grade because I was upset; I thought I had done well. He said, ‘Don’t you think you’re doing well enough for a minority?’” Savage recalls. “He went on to ask me other questions about my grades and my GRE score, and while I answered – telling him my GRE scores were in the top 10 percent, and that I was receiving A’s in all of my other UW classes – in my head I was thinking, ‘What are you talking about? I asked you about this exam; that has nothing to do with any of this.’”

She says she declined to file a complaint about the incident, fearing the personal and academic cost of doing so.

“This gets at women speaking out about being mistreated,” Savage says. “It’s really hard to do when you don’t have any evidence. It can really sidetrack your career. I thought, no, I can’t fight this right now.”

Female students often encounter unwelcoming climates in university science and engineering departments – for example, facing unconscious biases and gender stereotypes – according to a **2010 survey** by the American Association of University Women. As more women enter STEM fields and pursue degrees and careers in science, the organization recommends more inclusive practices and support services to encourage success and fair and open discussion.

Nelson Institute professor Tracey Holloway and Nelson faculty affiliate Erika Marín-Spiotta – both leading researchers in their fields – are helping to develop just that.

## A NETWORK OF WOMEN

Fifteen years ago, Holloway and six other women, early in their professional careers, debriefed after a long day at the annual American Geophysical Union meeting in San Francisco.

All were facing career transitions or decisions that teetered along the line between the professional and the personal, so they found comfort and confidence in their peers.

“We were all thinking about our next steps and were talking about issues we all faced – some were personal and some were purely work questions, but many of them were at the work-personal interface. They were things that were too work-related to be able to get good advice from our parents and too personal for us to ask our advisors what to do,” Holloway says.

After the conference, the women decided to stay in touch, creating an email list to ask questions and share advice. With time, friends and colleagues were added and the list continued to grow. What began as a small group of women looking for camaraderie in a male-dominated field is now the **Earth Science**

**Women's Network (ESWN)**, a nonprofit organization. The group's official listserv, hosted by the National Center for Atmospheric Research, reaches more than 3,000 women.

"What started as something between me and my friends really evolved," Holloway, a professor of environmental studies who serves as ESWN's president, says. "Once I saw what a difference this was making in the lives of women around the world, I expanded my thinking to realize that this may be one of the most important things I'm doing in my career."

Marín-Spiotta, ESWN treasurer and an associate professor of geography, is one of only four women to be tenured by UW-Madison's Department of Geography. Three are currently on the faculty.

"There are a lot of reasons women don't end up getting tenure in academia, or a lot of them end up leaving before they get tenure," Marín-Spiotta says.

Feelings of isolation, not being treated as an equal, sexual harassment, and the standard requirements for tenure are just a few of the reasons Marín-Spiotta lists.

"The traditional expectations for tenure are mostly based on research and publications, and the timing of that process isn't very favorable for women," says Marín-Spiotta. "It hits women right at child-bearing years."

In addition, a lot of women either intentionally or unintentionally end up doing more service work in departments than male colleagues, Marín-Spiotta explains. From mentoring to committee work to community outreach, studies have shown that women and people of color disproportionately take on more of those roles.

"Obviously, that takes time away from research productivity, and if peers don't value those things when looking at tenure, a lot of women end up being curbed," she says.

Both Marín-Spiotta and Holloway hope to use their platform within ESWN to keep the conversation going and level the playing field.

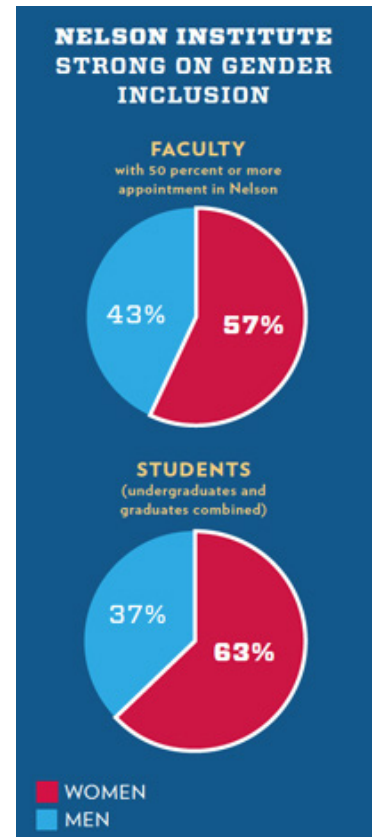
"Everybody should have the chance to pursue the career that they're interested in," says Marín-Spiotta. "A lot of people think that gender bias and discrimination are no longer a problem, and that's not true."

Beyond increasing opportunities for women in science, ESWN is working with universities and professional societies to create a common code of conduct with principles on how to address and prevent sexual harassment, bullying and discrimination.

In fact, Marín-Spiotta recently received the President's Award from the Association for Women Geoscientists for her dedication to tackling sexual harassment in science. Her work culminated in a workshop on sexual harassment in September 2016, bringing together 60 leaders from professional societies, government agencies and universities, and resulting in a **website** with resources for handling sexual harassment.

Studies show that support activities such as these are critically needed.

According to a **2015 report** by the Association of American Universities, 12 percent of female graduate students surveyed at UW-Madison say they have been sexually assaulted since entering UW. In separate research, 71 percent of surveyed female field scientists reported experiencing sexual harassment in the field. But more often than not, these acts go unreported.



*Nelson Institute gender  
equity by the numbers.*



“People are afraid to report, because often you have students being harassed by people in power, so you risk your career, finishing your studies, your funding, your publication, somebody writing you a bad letter, or somebody going around badmouthing you – there can be retaliation,” says Marín-Spiotta.

A lack of serious consequences for the accused, or a perception that action will not be taken, can also dissuade reporting, she says.

“There’s been a lack of accountability, where universities will hush it up and not do anything. And when you think about why? Well, sometimes these people are bringing in research dollars, or sometimes it’s hard to provide evidence,” says Marín-Spiotta. “If someone has been found to violate laws or policies, you must do something about it.”

With the face of science changing, these are issues that workplaces, universities and professional societies must face. And with mutual benefit. As Savage notes, a more diverse workforce can lead to better science, more robust solutions, and improved holistic approaches.

“The institutions that are shaping science are beginning to recognize the need to proactively address diversity in their programs,” Holloway says. “The fact that we’re even talking about this is an indicator of how the culture is changing and how much support there is to encourage women to pursue science, engineering and related endeavors.”

“The downside is that the world is not perfect,” she continues, “but the upside is that there’s so much opportunity and things are only getting better.”

## WOMEN IN THE FIELD

Field research is demanding. Researchers, natural resource managers and rangers often must live and work in remote locations, facing difficult conditions, weather and hours. The work is not for the faint of heart.

But these challenges could not have prepared countless women working for the National Park Service (NPS) for what has recently been alleged to be a “toxic environment” of rampant sexual harassment and assault.

In September 2014, the U.S. Department of the Interior received a request for **investigation** from 13 former and current NPS employees who had worked in the Grand Canyon. The complaint told of “discrimination, retaliation and a sexually hostile work environment.”

Since the initial complaint, more women have come forward, **telling their stories** of misconduct and forcing the park service to expand its sexual harassment probe.

NPS Director Jonathan Jarvis has vowed to address the problem through a multi-pronged effort: surveying employees and revisiting the reporting process for incidents of harassment, conducting extensive employee training, implementing better support networks, and adopting other federal agencies’ best practices for preventative efforts.

Jarvis addressed the issue in Madison last October when he delivered the Nelson Institute’s Jordahl Public Lands Lecture.

“I am incredibly disappointed that actions like this have happened inside of an organization that values service to both the American public and international visitors, and to the resources that are entrusted to us by you,” Jarvis told the crowded lecture hall. “The park service is addressing this very aggressively and will be for years to come.”

The big problem is [sexual assault and harassment] are not being reported, and that's mostly related to people being afraid. On the extreme, you have rape - and it happens. Then you also have the more subtle side: people boycotting research or going behind someone's back and telling others not to work with them - there's a whole spectrum of ways it can manifest.

Sadly, harassment and assault in the field appears to be a widespread danger for women. A [2014 Survey of Academic Field Experiences](#), published in PLOS ONE, revealed that 71 percent of the more than 500 female respondents – researchers and field scientists from a range of disciplines – reported having experienced sexual harassment (including inappropriate sexual remarks and comments about appearance) at a field research site. Twenty-six percent said they had been sexually assaulted, experiencing unwanted or nonconsensual physical contact, during scientific fieldwork. The survey found that few respondents were aware of mechanisms to report incidents, and most who did report were unsatisfied with the outcome.

Erika Marín-Spiotta, a UW-Madison associate professor of geography and faculty affiliate of the Nelson Institute, is using her platform through the Earth Science Women's Network (ESWN) to address sexual harassment and assault in science and to advance awareness and policies around preventing and reporting misconduct.

"The big problem is that it's not being reported, and that's mostly related to people being afraid," Marín-Spiotta says. Women face a range of threats, she says, that run from difficult to dangerous. "On the extreme, you have rape – and it happens. Then you also have the more subtle side: people boycotting research or going behind someone's back and telling others not to work with them – there's a whole spectrum of ways it can manifest."

For example, Marín-Spiotta and ESWN have been hosting workshops on the topic at professional meetings around the country to help ensure a safe, inclusive workspace for all. Marín-Spiotta led a workshop on sexual harassment for graduate students and post-docs at the Early Career Conference at the American Geophysical Union's annual meeting in December, providing two hours of training on how to identify harassment and how to respond.



*In Spring of 2017, In Common, a magazine of the Nelson Institute for Environmental Studies at the University of Wisconsin-Madison, published this article about women in science. In it, ESWN Leadership Board Members Tracey Holloway and Erika Marín-Spiotta discuss ESWN's efforts to increase the retention of women in science.*