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Association for Women in Science

AWIS

Your Network, Your Resource, Your Voice

awis
association for women in science
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AWIS Spotlight on Women in Global Research
Holly J. Falk-Krzesinski

AWIS Spotlight on Women in Research

Holly J. Falk-Krzesinski, PhD

Vice President Global Strategic Networks, Elsevier

By Sacha Boucherie
Senior Communications Manager,
Elsevier

Holly J. Falk-Krzesinski, PhD, co-developer and co-author of the new report *Gender in the Global Research Landscape*, is the Vice President Vice President Global Strategic Networks at Elsevier, the information analytics company specializing in science and health. In this role she focuses on using insights from data and analytics to guide strategic planning and alliance formation within the global research enterprise. Prior to joining Elsevier, Dr. Falk-Krzesinski was a faculty member within the arts, science and medicine department for fifteen years at Northwestern University for fifteen years at Northwestern University, where she led initiatives related to research development and team science. She facilitated a multitude of trans-institutional collaborative grant programs spanning art history to bioenergy, with a special interest on approaches to evaluating collaboration and interdisciplinary research, team science leadership, and research networking tools.

> "At the time, I realized that we were engaging with the very best of intentions but sometimes lacked data that allowed us to quantify where we were and what milestones to set, and we weren't necessarily building from growing evidence-based research on issues related to inequality and bias."

To enable broad sharing of her experiential knowledge in combination with effective practices drawn from team research, Dr. Falk-Krzesinski was a co-developer of TeamScience.net. Through her leadership with the Annual International Science of Team Science Conference and NIH Team Science Toolkit project, Dr. Falk-Krzesinski has also been instrumental in developing a strong international community of practice for team science and interdisciplinary research. Dr. Falk-Krzesinski continues to teach grantsmanship as an adjunct lecturer at Northwestern University, consults at universities and funding agencies on team science, and serves on the Business Steering Group and as board-alternate for ORCID. She launched NORDP in 2008, serving as the organization's founding president.

Why did you decide to put this report together?
Before joining Elsevier, I had been active in co-leading two programs at Northwestern University aimed at supporting the professional development of women faculty members in STEM departments. At the time, I realized that we were engaging with the very best of intentions but sometimes lacked data that allowed us to quantify where we were and what milestones to set, and we weren't necessarily building from growing evidence-based research on issues related to inequality and bias. That's when I first dove into the literature and sought opportunities to collect data around gender biases within research. Not too long after I joined Elsevier, I learned about the activities of the Elsevier Foundation and its role in promoting women in STEM, including its work with the Association for Women in Science (AWIS, with whom I've been a member since 1994) and its support of the international Gender Summits (organized by Portia Ltd). I presented at the first North America Gender Summit on a project to help make women scientists more discoverable, and after that, the Elsevier Foundation Program Director, Ylann Schemm, and I began discussing other issues we might work on together related to gender inequality and promoting women in science. As part of the organization's broader diversity and inclusion initiatives, we both understood that as a steward of world research, Elsevier had a responsibility to promote gender equality and to advance an understanding of the impact of diversity in research. A couple of years later, we found ourselves co-chairing a new trans-business unit Gender Working Group. At roughly the same time, colleagues

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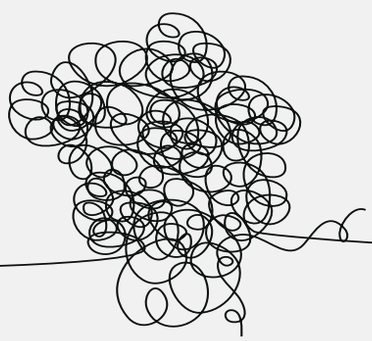

"From the Cover" from page 1

in Elsevier's data science and analytical services teams were developing a new methodology that enabled gender disambiguation of authors (researchers) indexed in the Scopus database with a proof-of-concept project underway, so I proposed a full-blown global analytics report. It was an opportunity to bring to bear Elsevier's robust data and analytics expertise to examine research performance through a gender lens. It was also an opportunity for Elsevier to answer an important call to action that had been put forward by NIH leadership [Valantine, H. A. & Collins, F. S. National Institutes of Health addresses the science of diversity. *Proceedings of the National Academy of Sciences*. 112, 12240–12242 (2015)], in which it was explicitly noted that critical issues related to gender disparity and bias should be examined by sound studies and supported by data. Information analytics meets a commitment to the research community, and voilà, the idea for the report was born!

About midway through the project, for example, a prominent research leader in Europe wrote the following, after hearing me present our plans for the report and Gender Working Group: "I am so impressed with what Elsevier is doing to further gender equality in academia. You and your firm are showing leadership in the best sense of the word."

The development of the report was a labor and time intensive ride. What kept you going?
Collaboration! First of all, there were eight of us on the core report and communications team, all with different and complementary expertise, skills, and personalities, and my colleagues are the most collegial group I've ever had the pleasure of working with. Close to two dozen additional colleagues worked with us at various stages of the project. And there are countless other colleagues who have been wildly supportive—this project cast a wide net in that sense. Plus, we had strong encouragement from our organization management and board members. Externally, we engaged with almost twenty experts and leaders around the world, who provided guidance about the report's scope of work; suggested how best to present our findings; and shared critical thought leadership and context on how the report provides powerful evidence-based insight and guidance for policy development related to gender equality and gender research for organizations worldwide. I was also motivated by the feedback we started receiving from the community, even long before the release of the completed report. About midway through the project, for example, a prominent research leader in Europe wrote the following, after hearing me present our plans for the report and Gender Working Group: "I am so impressed with what Elsevier is doing to further gender equality in academia. You and your firm are showing leadership in the best sense of the word."

What surprised you most, personally, around the findings of the report?
I was most surprised by the variability between geographies and between subject areas. I realize that our report can't directly address the questions around the "why" of those differences, but it was compelling to see that having the data ensures that we don't mistakenly believe that it's the same for all women everywhere. It's clear that factors such as societal and disciplinary culture come into play. And while not surprising, I found it fascinating that the data could tell us not only about the number of women and men in research, but also so much about how women and men engage in research. The report really drove home the point that gender equality means more than merely increasing the number of women engaged in research.

Now the report is finally out, what's next?
Community engagement was always one of our major drivers, so to begin, we're presenting the report findings in a regional context in venues around the world. Our goal is to disseminate the report findings as broadly as possible, and to engage stakeholders in discussions about the importance of data-informed policy and the need for additional research to

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Bahija Jallal, PhD
AWIS President
AstraZeneca, MedImmune
AWIS member since 2012

Act Locally; Influence Globally

On the first Earth Day, celebrated on April 22, 1970, Friends of the Earth Founder David Brower coined the phrase, "Think Locally, Act Globally," to encourage people across the world to consider the health of the entire planet and to act to protect the environment in their own communities.

This year's Earth Day, April 22, 2017, saw tens of thousands of people descend on Washington, D.C., and five hundred other cities around the world for the March for Science, a nonpartisan movement to celebrate science and the role it plays in everyday lives.

This event is an excellent example of how we all can act at a local level but influence the entire world. And it is reminiscent of the Women's March, held just three months earlier, where more than five million people marched across the world for the rights of women.

These two marches symbolize just how effective we can be when we take simple actions. Several years ago at MedImmune, we hosted a Women's Summit for our Maryland-based employees to raise awareness of issues specific to women working in science. That first year, we had three brave men in attendance, and the rest of the four-hundred-seat auditorium was filled with enthusiastic and supportive women. Since then, the event has grown in both size and scale, with Women's Summits being held across AstraZeneca and MedImmune campuses worldwide and men turning out in equal numbers to women. It has become one of the most popular employee events in the company.

The Summit does not cost a lot of money to run. A small committee of volunteers in each Summit location plans the local event. And no topics are off-limits. What began as just a small idea has grown into a premier event attended by thousands of men and women across the globe. It just took a spark to fire up the idea.

These are the kinds of things we, as women working in scientific fields, can do to raise awareness of issues related to and provide resources for other women in the field. We have so much work to do.

So I ask you, what can you do, on a local level, to advance women working in scientific fields? When we act locally, I assure you that we can indeed influence globally.

Thank you,

Bahija Jallal, AWIS President
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The *AWIS Magazine* is a record of women's contributions to the STEM enterprise and their impact on society with story ideas that come from the real challenges our members face every day in labs, classrooms, corporate boardrooms, and government offices around the country. *AWIS Magazine* editors and contributors—who volunteer their time—mine their own experiences and frustrations to create content ideas. As with all our publications, we look to our AWIS members across all disciplines and employment sectors to tell us where they need support in their work or in their lives and we offer them practical, everyday solutions that are impactful, smart, and inspiring.

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Revision Place

Janet Bandows Koster
AWIS Executive Director and CEO

In this issue of the *AWIS Magazine* we focus on themes which impact the scientific community around the world. Specifically, in Trendspotting, two articles focus on the potential implications of changes to America's immigration regulations.

On a recent vacation trip to Europe, friends and I were held at the Polish border for six hours. No reasons given. Nothing said. Just a sign in Polish with the translation, "Revision Place." As we waited looking out a chain-link fence, I reflected on our own borders, the ban on immigration, and the wall between the US and Mexico.

Not only do these proposed changes fundamentally conflict with long-standing American values, they also seriously undermine our country's economic dynamism and its ability to harness the talent and enthusiasm of immigrant workers. There are many reasons why people from all over the world choose to build their scientific careers in the US. As well as the ample opportunities for study and work at a host of great institutions and companies, a big reason why people are drawn to the US is its commitment to diversity, tolerance and equal rights. Applying an en masse travel ban against lawful US residents and visa holders seriously destabilizes this image.

Research into diversity shows the value of a varied workforce. It suggests that companies excel when people with diverse perspectives are brought together, not kept apart. Diverse groups often possess a wider range of knowledge, alongside distinct skills which can facilitate better decision-making and innovation. The long-term sustainability and growth of companies depends on how well they can capitalize on the diversity of their workforce.

In an increasingly globalized world, it is essential that firms reflect the diversity of the environments they operate in. In contrast, a homogeneous workforce will lack the skills to exploit new opportunities or address unmet needs of Americans if they do not reflect the characteristics of the markets they are trying to reach.

Since 1971, AWIS has embraced and respected the value of a diverse and inclusive community reflective of the rich experience of our membership, board, and employees. If we are truly to "Make America Great Again," we need to welcome and celebrate diversity.

Janet Bandows Koster
koster@awis.org

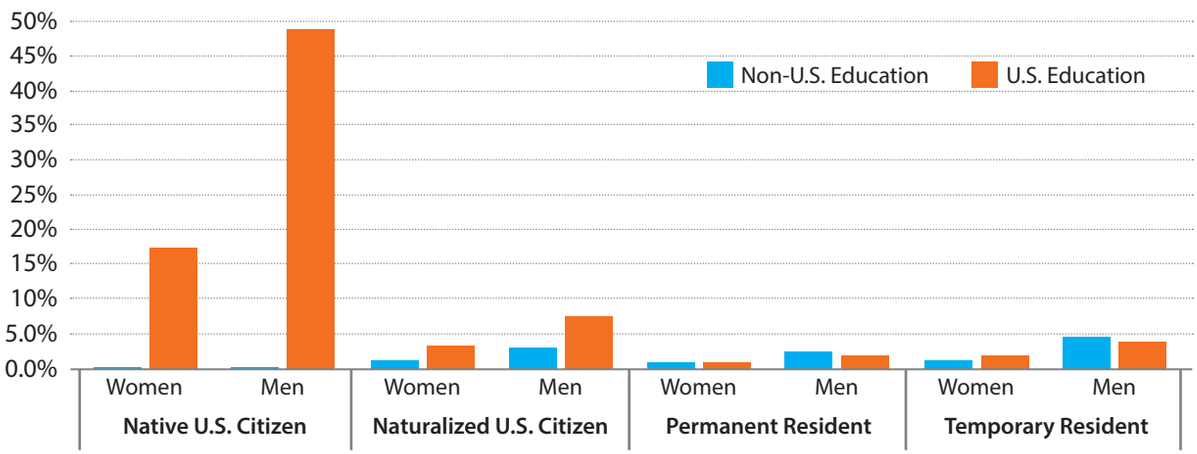
Among those U.S. STEM innovators who have won national awards for their inventions or filed for international triadic patents in information technology, life sciences, material sciences, or for advanced-technology companies:

>1/3 More than one-third (35.5%)... were born outside of the United States.

Source: Nager, A., Hart, D., Ezell, S., & Atkinson, R. (2016). The demographics of innovation in the United States. Information Technology and Innovation Foundation. Retrieved from https://itif.org/publications/2016/02/24/demographics-innovation-united-states.

What does this look like for women?

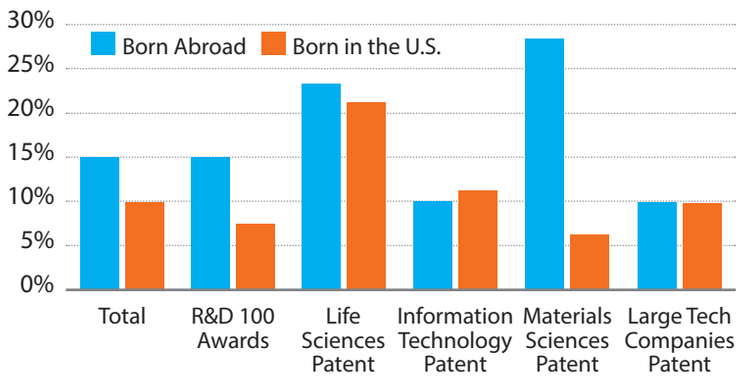
STEM Entrepreneurs* by Citizenship, Gender, and Place of Highest Degree



Source: Metcalf, H. (2017). AWIS original descriptive analysis of 2015 data from the NSF's National Survey of College Graduates.
** Entrepreneurs are those who are self-employed in incorporated or non-incorporated non-educational institutions.*

Women born abroad are about twice as likely to have R&D 100 awards and are almost five times more likely to contribute innovations in materials sciences.

Percentage of Women Among STEM Innovators by Birthplace & Innovation



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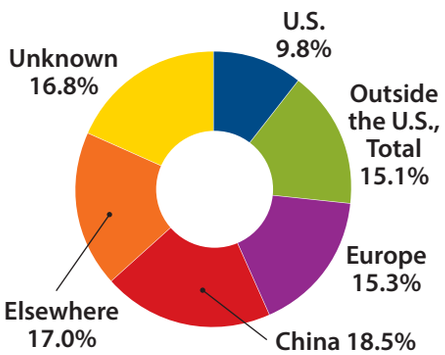
Percentage of Women Among STEM Innovators by Birthplace



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ADVANCE | GSE PROGRAM WORKSHOP

The 2017

NSF ADVANCE / GSE Program Workshop Broadening Participation: *Intersectionality*

AWIS
ASSOCIATION FOR WOMEN IN SCIENCE

will bring together grantees from the NSF ADVANCE and the Research on Gender in Science and Engineering (GSE) communities to discuss the role intersectionality plays in driving systemic change and fostering gender equity in the academy. Researchers, practitioners, evaluators and all ADVANCE and GSE team members will find valuable programming at the workshop.

While the workshop highlights the thought leadership of NSF grantees, it is open to everyone engaged in gender equity research and practice as an opportunity to foster strategic partnerships and collaborations.

Register Today
www.awis.org/ADVANCE/GSEWorkshop

Perspectives on STEM Careers at UC Davis

Three women at different points in their academic careers reflect on their experiences and removing barriers

By Kristin Burns, Writer, UC Davis
AWIS Institutional Partner Since 2012

Rachel Houtz ▲

Doctoral student, Theoretical Particle Physics

Studying for a Ph.D. in theoretical particle physics gives Rachel Houtz plenty of challenges, but feeling isolated as a female in physics was one she struggled with.

A Women in Sciences and Engineering mentoring program helped Houtz overcome that isolation, matching her with a professor and an undergraduate student for bi-weekly meetings through an academic year.

"I got perspective outside of my department and learned about the types of strategic moves I should be following in my career," said Houtz, who will complete her degree in August and head to the University of Madrid for a postdoctoral research position. "At the same time, I was able to pay it back to the community and guide the undergraduate."

Houtz is also active in the student-run Diversity & Inclusion in Physics group, a resource for students to discuss experiences and what they want to see changed within the department.

Seeing a need for more discussion in undergraduate physics, Houtz created the H-Bar activity, where physics students can get homework help over cookies and coffee. H-Bar has been so successful that the physics department added it to the curriculum and gave Houtz a TA-ship to run it.

"Connect, collaborate, do homework together — these will build support networks that you really lean on once you get to more advanced study," said Houtz. "It's really important to be a part of a community when you start to get those feelings of doubt."

Rebecca Calisi ▲

Assistant Professor, Neurobiology, Physiology and Behavior

CAMPOS Faculty Scholar

Rebecca Calisi studies how the environment affects animal behavior. When a faculty position opened two years ago at UC Davis, she said she "jumped at the chance to work among giants."

She also jumped into her duties as a Center for the Advancement of Multicultural Perspectives on Science, or CAMPOS, faculty scholar, helping to promote women and underrepresented minorities in the sciences.

"It's my job not only to serve as role model as a Mexican-American mother in science, but also to push department research groups and the campus community to be more equitable and inclusive," said Calisi.

Working mothers at UC Davis receive a quarter off for maternity leave and "teaching relief" — a quarter of active service with modified duties — within the first year of giving birth. Calisi, who had a son last year, says these are great ways that UC Davis helps support working mothers.

As a culture in general, Calisi feels "we still have a long way to go." She's vocal about how to level the playing field and believes even small changes, like family-friendly parking on campus or covering the cost of shipping breast milk while traveling for work, can make a difference.

"These are simple, low-cost ways that would make life easier and help lessen the issues women deal with that can create barriers to career advancement," said Calisi.

Twenty of the 23 undergraduate students working in her lab are women, and seven of those are Latina. She also employs two Ph.D. students and three postdocs.

Calisi notes that many women and minorities are attracted to her lab for the science and the supportive space. "Graduate school is a particularly pivotal time for women to feel encouraged and supported because they see the field dominated by men," she said. "They begin to feel their voices are not heard as much."

Linda Bisson ▲

Professor and Maynard A. Amerine Endowed Chair, Viticulture and Enology

ADVANCE Associate Director, and Policy and Practices Review Initiative Co-Director

When geneticist Linda Bisson arrived at UC Davis in 1985, she found the collaboration and lack of ego in the Department of Viticulture and Enology unusual. She proudly calls the campus a "jerk-free zone."

"I've never regretted spending my career here," said Bisson. "Davis is a nurturing, supportive place, where women speak and people listen."

In her leadership role with UC Davis ADVANCE, a five-year National Science Foundation grant program to increase the participation and advancement of women in academic science and engineering careers, Bisson figures out how to find and address barriers to inclusion.

ADVANCE is completing a major study of the career paths of Latinas selected for the University of California President's Postdoctoral Fellowship program. The study seeks answers for the high drop-out rate of Latinas from postdoc to faculty positions.

"We don't want to lose that talent pool," said Bisson. "The more diversity we have, the faster and better the outcome to important issues of society."

Implicit bias is a big obstacle for women in STEM, Bisson said. "Society likes to have order and people in certain positions. Something unconsciously seems wrong if a woman is in a position of self-promotion or leadership, instead of a nurturer, and the reverse is true for men." Bisson recalls talking to a Latina scientist who had left academia for industry because she was tired of being mistaken for a janitor.

ADVANCE offers faculty-driven implicit bias training for search committee members through the Strength Through Equity and Diversity program. Bisson would like to develop a training program for students, too.

"Once you're aware of it, you control it. We just need to get people talking about it."

Outcomes of ADVANCE initiatives at UC Davis include:

- **Increases** in **women STEM faculty** from 26.2% to **30.8%** (2012–2015)
- **Increases** in **underrepresented minority women STEM faculty** from 5.9% to **8.2%** (2012–2015)
- **Trained** over **1,000 faculty members** serving on search committees on implicit bias
- **Implemented Diversity Statements** in faculty job applications

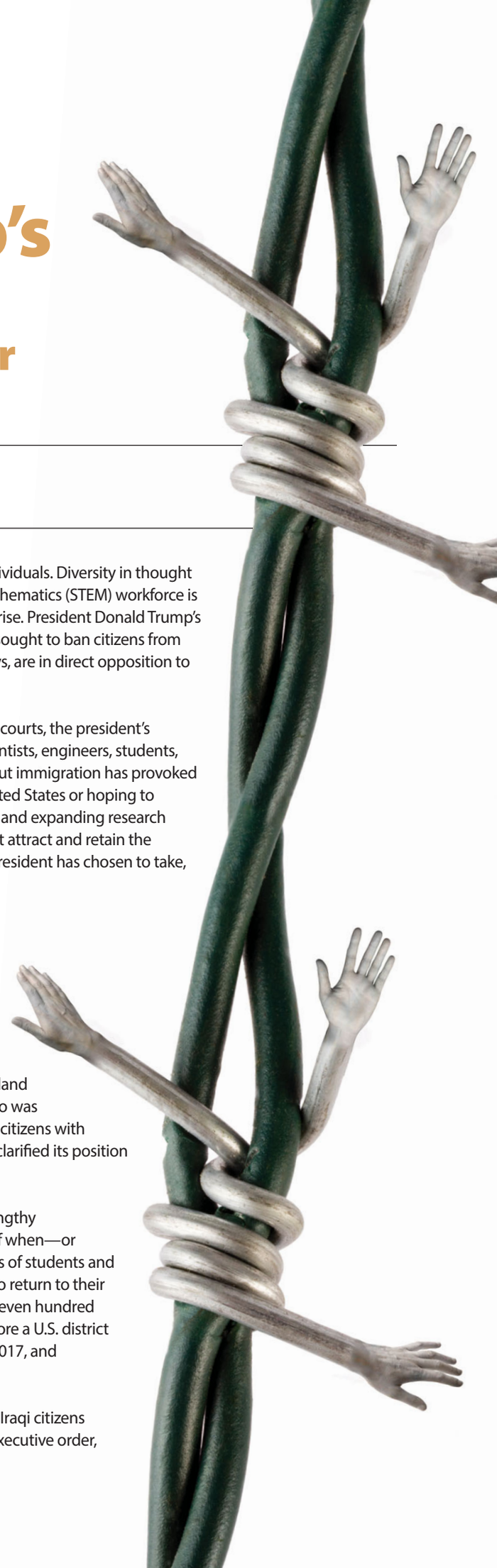
#1 UC Davis is **1** for **women in STEM** (*Forbes*)

Learn more about women in STEM careers at UC Davis: **ucdavis.edu/women-stem**.

The UC Davis ADVANCE Institutional Transformation program is supported by NSF Grant No. HRD 1209325.

President Trump's Travel Bans

Signal a Long-Term Loss for American Science



By Kenneth M. Evans, PhD
Baker Institute for Public Policy, Rice University
AWIS Institutional Partner Since 2014

Scientific research and discovery rely on the free movement of ideas and individuals. Diversity in thought and in the population of the U.S. science, engineering, technology, and mathematics (STEM) workforce is critical to the vitality and leadership of America's scientific and technical enterprise. President Donald Trump's January 27, 2017, executive order and the revision released on March 6, which sought to ban citizens from seven Muslim-majority countries from entering the United States for ninety days, are in direct opposition to these ideals.

While both "travel bans" have been indefinitely blocked by multiple U.S. district courts, the president's executive actions nevertheless uprooted the lives and work of hundreds of scientists, engineers, students, and educators. Beyond the bans, the Trump administration's harsh rhetoric about immigration has provoked fear and uncertainty among foreign-born men and women currently in the United States or hoping to travel here. In order to remain competitive in an increasingly globalized market and expanding research community, the United States needs forward-thinking immigration policies that attract and retain the world's best scientists and engineers. This does not appear to be the path the president has chosen to take, and it bodes ill for the future of U.S. science.

Needless Chaos: The Travel Ban and Its Aftermath

Trump's original executive order, "Protecting the Nation from Foreign Terrorist Entry into the United States," called for a temporary halt to the admission of citizens from Iran, Iraq, Libya, Somalia, Sudan, Syria, and Yemen, a suspension of the U.S. Refugee Admissions Program, and an indefinite freeze on refugees from Syria (Executive Order No. 13769, 2017). Without proper vetting from federal agencies and only vague guidance for its implementation, the order threw airlines, consulates, the Department of Homeland Security, and thousands of active travelers into chaos; it was unclear exactly who was subject to the provisions. Travelers with legal visas, green card holders, and U.S. citizens with dual citizenship were all initially included under the ban until the White House clarified its position over the next several weeks.

In the meantime, families were separated, airline passengers were subject to lengthy detentions, and travelers were stranded in foreign airports with no indication of when—or if—they would be able to enter the United States. There were numerous reports of students and faculty from U.S. universities stuck overseas, unsure if they would ever be able to return to their home institutions (Morello and Reardon, 2017, and Yong, 2017). An estimated seven hundred people were detained, and sixty thousand visas were provisionally revoked before a U.S. district judge issued a temporary restraining order on the ban on February 3 (Kessler, 2017, and Zapotosky, 2017).

Trump's revised travel ban, issued on March 6, allowed current visa holders and Iraqi citizens to enter the United States (Executive Order No. 13780, 2017). Like the original executive order,

At research universities, which draw heavily from international talent, Trump's anti-immigrant rhetoric and early policies will have lasting consequences.

this version came with little warning and sent travelers, lawyers, government agencies, and universities scrambling to prepare for its enforcement. However, another U.S. district judge blocked the primary provisions of the second ban, again ordering a nationwide temporary restraining order hours before it went into effect late on March 15. The judge found that the order was in clear violation of the First Amendment of the U.S. Constitution, stating that it "was issued with a purpose to disfavor a particular religion, in spite of its stated, religiously-neutral purpose."

The temporary restraining order has since been extended to an "indefinite preliminary injunction," as of March 29, which indicates that the order will almost certainly be permanently deemed unlawful, at least in the state-led suits. The Department of Justice has stated that it will continue to appeal the state cases. Most legal scholars agree that the ban will not be completely settled until the U.S. Supreme Court rules on its constitutionality.

Life After the Ban at Universities

At research universities, which draw heavily from international talent, Trump's anti-immigrant rhetoric and early policies will have lasting consequences. The abrupt changes to federal immigration policy led to shock and confusion at U.S. universities, where more than seventeen thousand students and many more post-docs, research staff, and faculty members from the seven initially banned countries rely on visas to study, work, and travel outside the country to conferences and other research opportunities (IIE, 2016). Even if a more permanent ruling lifts the ban in the future, university administrators continue to warn international students and scholars about the risk of travel.

Iranian citizens make up roughly 70% of students in the United States from the seven initially banned countries, with a population of over twelve thousand in 2016. Over 60% of Iranian applicants each year are women (Trines, 2017). There is also a significant population of U.S.-educated Iranian STEM professionals who live and work in the United States. According to one estimate, more than three thousand Iranian students have received PhDs from American universities in the past three years; and between 1974 and 1983, Iran sent more students to study in the United States than any other country in the world. This includes more than fifty thousand Iranian students who entered the United States in 1979 during the Iranian Revolution (Academics Against Immigration Executive Order, 2017 and IIE, 2016).

Travel for Iranian scientists with U.S. visas can already be challenging because the United States does not have diplomatic relations with Iran. Without a U.S. consulate in their home country, Iranian citizens must enter the United States through a third, intermediary country—either Turkey, United Arab Emirates, or

Armenia. Additionally, U.S. work visas granted to Iranian citizens are only "single entry," meaning that travelers must apply for a new visa each time they leave the United States.S., a process that is costly and time-consuming. New visa applications typically cost several thousand dollars and can take months to process. For academic scientists, these barriers to free and convenient travel can be a serious hindrance to their research and early career development.

Adding to the uncertainty, the U.S. Citizenship and Immigration Services announced in March that it will suspend premium (or expedited) processing for H1-B visa applications for up to six months. The H1-B is a temporary visa that allows highly skilled foreign nationals in "specialty occupations," including many STEM fields, to work in the United States for up to six years. It is the primary work visa for recent advanced degree recipients hoping to remain in the United States and apply for permanent residency. H1-B visas are popular among employers because they are much faster to obtain than green cards, which can take many years to process. Almost all major companies request premium processing for H1-B visas to ensure expedited approval for new, foreign national employees; non-premium processing can take up to six months to complete. Without expedited processing, U.S. companies may forego the inconvenience of waiting to secure the best-qualified candidates.

The long-term impact of the bans, and the culture of fear and uncertainty they create, is yet to be determined. However, there are indications that Trump's presidency will continue to drive international talent to other countries and will ultimately hurt the nation's scientific enterprise. International applications to U.S. colleges and universities waned even before the bans, signaling Trump's campaign promises were enough to deter international students from U.S. colleges and universities (Fischer, 2017). In the current application cycle, U.S. engineering programs have already seen sharp drop-offs in applications from international students (Mervis, 2017). A shrinking applicant pool is a troubling trend for U.S. scientific institutions, many of which rely on foreign talent to drive their research labs.

Policy Outlook in Trump Administration

The contributions of first- and second-generation immigrant scientists to the American research community cannot be overstated. Immigrants account for 40% (thirty-one of seventy-eight) of all Nobel Prizes in Physics, Chemistry, and Medicine awarded in the United States since 2000, and over 50% of all U.S. start-ups valued at over $1 billion have at least one immigrant co-founder (Anderson, 2016 and National Foundation for American Policy, 2016). Such successes are a direct result of inclusive policies that provide support for international students and encourage their employment after graduation—for instance, the "L-1 Visa and H-1B Visa Reform Act of 2004" extended the cap for H1-Bs to include twenty thousand additional non-lottery slots for recent graduates with advanced degrees from U.S. universities.

In the rapidly changing global landscape of STEM research and companies, the United States must continue to update its visa policies to help attract and retain the world's brightest scientists and engineers. Trump has regularly called for reforms to the H1-B visa program, and his April 18 Executive Order, "Buy American and Hire American," directed several Cabinet departments to review the program and "suggest reforms to help ensure that H-1B visas are awarded to the most-skilled or highest-paid petition beneficiaries," hinting at a potential reform to the current lottery process (Executive Order No. 13788, 2017).

Any legislative change instituted by Congress after Trump's review process is completed should prioritize a clear, expedited process for U.S.-educated foreign national scientists and engineers to receive permanent residency in the United States after completion of their degree (U.S. Council on Competitiveness, 2016). Additionally, H1-B visas should be made more "portable," to give foreign national employees more flexibility to change jobs (National Research Council, 2001). Finally, a recent regulatory change that allows the spouses of some H1-B visa holders to work in the United States should be extended to include all immediate family members (American Academy for Arts and Sciences, 2014, and USCIS, 2015). Such policy changes would help foster a more welcome environment for international STEM students and professionals of all nationalities, races, and religions.

If the Trump administration continues to develop policies that devalue—and in the case of the travel bans, prevent—the contributions of foreign-born nationals, create barriers for gainful employment by immigrants, and sow uncertainty on the path to citizenship, many young researchers and career scientists will look elsewhere for opportunities. Such policies would reverse decades of progress that foster diversity in thought and in the social makeup of our research base, both of which have long proven to lead to scientific discovery and economic growth.

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Proposed Ban
Potentially Detrimental to Medical Care, Research, and Diversity

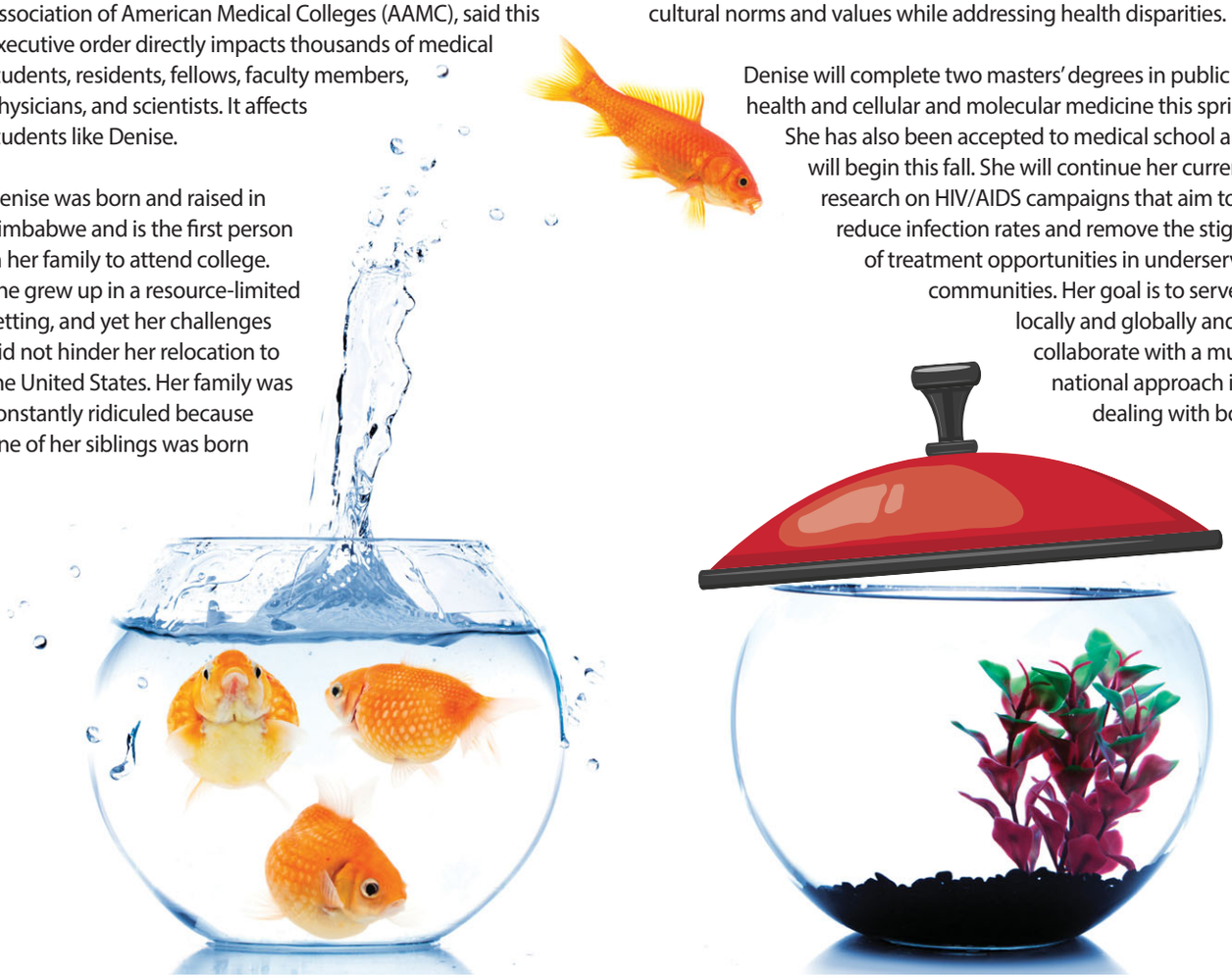
By Tanisha Price-Johnson, PhD
Executive Director of Admissions, College of Medicine, University of Arizona

President Trump's immigration ban is not just keeping out "potential" terrorists—it will also impede the intellectual and cultural exchange in medicine. Limiting travel will halt immigration pathways to medicine and threaten access to high-quality health care for some of our country's most underserved populations.

Border walls, travel bans, and other social fences such as racial anxiety will completely disrupt the social mandate to diversify medicine, as we block opportunities to cultivate global and national medical education. Darrell G. Kirch, M.D., President of the Association of American Medical Colleges (AAMC), said this executive order directly impacts thousands of medical students, residents, fellows, faculty members, physicians, and scientists. It affects students like Denise.

Denise was born and raised in Zimbabwe and is the first person in her family to attend college. She grew up in a resource-limited setting, and yet her challenges did not hinder her relocation to the United States. Her family was constantly ridiculed because one of her siblings was born with a disability. Consequently, she volunteered at a disability and rehabilitation center as a way to understand her brother's disability. Her curiosity allowed her to work as an intern at the National Research Institute in California, where she learned about the devastating effects of parasitic infections made worse by poverty. She explored how providing therapies that take poverty into account, by offering nutrition and health care to underserved populations, can bring about a new form of health literacy. Additionally, her internship exposed her to the importance of working in teams, becoming culturally sensitive, and navigating cultural norms and values while addressing health disparities.

Denise will complete two masters' degrees in public health and cellular and molecular medicine this spring. She has also been accepted to medical school and will begin this fall. She will continue her current research on HIV/AIDS campaigns that aim to reduce infection rates and remove the stigma of treatment opportunities in underserved communities. Her goal is to serve locally and globally and to collaborate with a multinational approach in dealing with both



clinical and public health issues. Denise's story should not be hindered by an immigration ban. Students like her are the answer to shaping the future face of holistic medicine.

Currently, the composition of underrepresented minorities in medicine is only 8.9 percent of the physician workforce. International graduates compose 25 percent of the physician workforce. They are critical to addressing the needs of the current physician shortage. Research shows that diverse physicians contribute to culturally competent care, improve access to health care delivery in underserved populations, and provide an increase in patient-care satisfaction overall. In contrast, the percentage of active underrepresented minority physicians declined between 2010 and 2013, and, despite a national demographic shift to more racial and ethnic diversity, the physician workforce has not kept pace.

Consider these statistics from the U.S. Census Bureau:

- In 2043, minority populations will become the majority in the United States. The non-Hispanic white population will remain the largest single group. By 2060, the minority population is projected to comprise 57 percent of the total population, an increase from 37 percent today.
- By 2060, nearly one in three Americans will be Hispanic (the term used by the U.S. Census), up from one in six today. The Hispanic population will more than double to 12.8 million.
- The percentage of African Americans will increase to 14.7 percent or 61.8 million in 2060.
- The number of international migrants is expected to grow by 41.2 million.

So, why is there is a need for a physician workforce to come from across the world? Without international doctors, medical research will be drastically affected, because medical schools and hospitals rely upon leaders and researchers from every continent. Research also shows that underrepresented minorities are more likely to return to serve their home communities. Additionally, patient affinity increases healthy practices. If patients feel some type of connection with their doctor, they will be more apt to ask questions, follow their doctor's treatment plan, and live a better life. Cultural understanding in health care promotes connection and enhances the field of medicine in general. The United States' patient population is diverse; being culturally competent cannot simply be a course you take in medical school.

The Statue of Liberty has long symbolized freedom and democracy and our commitment, as a nation, to welcoming refugees and immigrants.

Medical students must be a reflection of this country's population—this is where the higher learning provided by diversity takes place. Think about Oscar's story. His parents came to the United States from Mexico, and their first American home was a homeless shelter. His parents worked hard to purchase their first home—a dilapidated trailer surrounded by colorful broken glass. Oscar's mother helped him learn English, and he learned from his parents to be positive, despite the challenges of life. He is now a first-year medical student who plans to work to eliminate the health disparities prevalent in Native American communities. Keeping Trump's immigration ban or building a wall would undeniably limit our access to physicians like Oscar who truly care about their patients, their outcomes, and the impact on diverse communities. This ban cuts through the core of our nation's character.

The Statue of Liberty has long symbolized freedom and democracy and our commitment, as a nation, to welcoming refugees and immigrants. While the benefits of educational diversity in medicine have achieved certain structural milestones, the invisible wall still exists. If upheld, this executive order will disrupt the diverse workforce in medicine. Yes, some people believe the ban is necessary, considering the very real problem of terrorist activities. But, there are more informed ways to fight terrorism. Eliminating opportunities to be educated and freely serve others is not a good idea. If we want to keep our country healthy, educational leaders must carefully consider how this political decision adversely impacts diversity in higher education. Disease, patient care, and medical research have no boundaries—nor should the education of our future physicians and scholars. ✪

Dr. Tanisha Price-Johnson *is Executive Director of Admissions at the University of Arizona's College of Medicine and a Tucson Public Voices Fellow with OpEd Project. Email her at tanishap1@aol.com.*

The Implications of Accepting or Declining an Expatriate Assignment

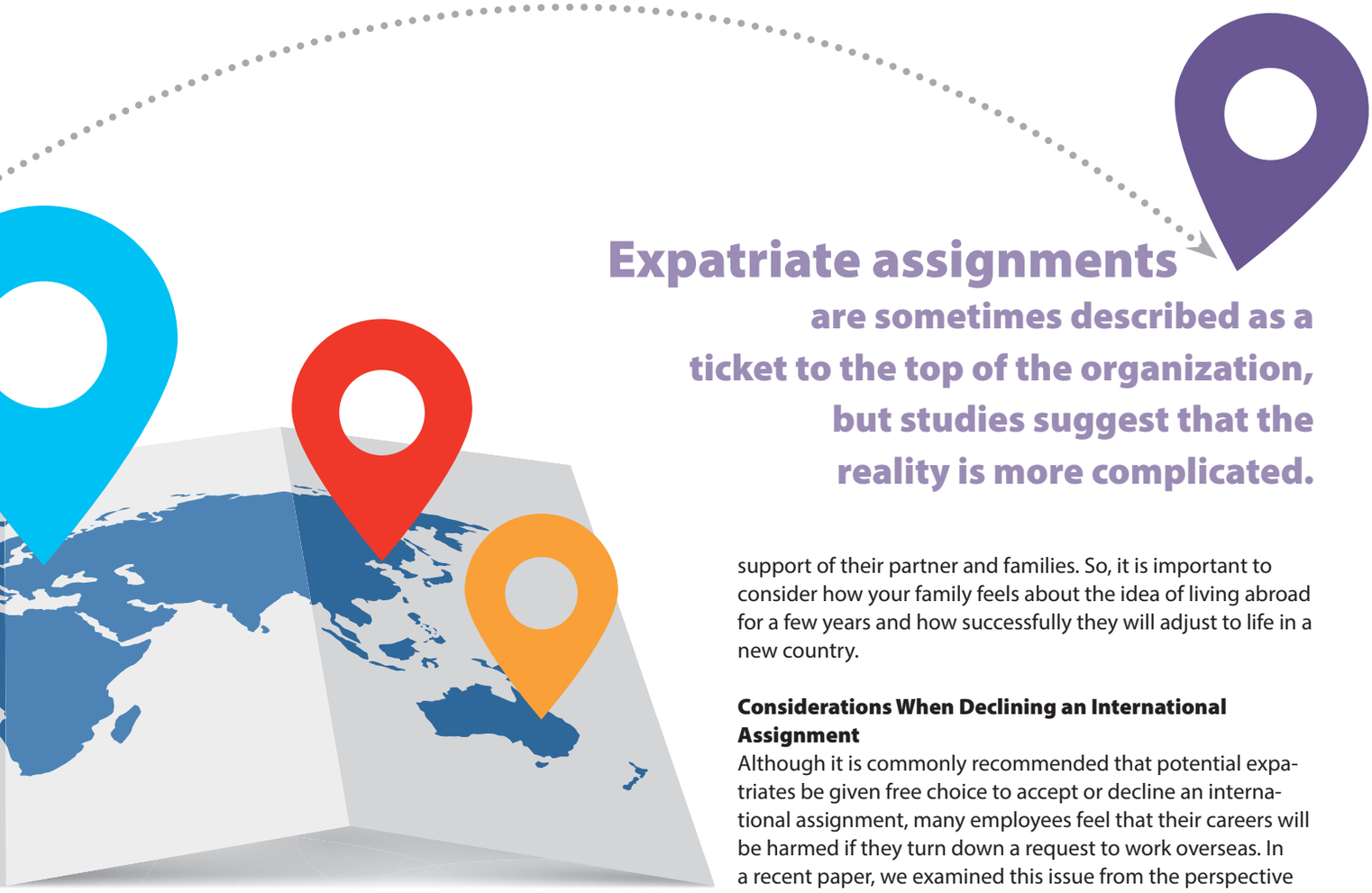
By Mark C. Bolino, PhD, Michael F. Price Chair in International Business, University of Oklahoma
Anthony C. Klotz, PhD, Assistant Professor, College of Business, Oregon State University
William H. Turnley, PhD, Sam and Karen Forrer Chair in Business Ethics, Kansas State University

The globalization of business means that organizations must frequently send their employees on different types of international work assignments. These can range from business travel that lasts only a few days, to short-term assignments that last for several weeks or months, to long-term expatriate assignments of two or more years. Although working internationally for a few days or even a few months is often seen as a nice opportunity to build international experience and see the world, the implications of taking on an expatriate assignment are complicated and can feel overwhelming. On the positive side, an extended stint abroad provides a developmental opportunity that can be critical for climbing the career ladder in many multinational companies; moreover, expatriate assignments can be personally and professionally fulfilling. On the negative side, working as an expatriate is typically challenging for both employees and their families, and returning expatriates (or repatriates) and their families frequently encounter difficulties trying to reintegrate at work and in their communities when they return home. Put simply, the decision to accept or decline an international posting is one that warrants serious consideration. So, if you have been offered an expatriate assignment, should you accept it? Below, we discuss some considerations that professionals should take into account when making the decision to accept or decline an international appointment.

Considerations When Accepting an International Assignment

Expatriate assignments are sometimes described as a ticket to the top of the organization, but studies suggest that the reality is more complicated[1]. Most fundamentally, accepting an international assignment is not going to help your career if it does not go well. So, employees should first ask themselves if they are ready for the demands of a foreign assignment. That is, do you not only have the right knowledge, skills, and abilities to handle the technical aspects of the assignment, but also have the soft skills (e.g., open-mindedness, flexibility, empathy) that are needed to succeed in a new culture? There is sometimes a misperception that women face more discrimination than men while working overseas and that women have more difficulty connecting with locals, but most studies tend to find the opposite—that is, that women expatriates are more effective listeners and are particularly adept at building cooperative relationships with local nationals[2]. Another factor that influences international assignment success is the support and mentoring—both at home and abroad—that expatriates receive. So, anyone considering an extended overseas assignment needs to feel confident that their organization will support them prior to the departure, during their time abroad, and perhaps most critically, when they repatriate back home. For this reason, it can be helpful to talk to other

Expatriate assignments only provide significant career benefits if they help you acquire valuable knowledge and relationships you could not otherwise develop at home.



Expatriate assignments are sometimes described as a ticket to the top of the organization, but studies suggest that the reality is more complicated.

expatriates within your organization—particularly other women—to hear about their experiences and the extent to which they were supported and to learn what they might have done differently. It may also be worth seeking out other female expatriates in the country to which you are moving, to help you through the culture shock that most individuals face when living in a different country.

Further, you should also consider how an international assignment fits into your career development and evaluate what professional opportunities you may miss if you go abroad. Expatriate assignments only provide significant career benefits if they help you acquire valuable knowledge and relationships you could not otherwise develop at home. Therefore, it is important to carefully evaluate the foreign location and what your assignment will entail, what your role will be, and what potential relationships you can build abroad, and then weigh that against the potential opportunities and relationship building that will be missed while you are away. In short, an expat assignment should primarily be viewed as an opportunity to enhance your skills and social capital rather than simply as a means to enhance your résumé. Finally, expatriates are more likely to succeed when they have the support of their partner and families. So, it is important to consider how your family feels about the idea of living abroad for a few years and how successfully they will adjust to life in a new country.

Considerations When Declining an International Assignment

Although it is commonly recommended that potential expatriates be given free choice to accept or decline an international assignment, many employees feel that their careers will be harmed if they turn down a request to work overseas. In a recent paper, we examined this issue from the perspective of the psychological contract—the unwritten agreement between employees and employers about what each expects of the other[3]. The necessity of accepting an international assignment is rarely spelled out in a written contract, but it may be part of the psychological contract. Using this lens, we sought to understand when company leaders are most likely to perceive that employees who turn down an international assignment have breached the psychological contract. Previous studies suggest that organizational leaders react differently depending on why the psychological contract has been broken. Specifically, sometimes breach is intentional, sometimes it is unintentional, and other times breach may stem from managers and employees having different perceptions of what is expected.

While leaders may react negatively if you turn down an international assignment, their reactions may be softened based on any potential mitigating circumstances, such as significant eldercare responsibilities or the unwillingness of your partner or children to relocate internationally. Thus, it is likely to be less damaging to your career to turn down an international assignment when you are perceived to have a compelling reason to do so. Ironically, the misperception that women are less

"Expatriate Assignment" continues on page 56

Featured Member

Hisako Ohtsubo, PhD, is a senior researcher at the Research Institute of Pharmacy

Nihon University in Tokyo, Japan. She began her career as a molecular biologist. Since 2011, Dr. Ohtsubo has been a senior researcher studying the visibility and gender equality of female researchers working in STEM in Japan.

Dr. Hisako Ohtsubo

Senior Researcher at Research Institute of Pharmacy, Nihon University in Tokyo, Japan

1. What does your STEM career pathway look like?
In the 1970s–1980s, after I received my PhD at Kyushu University in Japan, I became a postdoctoral fellow, then research associate professor at Stony Brook University, Long Island, NY. There, I concentrated on the research of transposons, jumping genes in bacteria as well as plants, for nine years. After that, I held posts of lecturer at Institute of Molecular and Cellular Biosciences at The University of Tokyo; visiting professor at the Support Office for Female Researchers in Hokkaido University; and professor at the University Research Center (URC) and director of Female Scientists Support unit at Nihon University (NU). At the same time, I served as chairperson of the Recommendations Committee of Japan Inter-Society Liaison Association Committee for Promoting Equal Participation of Men and Women in Science and Engineering (EPMEWSE), which is the association of more than ninety Japanese academic societies in STEM fields, actively advancing gender equality. www.djrenrakukai.org/en/index.html

In 2011, I moved to Department of Pharmacy, NU. Since then, as a senior researcher, I have been studying on visibility and gender equality of female researchers in STEM in Japan. I also have strong interest in policy-making procedure for advancement of gender equality in Japan.

2. What are the best things about working at your institution?
At present, I really appreciate my colleagues and staff at Department of Pharmacy NU, where I can continue my research on gender equality of female researchers in STEM. In Japan, it is very rare to find scientists like me, who developed her/his career as a molecular biologist, then jumped into gender equality movement in STEM. But, my experience is very important when we collaborate with other researchers who major in sociology, statistics, education, cognition, and so on. Department of Pharmacy helps me, giving such an important platform for our collaboration.

3. What are some of the challenges you face at work?
Last fall (2016), we, EPMEWSE, conducted "The Fourth Large-Scale Survey of Actual Conditions of Gender Equality in STEM in Japan," which has been done every five years since 2003.

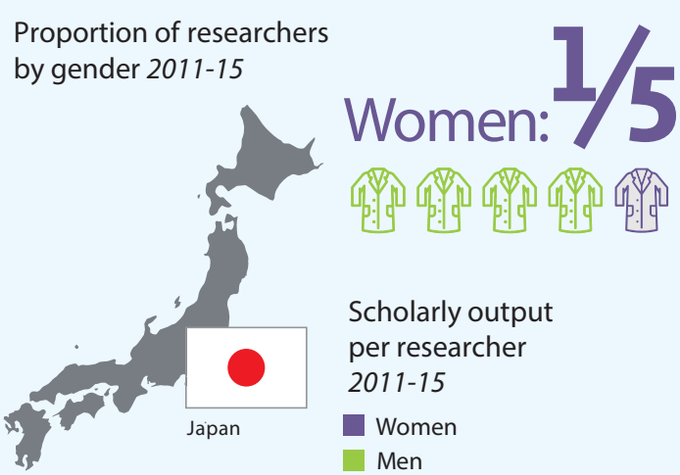
At present, we are in the middle of analysis of the answers from 18.000 respondents. As soon as analysis finishes, we are going to prepare recommendations to Japanese government, in order to improve present situations of the female researchers in STEM.

As you might know, that female ratio of researchers in Japan was only 15.3 percent in March 2016; that is the lowest among the developed countries. We have to improve this situation. It is really challenging work to convince government. We really need reasonable assessments to evaluate the level of gender equality of each university.

I also have plans this summer to give lectures in several Japanese universities, in order to help

In Japan, the number of women in research is relatively low; however their scholarly output tends to be higher than that of the men.

Proportion of researchers by gender *2011-15*



As you might know, that female ratio of researchers in Japan was only 15.3 percent in March 2016; that is the lowest among the developed countries. We have to improve this situation. It is really challenging work to convince government. We really need reasonable assessments to evaluate the level of gender equality of each university.

understand how unconscious bias prevents us female researchers. I have been giving these lectures for more than five years in various universities as well as scientific meetings. Every time, I have to add new information. *AWIS Magazine* is very helpful.

4. Why did you pick Nihon University as your workplace?
The reason is as follows:
There are many excellent female faculty members in NU, who received PhDs under the excellent professors in prestigious national graduate schools. I just wanted to support them, as they can be productive in their science. At the same time, NU offered the chance to me to do research on gender equality of the U.S. Note that we, the U.S. and Japan (as well as any countries), have common problems for advancing gender equality, although you (U.S.) have been leading a lot. The aim of my research at NU is to collect good examples and strategies, which have been developed under the programs like ADVANCE.

5. Is work-life balance important to you?
Yes! Work-life balance is essential to do good research as well as to keep good health. It is also naturally important to raise family. In Japan, it is difficult to have even two children for younger generation of dual-career couples in STEM fields.

The female researchers in STEM have difficulties to maintain their family and career, because of heavy family responsibility to women's side. I believe work-life balance for men's side would take off the heavy load from women's side.

6. Do you feel like you have a decent integration of work-life balance?
Since I am a part-time senior researcher, I can work in flexible schedule, as far as I show productivity in my research. But, for most of the full-time faculty members in Japanese universities, work-life balance is impossible. It takes long hours to fulfill the heavy loads of teaching, doing research, as well as administrative work.

7. How does your experience compare to other faculty members of Japanese universities?
I think I am very unique in my career development compared to other scientists. As I described above, I started my career as a molecular biologist working on transposons. It was really exciting time for me to identify new transposable elements and analyze their structures and functions that made themselves move from one place to another on the host genome. When I came close to my late fifties, I switched my field to gender equality movement in STEM in Japan. No female researchers at that period would take that way.

The reasons why I took that way are as follows:
1. I had been very exhausted to maintain my career and my family, although I had comprehensive colleagues as well as sympathetic family with me.
2. I recognized that change must be needed for us, female researchers, for example, by building strategies for leveling the field between men and women, reasonable assessment to evaluate their productivities, changing the climate of male-dominant and female-recessive, and changing the idea to regard female researchers as under-representatives, and so on.
3. I have been in Stony Brook University for almost nine years, where I saw good examples of affirmative action as well as dual-career support. So, after I came back to Japan, I began to have an idea to establish the similar system in Japan, and I thought this should work well because I saw good examples at Stony Brook. These thoughts brought me to work with EPMEWSE, which had been established in 2002.
4. I had three persons who helped us Japanese female researchers:

Prof. Nancy Hopkins at MIT:
She visited National Institute of Genetics at 2006, where she gave two lectures. One was the talk on zebra fish, and the

"Featured Member: Dr. Ohtsubo" continues on page 55

Featured Member

Janet Hering, PhD, is the director of the Swiss Federal Institute of Aquatic Science & Technology (Eawag), a professor of environmental biogeochemistry at the Swiss Federal Institute of Technology, Zürich (ETHZ) and a professor of environmental chemistry at the Swiss Federal Institute of Technology, Lausanne (EPFL). Dr. Hering's own research interests include the biogeochemical cycling of trace elements in natural waters, water treatment technologies for the removal of inorganic contaminants from drinking water, and knowledge exchange at the interface of science with policy and practice. She has been a member of the faculty of the California Institute of Technology and of the University of California, Los Angeles. Dr. Hering is a past recipient of the U.S. National Science Foundation's Young Investigator Award and Presidential Faculty Fellows Award.

Janet Hering, PhD

Director of the Swiss Federal Institute of Aquatic Science & Technology (Eawag)
Professional Member since 1987

1. What does your STEM career pathway look like?
My career pathway has shifted quite a bit in its focus over time. I began by studying chemistry, but my interests in environmental processes motivated me to do my PhD in chemical oceanography. During my PhD studies, I worked in a department of civil and environmental engineering, and my subsequent faculty positions were mainly in engineering departments. My most recent career shift was from a faculty position to academic leadership as the director of Eawag.

2. What are the best things about working at your institution?
Eawag is a very interesting and exciting place to work because it combines academic research with real-world applications and also maintains a strong link to tertiary education. We benefit greatly from the strong investment in research and education by the Swiss government. This gives us the opportunity to focus on *water research that matters*.

3. What are some of the challenges you face at work?
As the head of an institution, there is always the challenge of having to make hard decisions. The hardest ones always relate to personnel, including decisions about hiring and promotion and tenure. I have to accept that not everyone will always agree with my decisions and that sometimes my decisions may be wrong. Fortunately, I have an outstanding and supportive management team (including both Eawag's directorate and department heads), and we maintain a culture of open communication.

4. Why did you pick Eawag as your workplace?
Although I worked in excellent universities in the U.S., it was only when I moved to Eawag that my own field of water research (specifically water chemistry and water treatment processes) was also a core focus area for my home institution. I find this intellectually stimulating, and it was one of Eawag's main attractions for me. I was also interested in having broader responsibility for charting the direction of an institution that is a leader in water research worldwide. The "multiplier effect" of influencing a world-leading institution offers exciting opportunities, and I greatly enjoy supporting my junior colleagues and contributing to their success.

5. Is work-life balance important to you?
For women in STEM professions, I think that the term "work-life balance" has become counterproductive. For professionals, time is a crucial limiting resource. We need to set priorities strategically and then follow them. We also need to recognize that rest and recovery are absolute necessities for top performance. With these two elements in place, I think that we can focus on enjoying our productivity and accomplishments in all aspects of our lives.

6. Do you feel like you have a decent integration of work-life balance?
I get enormous satisfaction from my work. I am also pleased and proud that I can count many of my professional colleagues (including both former supervisors and students) as close personal friends. I have many opportunities to travel, and I am always learning new things. My interests outside work include reading, cycling, yoga, singing, and hiking in the mountains. And, like most Europeans, I take about five weeks of vacation each year. I am very grateful for the many opportunities that life has afforded me and I don't worry about "work-life balance". ✪

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Talented Women in STEMM

Face Multiple Disadvantages,
Reveals New Report on UK Higher Education

By Amanda Aldercotte, PhD
Researcher, Equality Challenge Unit, University of Cambridge, UK

In 2003, the first Athena Survey of Science, Engineering and Technology (ASSET) revealed that talented women working in science, technology, engineering, medicine and mathematics (STEMM) can become invisible (ASSET, 2003). Female academics were underrepresented in senior positions and more likely to be on fixed-term contracts, while their male colleagues were more visible at key career stages, encouraged to progress their careers, and relatively unaware of the barriers experienced by their female colleagues.

More than a decade later, the picture painted by the ASSET 2016 survey illustrates that little has changed: from recruitment to promotion, female STEMM academics were more likely to perceive, experience or be exposed to some form of disadvantage compared with their male colleagues, and in many cases, these disadvantages manifested differently across other characteristics such as ethnicity, sexual orientation, disability and age (Equality Challenge Unit, 2017).

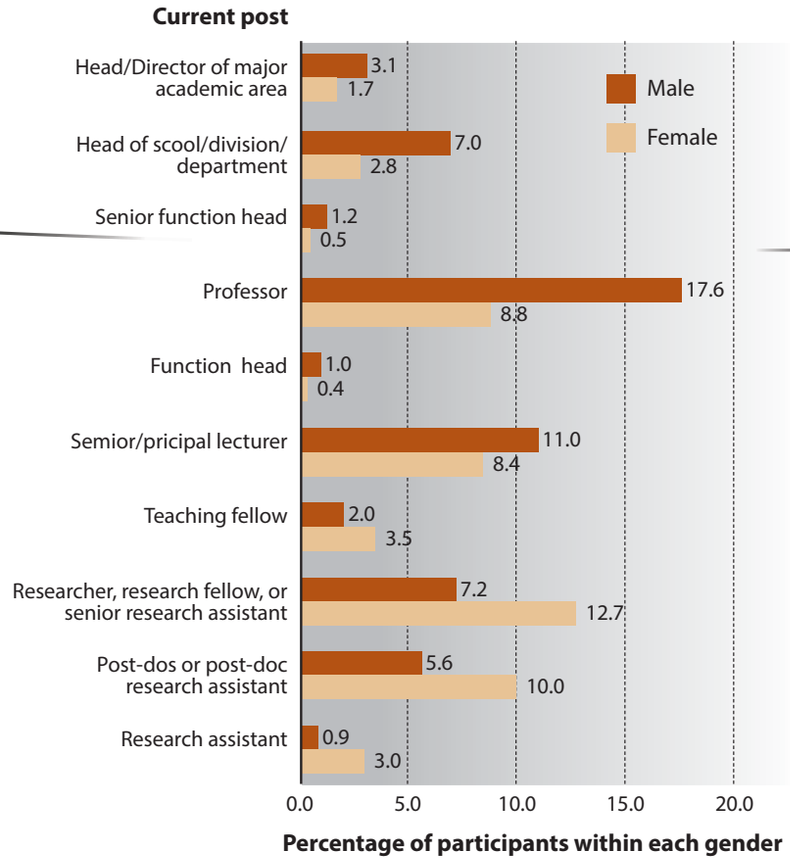
Background to the ASSET 2016 survey

Over several iterations, the ASSET survey has evolved and expanded to address remaining gaps in our understanding of the association between gender and experiences, expectations and perceptions of the workplace among STEMM academics. The ASSET 2016[i] survey included a final (weighted) sample of 4869 STEMM academics (2374 women)[ii] from 43 UK institutions. The survey covered six aspects of academic working life: perceptions of gender equality; recruitment; job and career; caring responsibilities and leave; training and leadership; and promotion and development.

Key gender differences

The overarching theme across the individual sections of the ASSET 2016 survey was that female STEMM academics experienced small but statistically significant disadvantages that were consistent across multiple aspects of their working life.

Figure 1. Gender differences in current posts.

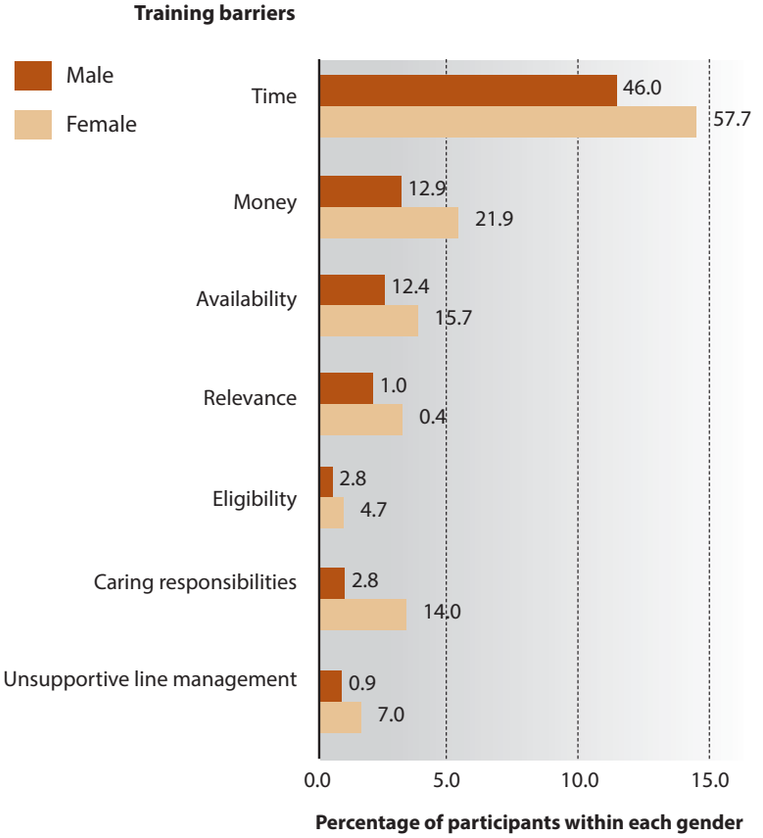


Perceptions of gender equality. Female participants perceived an advantage for men in the allocation of tasks and resources related to professional development (e.g., mentoring, positive feedback, and involvement in promotion decisions) and markers of esteem (e.g., invitations to conferences and recognition of intellectual contributions). Three quarters of female participants (75.7%) thought that it was easier for a man to get a senior post in their department while almost half of the male participants (47.3%) did not perceive an advantage for either gender.

Recruitment. Significantly more men reported that they had been formally promoted to their current post (13.5%) than women (9.1%). Among those who were interviewed for their current post, female participants were more likely to have more women on their interview panels than male participants.

Job and career. Women were underrepresented in senior positions, such as professor and head/director of a major academic area, and overrepresented in early career positions (e.g., teaching or research fellows, research assistants, and post-docs) (Figure 1).

Although both genders felt that the most beneficial factors for academic career progression were those associated with research (e.g., successfully obtaining grants or producing substantial research output), men spent more time on research-related tasks than women. In contrast, women spent significantly more time on teaching and other academic duties (e.g., administrative and pastoral tasks) than men, although both genders felt that these tasks impeded academic career progression.



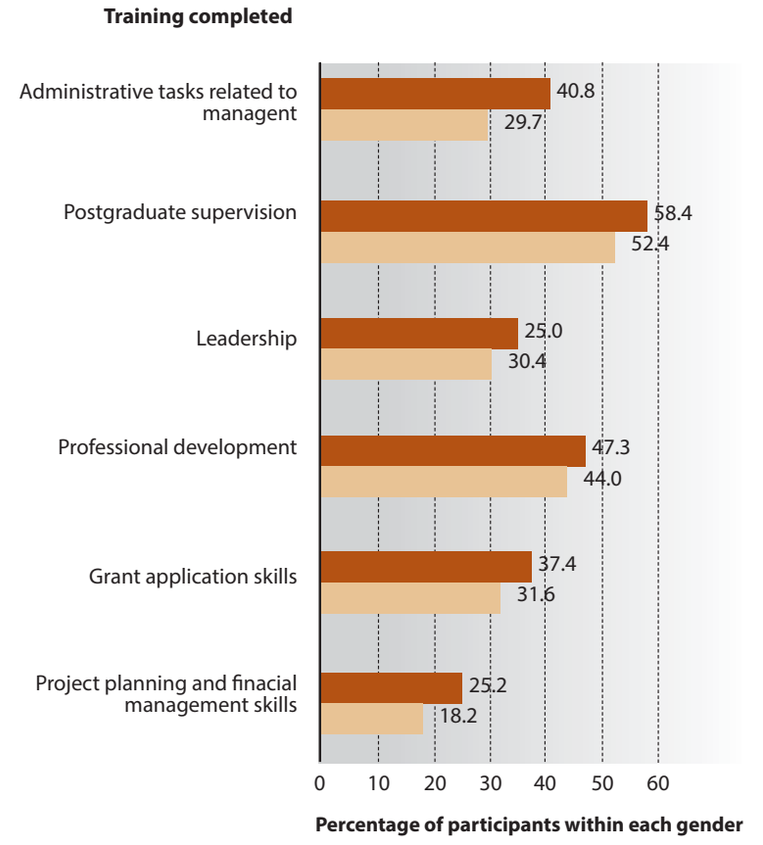


Figure 2. Gender differences in training barriers and experiences

> *"Allocation of teaching activities is disproportionately towards women carrying the burden, but this is [an] advantage for men."*
> *— Female participant, planetary and space science*

Caring responsibilities and leave. Proportionally more women (36.7%) had taken parental leave than men (25.5%). Overall, caring responsibilities took time away from activities that would increase a female academic's visibility. Compared with women who had not previously taken parental leave, women with caring responsibilities were less likely to: (i) be able to relocate for a new post if needed; (ii) feel involved in the social life of their department; and (iii) have their work successes celebrated in their department. Additionally, 14.0% of women had not obtained training that they wanted because of caring responsibilities, compared with only 4.4% of men.

Not surprisingly, women rated the impact of taking parental leave on their own career progression more negatively than men. However, women who had access to options such as keeping-in-touch days or flexible working hours upon return from leave were less likely to feel unprepared for the transition back to work and, in turn, less negative about the impact of caring responsibilities on their own career progression.

Training and leadership. Compared with men, proportionally more women reported that contextual barriers, such as those related to time, money, availability, relevance, eligibility, and unsupportive line management had prevented them from accessing training that they needed or wanted in the last 12 months (Figure 1).

These discrepancies in training barriers were accompanied by similar gaps in participants' training experiences: significantly fewer women had received training in a number of areas that are integral for developing skills as a researcher and obtaining senior posts (Figure 2).

Promotion and development. Significantly more men were explicitly encouraged or invited to apply for promotion (59.7%) than women (48.8%).

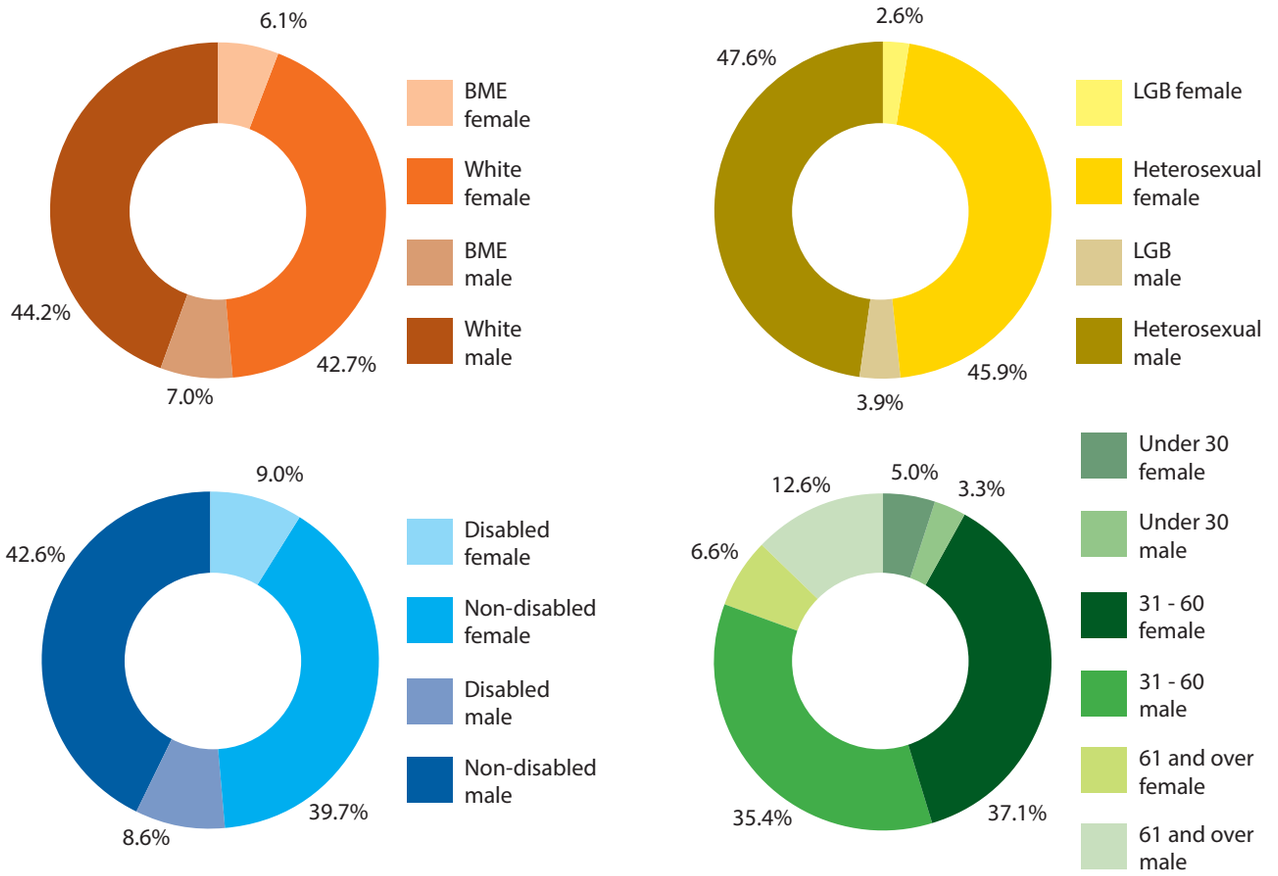


Figure 3. ASSET 2016 sample characteristics

Compared with female participants, male participants were also more likely to enjoy:
- a formally assigned mentor
- the opportunity to serve on important departmental committees
- feeling that their department valued their research
- feeling that they had sufficient administrative experience
- access to senior departmental staff
- having a supportive line manager

These differences between men and women's experiences may explain why significantly more women said that they would like to remain in STEMM-related professions but leave higher education (7.4%), compared with the proportion of men reporting this intention (5.4%).

Compounded disadvantage: Belonging to more than one underrepresented group

ASSET 2016 included a novel discussion of how gender differences intersect with other characteristics, including ethnicity, sexual orientation, disability and age.

Of the 4869 participants:
- 639 identified as black or minority ethnic (BME)[iii]
- 305 identified as lesbian, gay or bisexual (LGB)[iv]
- 862 participants disclosed a disability[v]
- 401 participants were under 30 years old, 3496 participants were between 31 and 60 years old, and 925 participants were over 61 years old

This investigation of participant groups revealed an intriguing pattern for each intersection.

1) *BME women are exposed to compounded disadvantage.* A distinct series of reported disadvantages for BME women were identified across the six aspects of working life. Specifically, BME women:
- were the least likely to feel that their department was committed to equality issues
- perceived even greater advantages for men in the allocation of tasks related to professional development and markers of esteem than those reported by white women
- were the least likely to be in a senior post compared with BME men, white men and white women
- felt the least supported by their department
- were less likely to report having access to keeping-in-touch days and flexible working options compared with white women
- were the least likely to report having been formally invited or encouraged to apply for promotion or undertake activities that would develop their careers

- were more likely to declare experiencing an unsupportive line manager, reduced access to senior staff, and appraisals that were not valuable

2) *The perceived advantages for men are conditional*. The comparison between men who identified as LGB and men identifying as heterosexual revealed a clear pattern: many of the benefits or advantages associated with being a man were limited to men who identified as heterosexual.

Compared with men identifying as heterosexual, men identifying as LGB were:
- less likely to be in senior posts
- less able to relocate and less involved in their department's social life after parental leave
- more likely to report that they had not been able to access training opportunities that they needed or wanted because of their sexual orientation
- less likely to be encouraged or invited to apply for promotion

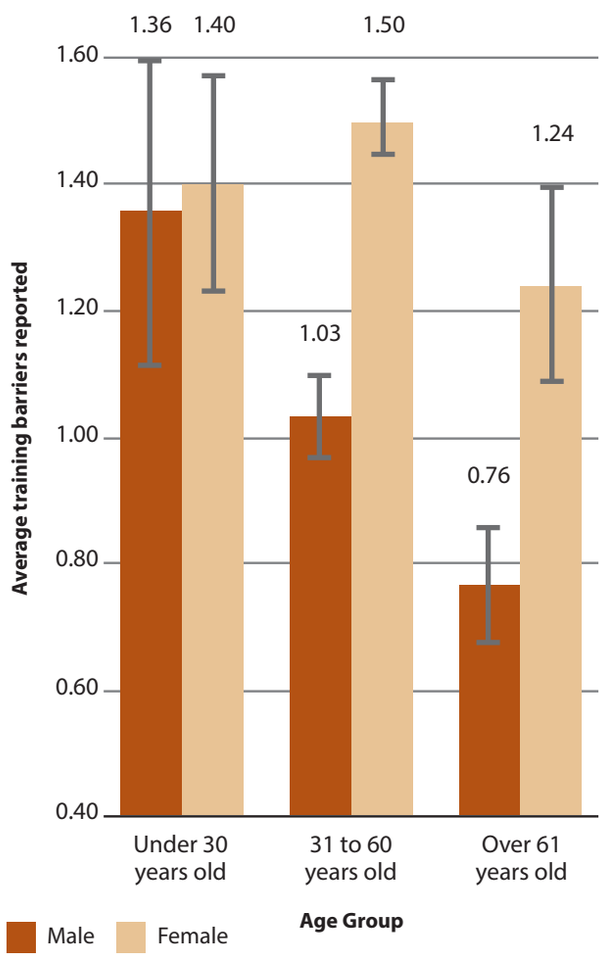


Figure 4. Total training barriers experienced decreased with age for men but not women.
Note: Error bars represent 95% confidence intervals

- less likely to have a formally assigned mentor or a supportive line manager

Participants' comments suggested that the advantages for men may be tied to stereotypically masculine traits (e.g., the confidence to put oneself forward for promotion, highlight one's strengths, and take ownership over one's work) rather than being a man per se.

3) *Disability is uniformly associated with disadvantage*. Regardless of gender, compared with participants who had not disclosed a disability, participants who disclosed a disability:
- felt that their department was less committed to equality
- were less likely to have obtained their current post through formal nomination or invitation
- earned a lower salary on average
- spent more time on teaching
- felt that their department was not transparent or fair in the allocation of resources
- were less likely to have had leadership and grant application skills training
- reported more barriers to training in the last 12 months
- were less likely to be encouraged or invited to apply for promotion and less likely to receive support for career development from their department

These experiences were paralleled in their aspirations for their future career: participants who disclosed a disability were twice as likely as participants who had not disclosed a disability to indicate that they did not want to continue their career in STEMM (6.7% and 3.3%, respectively).

4) *Gender gaps widen with age*. Many of the gender differences in working life were age-dependent. For instance, men and women under the age of 30 did not differ in:
- the type of contract they held (e.g., fixed-term versus permanent, part- versus full-time)
- how much they felt their department was committed to equality
- their ratings of their department's fairness and transparency
- how much they wanted to obtain a post in senior management in their institution
- whether they would like to continue their career in STEMM and higher education

In contrast, although women rated the allocation of tasks related to professional development as biased towards men in all three age groups, female participants who were older than the average academic reported the strongest bias towards men of all participants. Additionally, the total number of training barriers experienced by participants decreased across the age groups for men but not for women (Figure 4). However, it is unclear whether this pattern of wider gaps across age groups is related to other factors such as caring responsibilities or a reflection of cultural change.

How can institutions address these differences between men and women's experiences?

- ❏ Ensure academic contracts accommodate flexible working policies such as having core hours for meetings to be scheduled in
- ❏ Establish workload allocation models that balance teaching and administrative duties
- ❏ Have options like keeping-in-touch days and flexible hours to help staff return from parental leave
- ❏ Establish a set budget for training programs
- ❏ Ensure all staff have opportunities to engage with senior departmental staff and important departmental committees
- ❏ Create mentorship or sponsorship programs to increase visibility of early career academics
- ❏ Expand promotion criteria to include performance in other academic areas (e.g., teaching, pastoral and administrative duties)

Figure 5. Recommendations based on the results of the ASSET 2016 survey.

Conclusion

The experiences and perceptions of women in STEMM differ from those of their male colleagues' in many subtle, but consistent ways. There are a number of policies that institutions can adopt to address these discrepancies in order to promote a more balanced experience of academic working life (Figure 5). ✪

Amanda Aldercotte, PhD, *is a Researcher at Equality Challenge Unit (ECU). ECU is a London-based charity that works to further and support equality and diversity for staff and students in higher and further education in the UK. Amanda works on the development, analysis and delivery of ECU's research initiatives with a particular interest in exploring how gender and other protected characteristics such as ethnicity and sexual orientation interact with socioeconomic barriers to higher education. She completed her PhD in Psychology at the University of Cambridge in 2016 and her background is in developmental psychology, education, and quantitative statistics.*

Equality Challenge Unit, http://www.ecu.ac.uk/

ECU provides higher education institutions with a central source of expertise, research, advice and leadership. They support universities and colleges to build an inclusive culture that values the benefits of diversity, to remove barriers to progression and success for all staff and students, and to challenge and change unfair practices that disadvantage individuals or groups.

References

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Equality Challenge Unit (2017). ASSET 2016: experiences surrounding gender equality in STEMM academia and the intersections with ethnicity, sexual orientation, disability and age. www.ecu.ac.uk/publications/asset-2016

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[i] The Royal Society, the Royal Academy of Engineering, the Royal Society of Biology and the Academy of Medical Science commissioned Equality Challenge Unit (ECU) to design and implement the 2016 version of the ASSET survey.

[ii] The results of the ASSET 2016 survey are discussed in terms of being between male and female participants or between men and women. ECU appreciates that the gender-based labels of man or woman are not synonymous with the labels of male and female disclosed in the survey, and realizes the limitations of adopting a binary approach to exploring gender differences. However, the number of participants identifying under another gender identity (n = 30) was insufficient for conducting meaningful comparisons.

[iii] Ethnicities classified as BME included black (African, Caribbean, British or other), Asian (Indian, Pakistani, Bangladeshi, British or other), Chinese, or mixed. While this definition of BME status is widely recognised and used to identify patterns of marginalisation and segregation caused by attitudes towards an individual's ethnicity, ECU recognises its limitations, particularly the mistaken assumption that minority ethnic individuals are a homogeneous group.

[iv] The term 'LGB' was adopted in place of the more broadly used 'LGBTQ+' because the ASSET survey did not explicitly include 'queer', 'trans' or 'intersex' as response options in this item.

[v] Disabilities listed in the ASSET 2016 survey included the following impairments: learning difficulties, social/communication impairments, long standing illnesses, mental health conditions, physical impairments or mobility issues, deafness or blindness.

Gender Balance in Research:
New Analytical Report Reveals Uneven Progress

By Sacha Boucherie
Senior Communications Manager, Elsevier
AWIS Corporate Partner Since 2008

There is widespread agreement that fostering diversity is integral to innovation in research, and gender equality is key to achieving this. Critical issues related to gender disparity and bias must be examined by data—and it is then with the help of these empirical insights that governments, funders, and institutions can accurately be informed as they set their agenda around gender issues.

Launched in March of this year, a new report produced by Elsevier, the information analytics company specializing in science and health, does just that: it provides unprecedented empirical insight into the structure of the gender divide within the global research enterprise.

Drawing upon data from it's Scopus database, analytical expertise, and a unique gender disambiguation methodology, *Gender in the Global Research Landscape*, measures research performance and gender representation over twenty years, across twelve geographies, and twenty-seven disciplines.

> **Elsevier's Scopus database**
> *Scopus is the largest abstract and citation database of peer-reviewed literature. It covers 62 million records published in more than 21,500 academic journals, book series, and conference proceedings across all major research fields of science, technology, medicine, social sciences, and arts and humanities.*

Methodology: providing some context
The study analyzes Scopus data across two inclusive five-year time periods: 1996 to 2000 and 2011 to 2015; to accurately disambiguate the data by gender, Scopus Author Profiles were combined with gender-name data from social media, applied onomastics, and Wikipedia.

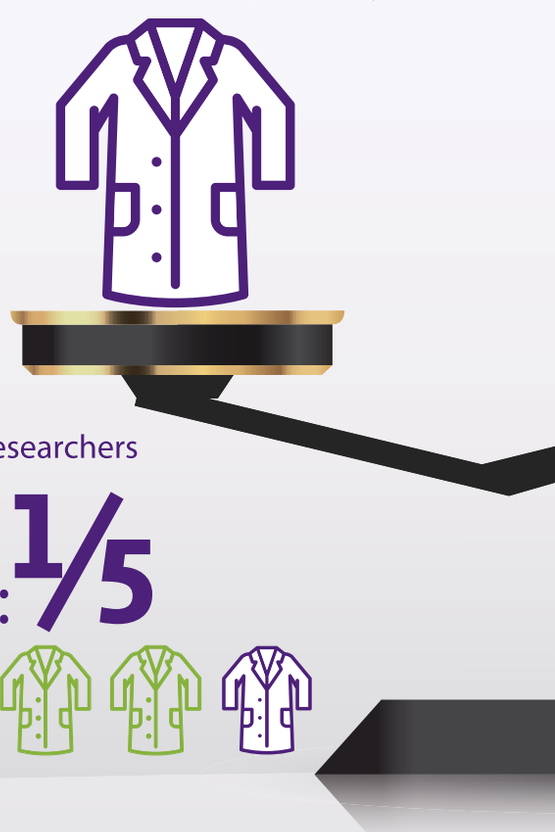
The twelve geographies (further referred to as comparators) studied are: Australia, Brazil, Canada, Chile, France, Denmark, European Union, Japan, Mexico, Portugal, the United Kingdom, and the United States. They were selected based on their representation of the major global geographies, having a high total scholarly output and allowing application of the gender disambiguation methodology.

The report is divided into three chapters: the first provides an overview of comparators' research output and impact by gender; the second focuses on a gender comparison of the social aspects of research, including leadership, collaboration, and mobility; the third offers a snapshot of gender research as a discipline.

Finally, throughout the chapters, interviews with experts are included, supplementing the objective findings with stakeholders' perspectives for context.

Main findings
Overall the report stipulates an increase in the proportion of women researchers across the years studied. However, it also notes that this progress has been incremental and—at best—uneven.

In both Brazil and Portugal, for instance, the proportion of women was 49 percent from 2011 to 2015 (up from 38 and 41 percent, respectively, from 1996 to 2000). In Japan, although



the proportion of women improved over the time periods, it was still just 20 percent from 2011 to 2015. The country with the largest percentage point increase in proportion of women researchers between the two time frames was Denmark (moving from 29 percent to 41 percent).

On average, women have a lower scholarly output than men but perform similarly on research impact measures. In eleven of the twelve comparators (all but Japan), men published more papers on average. However looking at the impact of their research, normalized for subject area to produce a field-weighted citation impact (FWCI), there is no significant difference between men and women. Although men tend to have a slightly higher FWCI overall, women's FWCI is higher in the United States, as well as in the United Kingdom and the European Union.

Findings also showed areas where improvements are needed to approach equality. For example, the share of women researchers differs across fields: health and life sciences have the highest representation of women, while in physical sciences, fewer than 25 percent of researchers are women.

On the topic of collaboration, women researchers are generally less likely than men to collaborate internationally, and less likely than men to collaborate across academic and corporate sectors. Women researchers tend to be less geographically mobile than their male counterparts, although in Japan a relative high number of women researchers were found to leave the country.

Indicated by the number of patent applications they submit women researchers constitute a small proportion of inventors. For some comparators however, the gap is starting to close. In Portugal, for example, women now make up 30 percent of inventors (compared with 14 percent in 1996–2000), while in Mexico they've increased from 7 percent to 21 percent.

The analysis on gender-related research as a subject area found that overall the field is growing quickly— faster than the overall growth rate for all scholarly research. It is also becoming less concentrated in the United States (50 percent of papers from 1996 to 2000) and more equitably split between the United States (34 percent of papers from 2011 to 2015) and the European Union (35 percent from 2011 to 2015).

PROPORTION OF WOMEN AND MEN (AMONG NAMED GENDERED AUTHOR PROFILES)

		Women	Men		
EU28	1996-2000	343,946	732,359	32%	68%
	2011-2015	965,025	1,389,772	41%	59%
United States	1996-2000	310,666	696,947	31%	69%
	2011-2015	705,579	1,071,606	40%	60%
United Kingdom	1996-2000	68,912	154,175	31%	69%
	2011-2015	166,481	253,257	40%	60%
Canada	1996-2000	36,539	77,569	32%	68%
	2011-2015	99,055	137,259	42%	58%
Australia	1996-2000	22,632	45,665	33%	67%
	2011-2015	75,600	97,908	44%	56%
France	1996-2000	58,396	114,205	34%	66%
	2011-2015	121,948	185,350	40%	60%
Brazil	1996-2000	18,171	29,620	38%	62%
	2011-2015	153,967	158,873	49%	51%
Japan	1996-2000	49,173	273,604	38%	62%
	2011-2015	105,384	411,394	49%	51%
Denmark	1996-2000	7,089	16,984	29%	71%
	2011-2015	21,240	30,813	41%	59%
Portugal	1996-2000	5,134	7,409	41%	59%
	2011-2015	27,561	28,935	49%	51%
Mexico	1996-2000	8,072	15,792	34%	66%
	2011-2015	34,410	55,042	38%	62%
Chile	1996-2000	3,021	6,024	33%	67%
	2011-2015	13,377	22,099	38%	62%

Gender in the Global Research Landscape

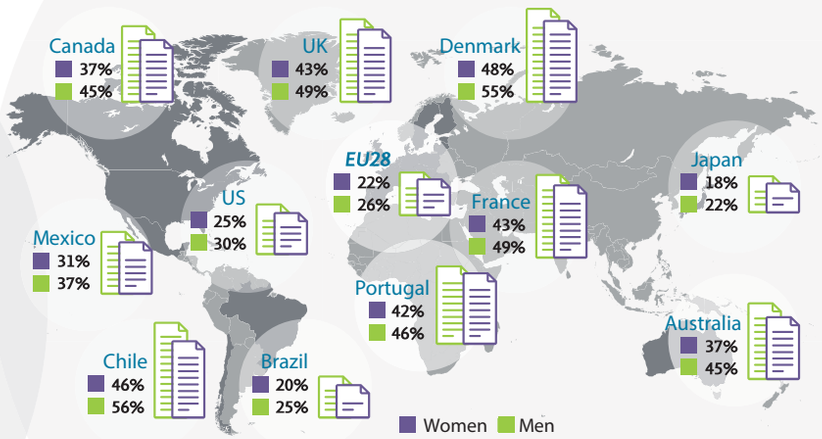
Elsevier's comprehensive report on research performance through a gender lens, Gender in the Global Research Landscape, spans 20 years, 12 geographies, and 27 disciplines. This global study draws upon data and analytics, a unique gender disambiguation methodology, and involvement of global experts. Illustrated below are some of the report's key findings.

NEW METHOD & RESEARCH BY ELSEVIER

>40% Women

Comparator countries and regions analyzed where women comprise more than 40% of researchers.

1996-00	*2011-15*		
Portugal	US	EU28	UK
	Canada	Australia	France
	Brazil	Denmark	Portugal



Proportion of scholarly output resulting from international collaboration
2011-15

Among researchers in the selected comparator countries or regions, women are slightly less likely to collaborate internationally on research papers.

There is incremental progress towards gender balance in research

Between 1996-2000 and 2011-2015, the proportion of women among researchers increases in all 12 comparator countries and regions.

The share of women among researchers differs across fields of research: Health and Life Sciences fields are found to have the highest representation of women.

Women's scholarly output includes a slightly larger proportion of highly interdisciplinary research than men's.

Women are slightly less likely than men to collaborate across academic and corporate sectors on papers.

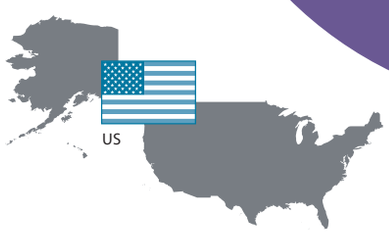
Among researchers, women are generally less internationally mobile than men.

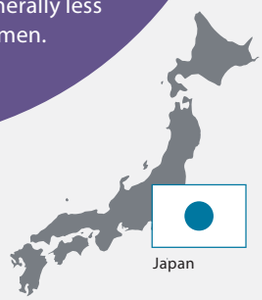
In Japan, the number of women in research is relatively low; however their scholarly output tends to be higher than that of the men.

Proportion of researchers by gender
2011-15

Women: 1/5

Although women tend to publish fewer research articles than men, their articles are downloaded and cited at similar rates, and at slightly higher rates in the US.





Scholarly output per researcher
2011-15

Field-Weighted* Download Impact in the US by gender
2011-15

1.12
1.08

Field-Weighted* Citation Impact in the US by gender
2011-15

1.57
1.52

Women Men

* Field-Weighted Impact indicators normalize the data to account for different download and citation rates and practices across articles' fields, types, and ages.

ELSEVIER

Drawing on the literature and interviews with experts, the report provides some possible explanations for continuing inequalities. Aside from persistent biases in hiring, authorship, recognition, and promotion, it describes a "Matilda effect," in which women authors are associated with a lower perceived quality of publication and interest in collaboration compared to men. Generally, women are more likely than men to have a non-linear career path and to leave the academic track because of personal factors, such as maternity.

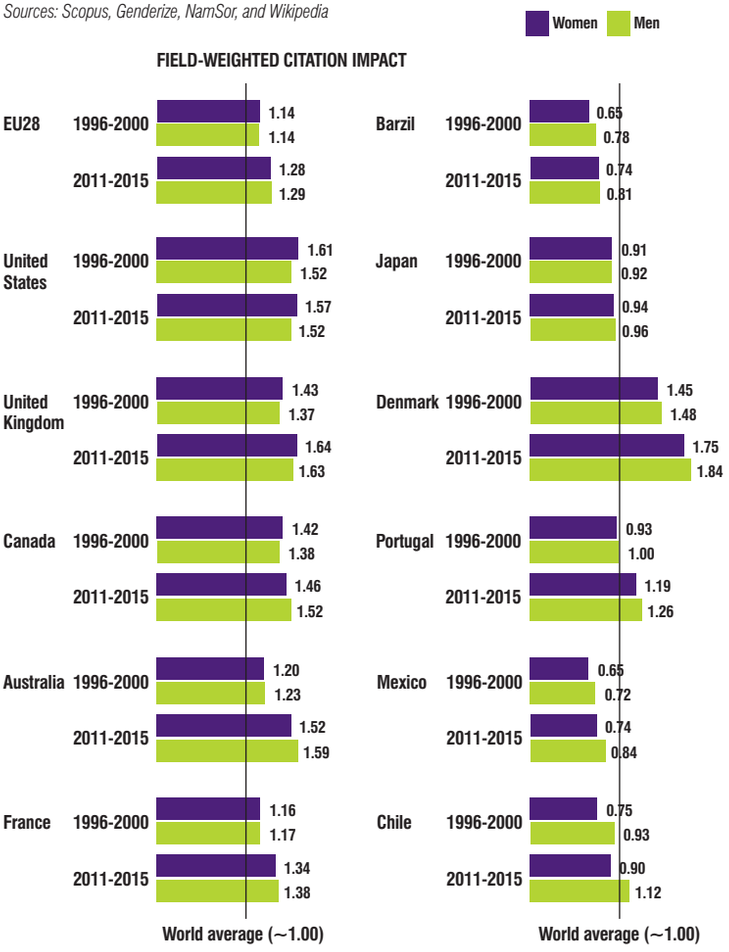
As a next step, it will be incumbent on all of us—men, women, researchers, and other professionals—to continue talking among ourselves about these and other underlying reasons that can help explain the gender disparity in the areas within the research arena that still exist. Discussed by experts and covered by media worldwide, *Gender in the Global Research Landscape* has given us a great starting point—and evidence base to feed those discussions.

For a copy of the report contact: newsroom@elsevier.com or visit Elsevier's Gender & Science Resource Center: www.elsevier.com/connect/gender-and-science-resource-center

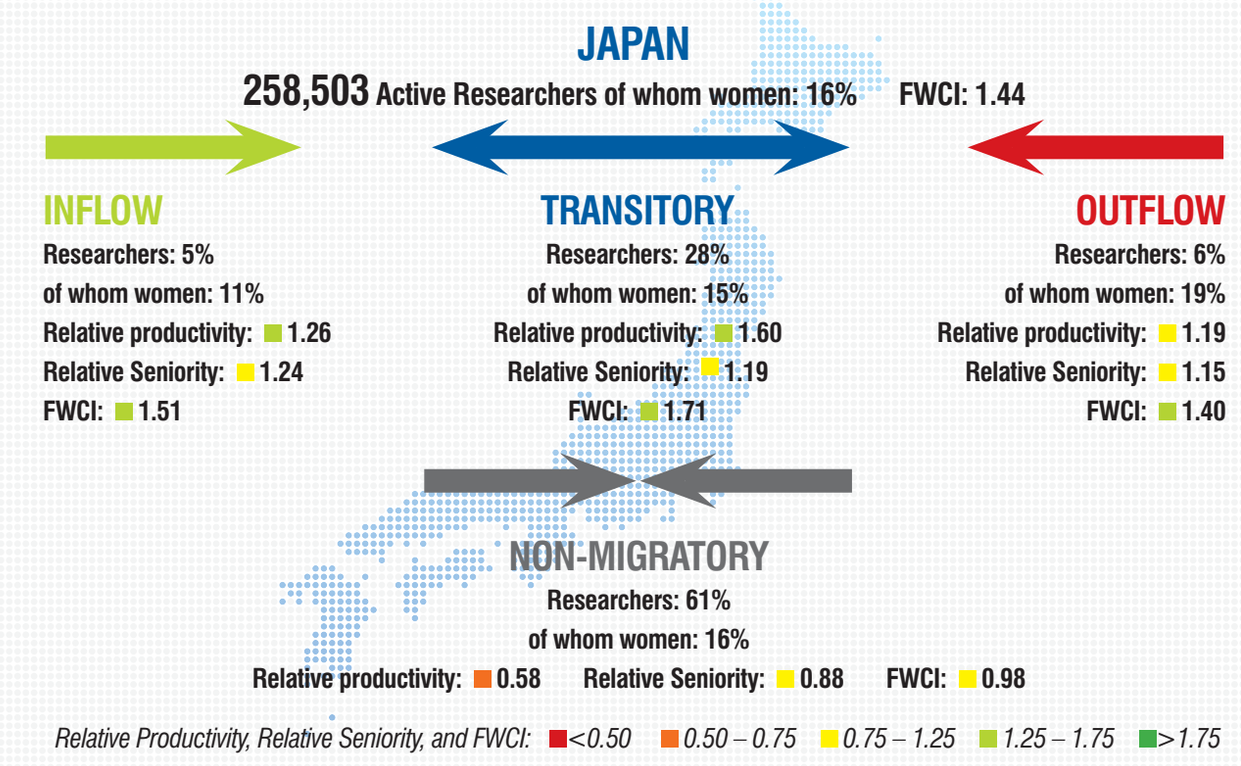
Sacha Boucherie *is a senior communications manager working in Elsevier's Global Communications department. She is responsible for media relations and communications around Elsevier's Research Intelligence portfolio of technology and analytics solutions. Sacha received her MSc in social phycology from the University of Groningen, the Netherlands, in 2008.*

FIELD-WEIGHTED CITATION IMPACT BY GENDER FOR EACH COMPARATOR, 1996-2000 VS. 2011-2015

Sources: Scopus, Genderize, NamSor, and Wikipedia



INTERNATIONAL MOBILITY OF RESEARCHERS FOR JAPAN, 1996–2015



Women in International Research Collaborations: The Role of Professional Associations

By Kathrin Zippel, PhD
Associate Professor of Sociology, Northeastern University

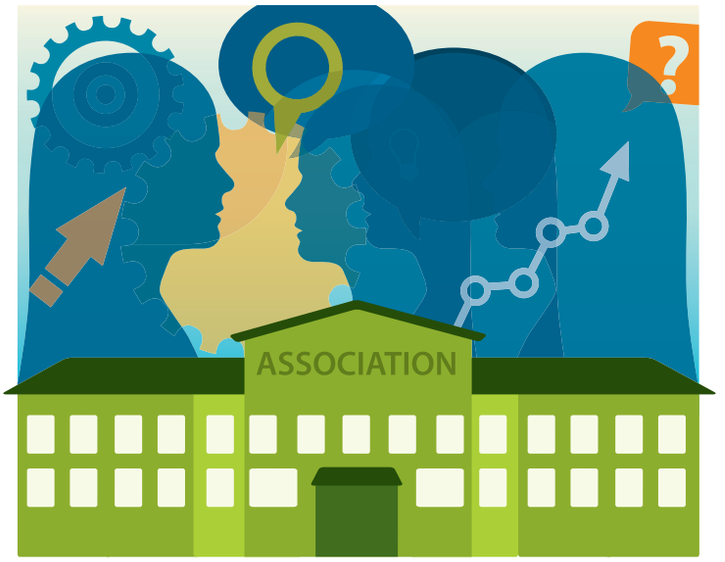
As scientific and engineering research becomes increasingly global, international collaboration is paying dividends for institutions and individual academic careers alike. However, as these benefits have emerged, so has a gender gap: women researchers have less access to international research collaborations, coauthor less frequently with international partners, and have less international mobility (Elsevier 2017, Frehill and Zippel 2011). Though this gender gap has important ramifications, it has drawn insufficient attention until now. In this article, I outline the rewards and obstacles to international collaboration, in particular for women. I then propose a set of strategies for professional associations that seek to promote a more inclusive global world of science and to encourage and support individual women in engaging globally.

Benefits of International Research Collaboration

International collaborations benefit academics, and women academics in particular, in several ways. Academics who observe transnational phenomena, such as geologists or climate change researchers, must go abroad. In other STEM fields, large-scale collaborations, such as the particle physics work at CERN in Geneva or the international teams studying the human genome, have become essential. Even in academic fields where international collaborations are less important, international funding sources can be important resources. Not surprisingly, then, one third of published articles of U.S. scientists and engineers are coauthored with partners abroad (NSB 2016), and internationally coauthored articles (Adams 2013) tend to be placed in higher-impact journals and to receive more citations (Tahamantan et al. 2016).

Obstacles to International Research Collaboration

Though their benefits are clear, international research collaborations can be complicated and resource intensive. Researchers must find suitable partners, adequate funding, and the time to initiate, build, and maintain collaborative



When professional associations promote inclusive internationalization in order to build an inclusive world of global science, they benefit science, academia, and women in the United States and globally.

relationships. Participants need the time and money to travel to international conferences, visit partners' laboratories or research institutions, send their students or postdocs to their partners, not to mention the bureaucratic know-how to navigate institutional, governmental, and international rules and regulations. Inviting collaborators to the United States entails figuring out visas and health care requirements, finding suitable work spaces and housing for guests, and adding collaboration to one's regular list of teaching, research, and service obligations. While universities, funding agencies, and government institutions can provide valuable support for collaboration, their policies, practices, and values often create further obstacles.

A New Frontier for Women

In my recent book *Women in Global Science*, I argue that global science is the new frontier for women. The globalization of scientific work brings challenges and opportunities for all U.S. academics, but especially for women faculty. Historically, women scholars have benefited from educational and research opportunities abroad, often getting their foot in the door of elite academia by studying and earning degrees abroad. Today, international collaboration still offers crucial opportunities to step outside of exclusionary networks at home.

Women trained in the United States and affiliated with U.S. institutions also benefit from what I call the .edu bonus. Named after U.S. academic email and website addresses that end in .edu, the .edu bonus is based on a set of positive status beliefs that frame U.S. academia and science as the gold standard. In turn, academics trained or affiliated with U.S. universities are assumed to be highly competent, well-resourced researchers with access to highly ranked publications—and thus highly attractive collaboration partners. For U.S. women abroad, the .edu bonus means that their "academic nationality" often eclipses gender, making other countries more hospitable environments for research, collaboration, and funding than their home institutions or U.S. academia in general.

Glass Fences for Women

While women academics face the same obstacles to international collaboration as their male colleagues, the gendered organization of global science also creates specific barriers for them, which I call "glass fences." Like the glass ceilings that keep women from moving up in hierarchical organizations, glass fences are invisible. They nevertheless demarcate— and block—the borders women must cross to participate in international collaborations. Women in academia tend to hold positions in academic institutions and fields that have less status and fewer financial resources. Women professors across ranks are more likely to carry extra loads of service work and teaching. International conferences, research institutes, and field sites often do not consider the needs of parents and caregivers and frequently do not create welcoming spaces for women. Women thus tend to have less time and money for international collaborations, as well as more challenges when they do manage to arrange them. These glass fences become visible when women travel less to international conferences, stay shorter times on research visits abroad, face more sexual harassment and violence, and deal more with work-family conflicts than do men.

Strategies for Professional Associations

Ironically, professional associations, funding agencies, and universities have created some of these glass fences for women. However, this also means that they can work to dismantle them. Chapter 6 of my book addresses policy implications for funding agencies and universities. Here I want to point out

some important steps professional associations can take to further international collaborations:

1) Professional associations should be aware of both the importance of international collaborations and how women and minorities have been systematically excluded from them. Thus, they should proactively include gender and diversity concerns in their international strategies, and incorporate international perspectives into their strategies to promote gender equity and diversity.
2) Recognizing that overcoming glass fences often requires additional resources, professional associations should provide extra funding for targeted constituencies —for example, parents and other caregivers, women, or individuals from visible minority groups—to be mobile, attend conferences, and take advantage of international opportunities. These could be flexible fellowships or reimbursement schemes to cover extra costs.
3) Conferences, especially smaller invitation-only workshops and meetings, are key sites for nurturing international collaborative relationships. These events allow faculty to meet prospective collaborators, maintain international professional networks and relationships, and initiate and work on joint projects, all of which can be difficult tasks, particularly for women (Fox et al. 2016). Professional associations and workshop organizers should pay attention to creating structures that visibly include diverse participants and support international networking. These can range from open calls for participation, to free childcare, to gender-inclusive social events that appeal to all (rather than alcohol-focused events that can place women in uncomfortable situations).
4) Professional associations can also take steps to make their networks more inclusive of all members. When distributing money and resources for international collaborations—such as conferences, seminars, symposia, and workshops—professional associations should insist on diverse participation, including key speakers of different gender identities, races, and ethnicities, and full participation by graduate students and postdoctoral researchers. When taking steps to internationalize their own organizations, professional associations can continue to focus on gender equity and diversity concerns. As they integrate international colleagues into committees, section and panel organizers, and the like, they can insist on the inclusion of international women and individuals from underrepresented minorities.
5) Professional associations can provide venues for sharing expertise and knowledge among faculty about how to work abroad and collaborate, as well as training for graduate students and postdoctoral fellows. These professional development efforts could address specific national

contexts and more general skills and content, including international funding mechanisms, federal import/export regulations, intellectual property regulations, managing bureaucratic hurdles, ethical conduct in international partnerships, strategies for handling work-family responsibilities (Lubitow and Zippel 2014), and intercultural knowledge. Mentoring and career advising for women and individuals from minority groups could also include skill sets and information about international collaborations.

6) Although intercultural knowledge and skills are critical to successful international collaborations, universities provide little training or preparation for international research at home and abroad. By providing such training, professional associations could improve working relations on international teams, help eliminate myths about the effectiveness of women in international assignments, and foster more successful stays abroad.
7) Professional associations can provide training for all members on how to prevent and handle: risks to personal safety; microaggressions; and sexual, gender, and other forms of harassment and violence. They can also provide individuals from minority groups with strategies to obtain knowledge about local environments and navigate xenophobia, racism, Islamophobia, homo- or transphobia, and other prejudices.
8) Professional associations can find ways to create a culture that is supportive of gender and diversity efforts among their own members. For example, they can provide bystander training and other strategies for members, and they can hold them accountable, such as the American Geophysical Union ethics taskforce's efforts on sexual harassment.
9) Monitoring and collecting data on their own and their (international) partner organizations is one last crucial way professional associations can support women and minorities. Tracking data by gender and minority status on workshops, programs, conference attendance, panels, section chairs, awards, nominations, and elections will provide useful evidence to support strategies and initiatives to promote inclusion.
10) As well as serving their members, professional associations have a critical role to play in supporting international collaboration overall. U.S. funding agencies and universities are under increasing pressure to prove the value of international collaborations, so professional associations need to step up their efforts to keep the doors open for U.S. academics to go abroad and for international

"Professional Associations" continues on page 57

Re/Framing Disability in Geosciences Curriculum

By Amanda Kraus, PhD, Director, Disability Resources, University of Arizona
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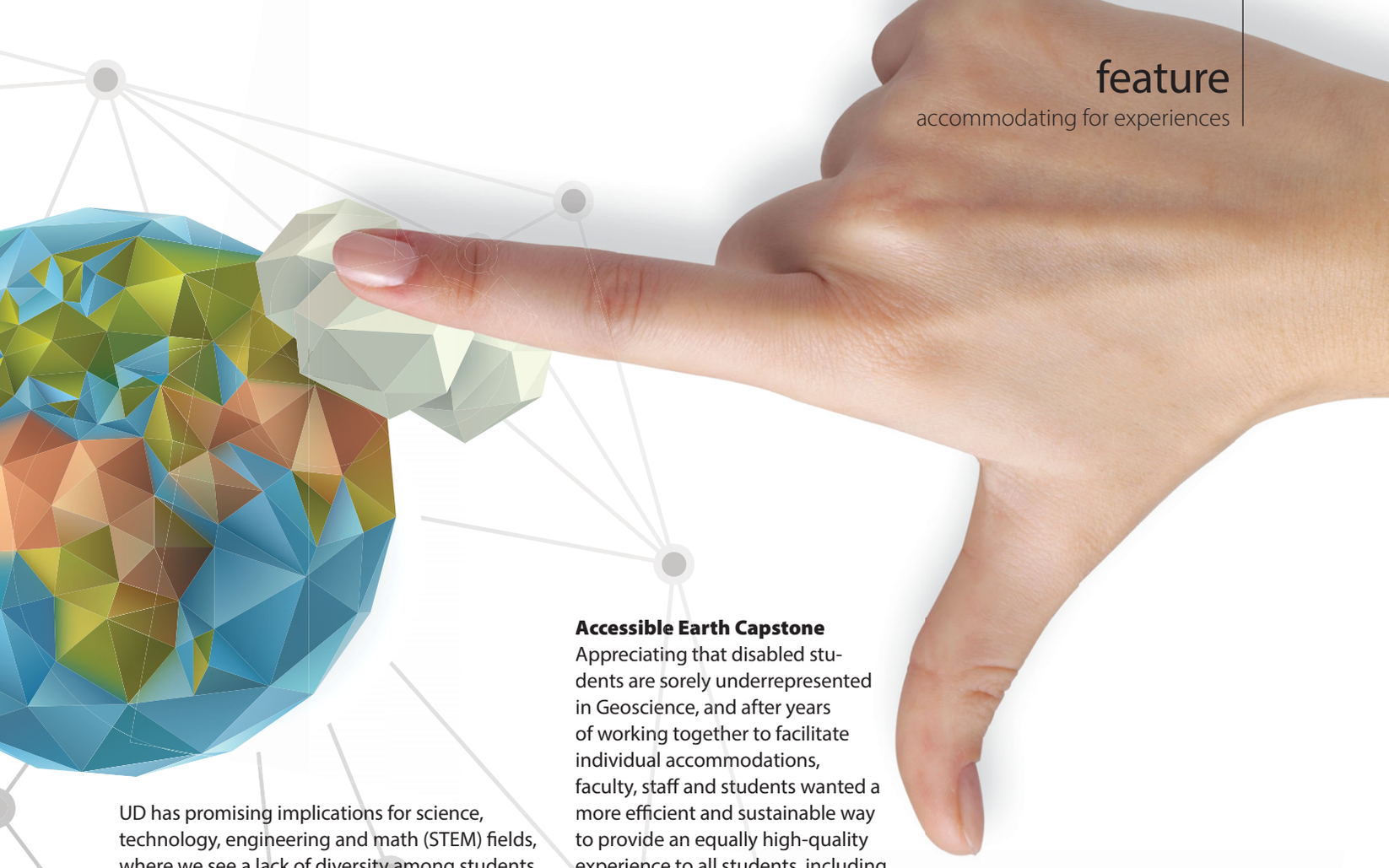
Emerging thinking suggests that disability is the result of inaccessible environmental or systemic design (Shakespeare, 1997). Having been socialized to understand disability as a personal tragedy to be fixed, hidden, or individually accommodated, rather than an experience created and perpetuated by design, faculty and campus professionals are trained on Americans with Disabilities Act (ADA) compliance and are not typically supported in making the paradigm shift necessary to operationalize new thinking about disability access and inclusion on campus.

Current practice in college and university classrooms prioritizes legal requirements or ADA compliance over cultivating a welcoming and inclusive environment for all students. We ensure that disabled students have access to academic experiences by facilitating individual accommodations, oftentimes retroactively. Accommodations may respond to barriers in the physical environment, such as accessible classrooms or reserved seating; or they may mitigate curricular barriers around inaccessible exams or activities. Often accommodations results in an experience for disabled students that differs significantly from that of their non-disabled peers. While accommodations ensure access, they do not guarantee an experience that is equitable or identical. The process of requesting, determining and implementing accommodations can be burdensome or confusing for faculty and students alike and, further, accommodations are "individual", and will likely need to be put in place class after class, semester after semester. If we continue to respond to access solely through individual accommodation, faculty miss the great opportunity to address inclusion proactively and sustainably by designing their courses to be accessible and inclusive for all students without accommodation.

A more sustainable and effective approach to inclusion requires reimagining the curriculum to be barrier-free. By utilizing concepts of Universal Design (UD), we can maximize access and engagement for all, without the need for modification or individual accommodation. UD strives for equity, flexibility and usability. We can use UD to design specific assessments and activities, or more generally in terms of course requirements so that students are able to choose from options that satisfy degree requirements and best suit their abilities and goals. An outcome of a UD approach to curricular design is that all students will have identical experiences thereby reducing the stigma and separateness of accommodations or special processes.



UD has promising implications for science, technology, engineering and math (STEM) fields, where we see a lack of diversity among students with respect to disability (Langley-Turnbaugh, Blair, & Whitney, 2013). Increasing diversity in STEM fields is critical given anticipated shifts in demographics over the coming decades which, if unaccounted for, will result in a shortage of skilled workers in STEM fields[1]. According to several recent studies, many students, particularly those with disabilities, may perceive limited opportunities for advancing in some science careers due to physically inaccessible field-based instruction practices (American Geosciences Institute, 2017); this is particularly true of the field of Geosciences. Disabled students are inordinately discouraged from participating in geosciences because traditional field-based learning practices are inaccessible or they begin programs and ultimately drop out because they do not have access to all aspects of the curriculum. This article highlights outcomes of a partnership between Geosciences faculty and Disability Services professionals at the University of Arizona (UA) that results in a more inclusive and accessible curriculum and a completely accessible field camp capstone experience.

Accessible Earth Capstone

Appreciating that disabled students are sorely underrepresented in Geoscience, and after years of working together to facilitate individual accommodations, faculty, staff and students wanted a more efficient and sustainable way to provide an equally high-quality experience to all students, including those with disabilities, and demonstrate that Geosciences could be accessible. Initially, UA Disability Resource Center (DRC) staff worked with the UA Geosciences department (GEOS) to develop a *substitution* for their 6-week capstone field camp. However, the experience of the substitution to field camp is vastly different and therefore prohibits a student from having the same experience as all other students that GEOS

***The photograph shows students engaged in a reflective activity that was adapted for the AE curriculum from professional development materials in the* Portal to the Public Implementation Manual Catalog of Professional Development Elements.**

requires for degree completion. We continued to investigate the possibility of developing curriculum that could be both academically rigorous and accessible.

DRC staff engaged in challenging dialogue with GEOS faculty about the essential components of the field camp experience. Developing a mutual understanding of why field camp is considered the hallmark of most college geology programs and why access for a diverse student population is essential to the field, we developed Accessible Earth (AE), a new capstone course as academically rigorous as the traditional field camp course and also barrier-free. We successfully piloted AE in summer 2016 in Orvieto, Italy.

Our program is based in the beautiful Umbrian hilltop city of Orvieto, Italy. AE students learn to use state of the art open-source software to acquire and analyze data from a variety of sources, including archives of satellite and ground based instruments. The location in central Italy provides numerous opportunities for students to witness the intersection of Earth processes and society, as exemplified by the devastating 2016-2017 earthquake sequence which leveled the city of Amatrice some 70 km to the southeast of Orvieto. Our goal is to empower students with the knowledge that they may achieve cutting edge research with nothing more than a desire to learn about the world, and a commonplace laptop computer.

AE represents a collaboration between UA's DRC, Study Abroad & Student Exchange (SASE), and GEOS. Eight students participated in AE summer 2016. DRC ensured that all of our students had equal access to the affective, motivational, and social gains that are the hallmark of study abroad experiences. Although much of the AE curriculum is focused on acquisition and analysis of Earth remote sensing data from near Earth orbiting satellites, the AE curriculum also offered a broad array of professional development components, engagement activities and a 5-day accessible trip in northern Italy, including historical sites such as the Due Torre in Bologna, where Galileo's theory of gravity and the Copernican world system were first tested. Students reported that not only did they enjoy AE, but it was a transformative experience that changed their perspectives on field camps and accessibility. Students were appreciative for the opportunity to engage in meaningful and accessible field work abroad.

The Bigger Picture

Reimagining and redesigning curriculum to be barrier-free is a slow, but tremendously meaningful, process, and the success of AE proves that we can create an accessible and inclusive experience without sacrificing academic rigor. At UA, we are expanding our efforts to reimagine other GEOS courses that require field work. We are exploring course design that increases access by capitalizing on new technology and approaches. As we work to achieve a more equitable and inclusive curricular environment, we must communicate this commitment widely. We must include statements about diversity and accessibility in our literature. We must include images of diverse learners and activities in our marketing. We must highlight the success stories of both disabled students and professionals. We must respond to the under-representation of disabled students in STEM by over-communicating that our curriculum and activities are now designed with diversity in mind. ✪

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Diedre Lamb, MEd, *is the assistant director of Disability Resources at the University of Arizona. Lamb received her MED in educational and instructional technology from Northern Arizona University in 2005.*

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Jessica Kapp, PhD, *is an instructor in the Department of Geosciences at the University of Arizona. Kapp received her PhD in geology and earth sciences from the University of California, Los Angles in 2003.*

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[1] Congressional Commission on the Advancement of Women and Minorities in Science, Engineering, and Technology Development, 2000.

Tackle Gender Bias in STEM to Promote Growth in Africa

By Sam Otieno
Director, Disability Resources, University of Arizona

Mainstreaming gender equality in Science, Technology, Engineering and Mathematics (STEM) could be significant for socioeconomic development in Africa, according to experts.

The experts who attended the 2nd International day for Women and Girls in Science meeting in Kenya noted that discriminatory practices against women limits the ability of many developing countries to grow and to reduce poverty.

The meeting was organized by the United Nations Educational Scientific and Cultural Organization (UNESCO), National Commission for Science, Technology and Innovation (NACOSTI) and African Women in Science and Engineering.

Roy Mugiira, director of technical services at NACOSTI, says that engendering STEM policy in African countries will create the enabling environment to promote the educational and professional success of all people irrespective of gender, race or ethnicity. He explains that policies should be based on the guiding principles such as relevance, inclusiveness, synergy, ethical leadership and good governance.

Mugiira says African institutions must be held accountable and provide evidence that women and men receive equitable opportunities, resources and support.

Caroline Thoruwa, a lecturer at Kenyatta University in Kenya, tells SciDev.Net that equal participation will allow men and women to reach full intellectual potential, which will also enhance women's contribution to economic development of the continent. "But there is a large gap in the contribution of women in STEM compared with the participation of men, in precise at the more advanced career stages," says Thoruwa, adding that fewer women get opportunities for graduate studies in STEM.

United Nations Educational, Scientific and Cultural Organization

"There is a large gap in the contribution of women in STEM compared with the participation of men."

—Caroline Thoruwa, Kenyatta University

Amelia Omollo, project manager, Kenya Airways, concurs, saying that STEM plays a great role in raising productivity and competency levels for Africa's socioeconomic development. She adds that African culture favours males over females, which informs social roles and responsibilities of females, access to resource, political power, education and all sectors of human advancement. Omollo explains that confident and single-minded women are stereotyped as socially unacceptable, which make women often stay within these socially defined roles and responsibilities.

Hendrina Doroba, executive director of Forum for African Women Educationalists, says that women and men have a role to develop their countries, and challenged African governments to make data available for creating, monitoring and evaluating long-term policies for solving gender inequality in STEM.

Doroba also encourages a holistic approach for collaborations among gender champions in sharing knowledge and experiences on gender issues in STEM that will be capable of influencing policy decisions in Africa. ✪

This piece was produced by SciDev.Net's Sub-Saharan Africa English desk and republished with permission.

How Dismantling the ACA's Marketplace Coverage Would Impact Sexual and Reproductive Health

By Kinsey Hasstedt, MPH
Senior Policy Manager, Guttmacher Institute

President Trump, his administration and many conservatives in Congress remain intent on repealing the Affordable Care Act (ACA), despite widespread pushback and concerns over the potential loss and diminishing quality of coverage, increased cost to individuals, and ultimately, the harm to people's health and well-being. Their effort encompasses not only rolling back states' Medicaid expansions and fundamentally altering Medicaid itself but also changing the way that individuals can buy private coverage and, essentially, dismantling the ACA's health insurance marketplaces.

Conservatives are seeking to overhaul or eliminate the ACA's subsidies for marketplace coverage, eschew requirements that private plans cover a standard set of basic health care services and weaken requirements of plans to ensure accessible provider networks that marketplace enrollees can rely on. If they succeed in upending the affordability and usability of private coverage in these ways, there will be serious consequences for individuals' access to basic health care, which includes sexual and reproductive health care.

Subsidized private plans have helped more people get coverage

Online marketplaces have given people the chance to better understand how health insurance works and explore plan options available to them. In addition, the ACA's marketplaces have helped millions afford health coverage. In particular, considerably fewer U.S. women of reproductive age lacked coverage following the first two years of ACA implementation. Nationwide, between 2013 and 2015, the proportion of women aged 15–44 who were uninsured fell by 36%. This decline was driven by substantial gains in both Medicaid and private insurance coverage.

The ACA allows states to expand Medicaid eligibility to individuals with incomes up to 138% of the federal poverty level; thus far, 31 states and the District of Columbia have taken up that option. (The federal poverty level is $20,420 for a family of three.) For individuals with incomes too high to qualify for Medicaid, the ACA provides financial help to purchase private coverage through an online health insurance marketplace: People with incomes between 100% and 400% of the federal poverty level can get refundable tax credits to lower the cost of their monthly premiums, and those with the lowest incomes (100–250% of poverty) can get additional subsidies to reduce their out-of-pocket costs when obtaining health services. About six in 10 people who are enrolled in marketplace coverage receive cost-sharing subsidies, and eight in 10 receive premium tax credits. And under the ACA, the amount of these tax credits is tied to the cost of coverage and to enrollees' incomes, so lower income individuals in states with higher cost plans benefit most.

Furthermore, the ACA makes subsidized marketplace coverage particularly accessible for people facing barriers other than cost. This includes individuals experiencing domestic violence, who may be insured as a dependent on an abusive partner's plan and need to obtain independent coverage for confidentiality reasons. It also includes many lawfully present immigrants who are legally barred from obtaining other types of coverage, including Medicaid, but can qualify for marketplace plans and the financial assistance that makes that coverage affordable. According to government estimates, 12.2 million people enrolled in marketplace coverage as of March 2017.

Marketplace plans must cover core sexual and reproductive health services

In addition to making private coverage more attainable, the ACA has made private coverage more comprehensive. Notably, all marketplace plans (like other plans sold to individuals and small employers outside the marketplaces) must cover a set of 10 "essential health benefits." Among these benefits is maternity and newborn care, which in practice means a whole suite of services, including prenatal care visits, screenings and services that promote maternal and infant health, and labor and delivery.

Marketplace plans (like most other private health plans) must also cover dozens of preventive care services without patient cost-sharing, including a slate of services central to women's sexual and reproductive health. In addition to at least one well-woman preventive care visit each year, these services include 18 methods of contraception and related services, Pap tests, testing and vaccinations for human papillomavirus, counseling and screenings to prevent HIV and other STIs, screening for intimate partner violence, counseling and education on breastfeeding, and breast pumps.

Still, there is room for improvement. Although abortion is an integral part of reproductive health that should be covered consistently by insurance, Congress decided against guaranteeing its coverage under the ACA. Instead, Congress included provisions to ensure individuals can choose a plan that excludes abortion, with no corresponding assurance of the availability of abortion coverage for those who want it. In fact, Congress explicitly allowed states to ban abortion coverage in marketplace plans, and 25 states have done so. However, as imperfect as marketplace coverage of abortion is now, it would likely disappear entirely under whatever coverage alternative Congress puts forward.

Marketplace protections help ensure an accessible network of reproductive health providers

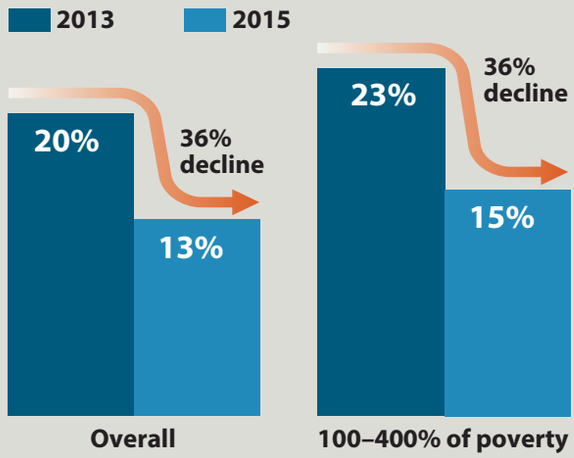
To translate coverage into affordable care, enrollees must be able to access a nearby provider who accepts their insurance. To that end, marketplace plans must adhere to certain "network adequacy" standards—that is, measures to ensure plans maintain provider networks capable of delivering timely, quality care to all enrollees.

Broad federal standards established under the ACA apply to all marketplace plans; however, as is the case with health insurance regulations generally, state policymakers have a great deal of flexibility to establish and enforce more specific requirements of plans' provider networks. Frequently, state standards require

"ACA's Marketplace Coverage" continues on page 59

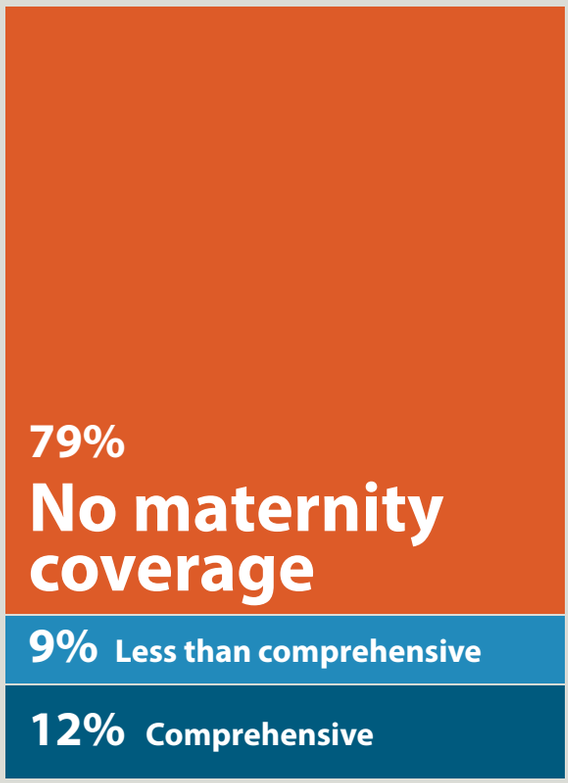
Following the Affordable Care Act, fewer low and middle income women of reproductive age were uninsured

% of women aged 15–44 who were uninsured



Source: Guttmacher Institute.

Before the Affordable Care Act, eight in 10 private plans in the individual market covered no maternity care at all



Source: National Women's Law Center.

Vera Rubin: In Memoriam

By Nancy Forbes
Technical Coordinator, Video and Image Analytics (VIA) Interagency Working Group (IWG), Senior Strategy Analyst/Writer
National Coordination Office for Networking and Information Technology Research and Development
AWIS Member Since 2000

Longtime AWIS member and AWIS Fellow Vera Rubin, eighty-eight, passed away quietly on Christmas Day, 2016. Her preeminence, both in astronomy research and in advocacy for women in science, cannot be overstated. Her revolutionary discoveries, confirming the existence of dark matter in the universe, should have garnered her a Nobel Prize, and many believe that gender may have been a factor in her not being so-honored (of 204 Nobel Laureates in physics, only two have been women: Marie Curie and Maria Goeppert-Mayer). Throughout her career, Dr. Rubin was tireless, patient, persistent, cheerful, and passionate about understanding the cosmos and advancing the cause of women in STEM. Matthew Scott, the president of the Carnegie Institution for Science (where Dr. Rubin spent most of her career), referred to her as a "national treasure."

Astronomer Vera Rubin at her "measuring engine" used to examine photographic plates, 1974. Copyright: Carnegie Institution of Washington

Born in Philadelphia in 1928, Dr. Rubin became interested in the night sky as a young girl, lying in bed, gazing up from her bedroom window toward the heavens, night after night. "At about age ten, I started watching the stars just move through the night. By about age twelve, I would prefer to stay up and watch the stars rather than go to sleep."[1] Her parents were "very, very supportive" of her interest in astronomy, though her mother would sometimes chastise her for staying up all night with her head out the window. This fascination with the stars led her to Vassar College, where she graduated in 1948 as the school's only astronomy major. She had chosen Vassar because her role model, Maria Mitchell, the nation's first professional female astronomer, had gone there. Dr. Rubin wanted to continue her studies at Princeton University, but the school didn't bother to send her the graduate studies catalog, because women were not then allowed in the graduate astronomy program. Instead, she enrolled at Cornell, where she met and married a fellow graduate student, Robert Rubin (the couple remained married for sixty years, until his death in 2008).

Among Dr. Rubin's teachers at Cornell were Hans Bethe and Richard Feynman, both Nobel Laureates in physics. In her master's thesis, she argued that galaxies might be rotating around an unknown center rather than just moving outward, a theory that ran counter to accepted theories at the time. Not surprisingly, her thesis was rejected for publication by major astronomical journals. Still, she insisted in presenting her paper, "The Rotation of the Universe," at a meeting of the American

Her insights into galactic dynamics were even then out of the ordinary: her PhD thesis on the spatial distribution of galaxies advanced the idea that galaxies clumped together, rather than being randomly distributed throughout space—an idea that was not recognized by astronomers for several decades.

"They told her, 'It's a real problem because we don't have a ladies' room,' so she went back to her room and took out a little piece of paper and cut it into a skirt and went to the bathroom door and stuck it on the men's figure on the door. She said, 'Look, now you have a ladies' room.'"

Astronomical Society in 1950, with her weeks-old son in tow, still nursing. As she described it, she entered the conference hall, gave her paper and then left.

As a PhD student at Georgetown University, Dr. Rubin continued her work on the large-scale movement of galaxies, guided by advisor George Gamow, a brilliant Russian émigré physicist who led the development of the Big Bang Theory. Her insights into galactic dynamics were even then out of the ordinary: her PhD thesis on the spatial distribution of galaxies advanced the idea that galaxies clumped together, rather than being randomly distributed throughout space—an idea that was not recognized by astronomers for several decades.

By the time she graduated in 1954, she and Robert had two children, David and Judith. Two more were born in the next few years: Karl in 1956 and Alan in 1960. All four of her children went on to earn PhDs in the natural sciences or in mathematics and to pursue highly successful research careers. "I succeeded in my two goals—to have a family and be an astronomer," she stated in the preface to her 1997 book, *Bright Galaxies, Dark Matters*, though one can only imagine what it took to raise four children while still carrying out a vigorous program of research in a male-dominated field, especially in the 1950s and 1960s.

After graduation, Dr. Rubin held various academic positions in the Washington, D.C., area (her husband worked at the Johns Hopkins Applied Physics Laboratory), until accepting a job at the Carnegie Institution's Department of Terrestrial Magnetism in 1965, where she spent the rest of her career. With her close colleague Ken Ford, she began observing spectra (the pattern of electromagnetic radiation emitted by objects in space) from the distant Andromeda galaxy, M31, hoping to determine the distribution of mass in the galaxy by looking at the orbital speeds of gas and stars at varying distances from the galactic center. Contrary to a key principle of Newtonian gravitational theory, which states that objects farther out from the center of a galaxy's mass move more slowly than those closer in, they observed that stars farther out from the center move just as fast as those that are closer.

Their observations were carried out at the Palomar Observatory near San Diego, California, despite the fact that the men at the observatory had warned Dr. Rubin that she would have

Vera Rubin with her orrery collection

difficulties using the facility, recalls her close associate, Neta Bahcall.[2] "They told her, 'It's a real problem because we don't have a ladies' room,' so she went back to her room and took out a little piece of paper and cut it into a skirt and went to the bathroom door and stuck it on the men's figure on the door. She said, 'Look, now you have a ladies' room.'"

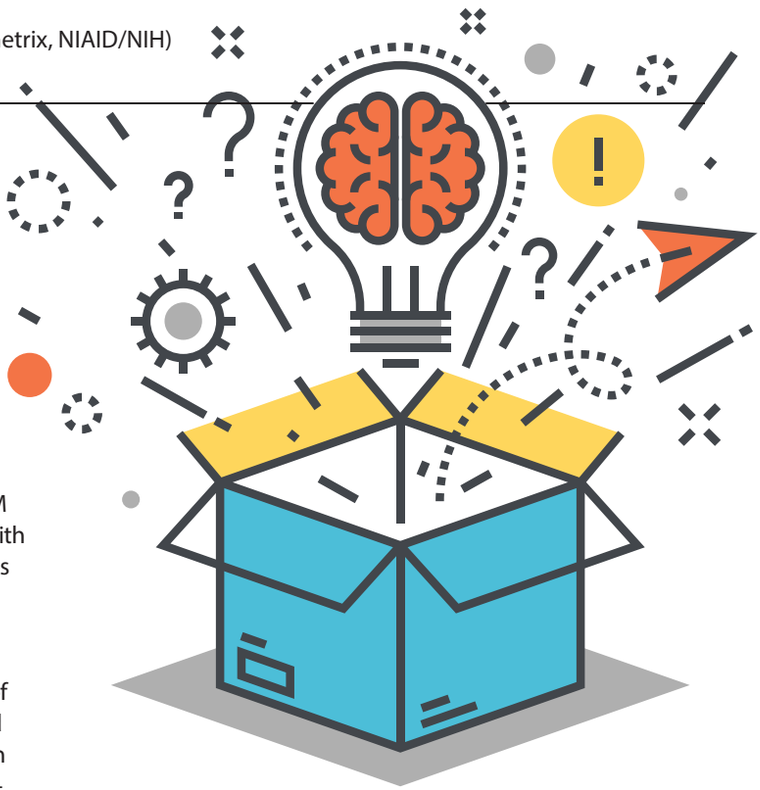
By the 1970s, after observing the rotation curves of many galaxies, Dr. Rubin concluded that something other than the visible mass must influence the stars' motion. Indeed, if the galaxies were rotating so fast, according to Newton's theory, they should ultimately fly apart—but they didn't. Something unseen must be holding them together and accounting for the observed angular speeds of the stars. In this way she confirmed the existence of "dark matter," material that does not emit light and is invisible all across the electromagnetic spectrum. As a result of Dr. Rubin's groundbreaking work on dark matter, physicists later concluded that over 90% of the universe is composed of dark matter.

While the exact nature of dark matter is still not completely understood, it is crucial to understanding the universe. According to Stanford University physics Professor Risa Wechsler, "It's one of the most important discoveries of the 20th century. [Dr. Rubin] basically showed that most of the mass in the universe is not emitting light."[3] Though passed over for the Nobel, Dr. Rubin still won recognition the world over: the

"Vera Rubin" Continues on page 58

Why Every STEM Professional Needs Some Project Management Know-How, and How To Get Started

By Gretchen L. Schieber, PhD, MBA
Working in Project Management since 1996 (Syva Co, Affymetrix, NIAID/NIH)
AWIS Member Since 1988



Introduction

In today's world, STEM progress and accomplishments frequently rely on a group or team. In industry, a new product effort might include hundreds of individuals across all functions in the company. In research, papers with ten or more authors are now common. This brings a new challenge to the workplace—how to coordinate so many people to maximize the opportunity to do great work and minimize the frustrations and wasted effort of "too many cooks." As this complexity has grown, the discipline of project management has taken on an increasing role. For STEM professionals, some understanding and experience working with or leading interdisciplinary teams in complex projects becomes an essential career skill.

Project management was created more than fifty years ago to manage technical development and manufacturing projects of great complexity. In its early days, it was a highly technical field known best, perhaps, for generating reams of paperwork. Even today, many people think of project management as a bureaucratic system of graphs, charts, and procedures, often implemented through some arcane software package.

In reality, project management is about keeping a complex activity organized and integrated so that everyone can be more successful at getting the job done. Today's project management is less a technical discipline than a framework of principles and techniques intended to provide a structured approach to making the everyday decisions that keep a business successful, even a small business or a laboratory. Done right, project management is customized to each organization and project so that everyone has what they need to do their best work, with the right amount of resources and support at every step.

A Quick Primer

A project is a unique body of work intended to deliver a specific goal or scope. To accomplish the project will require team members (content owners, task owners, and subject matter experts) from different areas of science or functions in the organization. Project management oversees the process so that the work can move smoothly forward, with everyone on the team having a shared understanding of what needs to happen and how it all connects. Depending on the size and complexity of the project, project management can vary from simple coordination by a team member to complex oversight by professional project managers.

In some companies, the lead scientist or engineer is also asked to take on the role of project manager, assuming responsibility for both the subject matter and the process. A second common model in STEM is to partner a high-level subject matter expert (e.g., director of product development)—who serves as project leader—with a professional project manager, a person who at some point "left the bench" to focus on process integration. In either model, project leadership works with a team incorporating all the people involved in the project. The team works to balance scope, cost, and timeline to deliver an optimal project.

Beyond a single project, a group of related projects can be managed in concert as a program. An organization manages priorities across all its projects using a series of techniques known as portfolio management. If a project involves collaborations or contracts

with other organizations, a specialized type of project management called alliance management might also come into play.

Depending on both your career goals and your level of interest, knowing how to be a team member, functional lead, project leader, or even a professional project manager can increase both your overall job satisfaction and help get the attention of hiring managers.

Resources to Get Started

To help guide you on your project management journey, here is some information on mostly free, online information and training options.

Courses available at edX (edx.org)

Founded by Harvard University and MIT in 2012, edX is one of the biggest MOOC (Massive Open Online Courses) platforms available and offers many project management (PM) courses. You can take most individual courses at no charge, and many of them can be accredited toward an edX credential. Courses can be at Introductory (I), Intermediate (M), or Advanced (A) level. Courses include:

Some general information

- *Introduction to Project Management (I):* Introduction to Project Management is an ideal starting point if you need to manage projects at work . . . while not necessarily being a formally trained project manager.
- *Stuff You Don't Learn in Engineering School (I):* Learn the essential soft skills technical professionals need in the workplace.
- *Stand up for Science:* Practical Approaches to Discussing Science that Matters (I): Anyone with a STEM story to tell will have the opportunity to develop a better understanding of their audience, craft a clear message, weave a compelling story, and practice giving and receiving feedback on science communications.

How to work in teams/on projects

- *Project Management Life Cycle (M):* Learn how to apply project management tools, processes, and techniques for the successful execution of a project from initiation to closing.
- *Creative Problem Solving and Decision-Making (I):* Learn how to solve complex problems with analysis-based decision-making and solution designs.
- *Leading with Effective Communication (Inclusive Leadership Training) (I):* All too often, we struggle to communicate effectively—particularly with others who are different from us in some way. Through research and real-world examples, you will learn strategies to enhance your communication skills and approach.
- *Managing Projects with Microsoft Project (M):* Learn how to do scheduling, resource capacity planning, progress tracking, and status reporting.

***Creative Problem Solving and Decision-Making (I):* Learn how to solve complex problems with analysis-based decision-making and solution designs.**

- *Interpreting and Communicating Data Insights in Business (M):* In this data analysis and statistics course, you'll discover effective strategies and tools to master the process of interpreting and then communicating your data analysis and visualization work to business audiences.
- *Project Management of Engineering Projects: Preparing for Success (M):* This course focuses on the early project phases, including examples from technical projects within various sectors and industries.
- *Communicating Strategically (I):* This [course] is geared toward experts (scientists, engineers, and other technical professionals) and will help them effectively communicate with non-scientists, usually management, to inform organizational decision-making.
- *The Science of Everyday Thinking (I):* We will explore the psychology of our everyday thinking: why people believe weird things, how we form and change our opinions, why our expectations skew our judgments, and how we can make better decisions.
- *Product Management with Lean, Agile, and System-Design Thinking (A):* Learn how to plan, develop, and deliver on all aspects of work in the life cycle of digital products using lean, agile, and system- design thinking.

Ready for project leadership

- *Project Management: Mastering Complexity (A):* Project success starts with recognizing the main drivers of complexity, which can be highly subjective and highly dynamic. In this course, you will learn to identify what makes a project complex and how to perform a complexity assessment.
- *International Project Management (A):* This course addresses the knowledge, skills, and behaviors required to successfully manage projects that span organizations, national boundaries, and cultural differences.
- *Results-Based Project Management:* Monitoring and Evaluation (M): This project management course is designed to address the growing demand for managers . . . who can use results-based approaches to design, implement, and manage an ever-growing range of programs and projects.

Becoming a Successful Leader (Inclusive Leadership Training) (I): **Using research and best practices, as well as stories from great leaders and everyday people, you will practice empowerment, accountability, courage, and humility—key leadership skills linked to inclusive, successful teams.**

- *Best Practices for Project Management Success (M):* Learn how to create an organizational environment that supports project success.
- *Financial Decision Rules for Project Evaluation (M):* Learn how to use decision criteria and rules to evaluate projects based on their impact on business, including payback, NPV, and IRR.
- *Evidence-Based Project Management (M):* Learn which project management strategies, tools, and techniques are most effective by analyzing evidence-based research.
- *Six Sigma: Define and Measure (I):* Understand the background and meaning of Six Sigma and the five steps of the DMAIC process improvement flow: Define, Measure, Analyze, Improve, and Control.
- *Becoming a Successful Leader (Inclusive Leadership Training) (I):* Using research and best practices, as well as stories from great leaders and everyday people, you will practice empowerment, accountability, courage, and humility—key leadership skills linked to inclusive, successful teams.
- *Managing People from a Global Perspective (M):* Learn people management practices and human resource tool sets to build high-performing cross-cultural and global teams.
- *Evidence-Based Business Communication (M):* Evidence-based business communication focuses on evaluating the evidence in support of different communication strategies, and guiding managers to identify the best strategy for different communication objectives.
- *Business Analytics: Theory and Practice (M):* Learn how to use data to develop insights and predictive capabilities to make better business decisions.
- *Innovation & Creativity Management (M):* This course focuses on ways to manage creativity effectively and introduces a flexible and iterative innovation management process model.

Other MOOCs and PM Sources

- **Alison (alison.com)** is another portal that provides free online project management courses and certification and offers a comprehensive review of project management with resources like methodology, tool sets, and documentation. It also includes insight into the project life cycle plus analysis, planning, design, and evaluation. The course also includes a project management case study.
- **Coursersa (coursera.org)** is a provider of project management courses and has partnered with world-renowned educational institutions to offer these courses and certifications to businesses worldwide. Businesses and individuals can register for free to take courses, and Coursersa offers project management courses at every level. While their courses aren't free, they are priced from approximately $29–$99, making them affordable for most, especially in light of the high-value content.
- **Project Management Institute (pmi.org)** is the leading not-for-profit professional membership association for the project management profession. It provides formal project management training and certification and is the home of the framework known as the Project Management Book of Knowledge (PMBOK).
- **PRINCE2 (prince2.com/usa, Projects IN Controlled Environments)** began in the United Kingdom. It is a project management framework that can readily be tailored to any size or type of project. Like PMI, their website, courses, and certifications provide a solid grounding in project management.

Moving your career forward

Regardless of your level of interest or immersion in projects, gaining a more in-depth understanding of project management can improve your effectiveness as a STEM professional, and ultimately it will increase your effectiveness, job satisfaction, and marketability. It's an excellent addition to a STEM professional's toolbox. ✪

Gretchen L. Schieber, PhD, MBA, *has been working in project management since 1996 at Syva Co, Affymetrix, and NIAID/NIH. She received her PhD in biochemistry and cell biology from the University of Florida.*

Congratulations to Our 2017 AWIS Star Award Winners!

Many chapters and affiliates around the country have strong leaders, are well-organized, and execute stellar activities that deserve to be recognized. The AWIS Star Chapter and Affiliate Award honors those groups that have accomplished key objectives outlined in the association's Strategic Plan. The award encourages groups to perform specific activities designed to ensure that women in STEM fields are able to achieve their full potential. Groups that successfully accomplish twelve of the goals outlined by the AWIS National Governing Board and the Chapters and Affiliates Committee during the fiscal year will be honored with the annual AWIS Star Chapter and Affiliate Award. There is no limit to the number of AWIS Star Chapter and Affiliate Awards that can be presented in any given year. Regardless of size, budget, or resources, so long as a group fulfills the necessary goals, it is eligible to receive the award.

2017 Star Award Winners

Washington DC Metropolitan Chapter
Central Arizona Chapter
LA/Ventura County Chapter
Palo Alto Chapter
Sacramento Valley Chapter
San Diego Chapter
UC Riverside Chapter
Chicago Chapter
Indiana Notre Dame Chapter
Massachusetts Chapter
St. Louis Chapter
New York Women in Natural Sciences (WiNS) Chapter
Northwestern Ohio Chapter
Philadelphia Chapter
Gulf Coast-Houston Chapter
Seattle Chapter
Central Massachusetts Affiliate Group

AWIS Provides Work-Life Satisfaction and Mentoring Strategies to Women Biological Anthropologists

Approximately seventy individuals from across the globe gathered at the University of Colorado-Boulder and at Santa Clara University to discuss issues relating to work-life satisfaction and mentoring. Students, faculty, and administrators attended the interactive workshops presented by Dr. Donna J. Dean, Association for Women in Science (AWIS) Past President and Executive Consultant, and Cynthia Simpson, Chief Business Development Officer, AWIS.

"Enhancing your Career with Mentoring and Networking Strategies" provided participants with pragmatic mentoring techniques and focused on the responsibilities of both mentors and mentees in developing and maintaining an effective mentoring relationship. "Improving Your Work-Life Satisfaction" covered seven different areas of importance to women in STEM, based upon the research and data collected by AWIS. "As evidenced during the workshop, participants were interested and engaged, and everyone was able to take something useful and important with them on a variety of issues that loom large for women biological anthropologists at all stages of their careers," stated Dr. Andrea Taylor, Professor in the Department of Basic Science, College of Osteopathic Medicine at Touro University and a co-PI on the *Action Through Organization: Supporting Mentoring and Networking for Early Career Women Scientists* AAPA Women's Initiative grant received from the Elsevier Foundation. ✪

For additional information on AWIS presentations, contact Cindy Simpson at simpson@awis.org.

ARPA-E Partners with AWIS on Women in Energy Event

For the third year in a row, APRA-E partnered with the Association for Women in Science to celebrate the achievements of women in energy. The annual "Women in Energy Event" was held in the Technology Showcase at the Gaylord National Harbor Hotel in Maryland as part of ARPA-E's Energy Innovation Summit. Approximately one hundred individuals attended this event, which kicked off with commentary from women scientists and entrepreneurs about their careers and the challenges and opportunities they have experienced as women in STEM.

This event brought together entrepreneurs, researchers, policymakers, investors, and others to celebrate the achievements of women in energy; discuss ways to better engage and provide opportunities for women in energy technology development and deployment; and provide networking opportunities. Panelists included: Dr. Jennifer Gerbi, ARPA-E Program Director; Ms. Rita Hansen, CEO and Co-founder of OnBoard Dynamics, Inc.; and Dr. Rachel Slaybaugh, Assistant Professor of Nuclear Engineering, University of California, Berkeley. The panel discussion was moderated by AWIS member Eeda Wallbank, an environmental scientist at ARCADIS U.S., Inc.

The ARPA-E Energy Innovation Summit is an annual conference and technology showcase that brings together experts from different technical disciplines and professional communities to think about America's energy challenges in new and innovative ways. AWIS is proud to support the efforts of the U.S. Department of Energy and ARPA-E and their focus on the continued role that women play in the energy sector in moving transformational energy technologies out of the lab and into the market.

AWIS Members March for Science

"I helped organize the Toledo Satellite march because I strongly believe in the mission of the march. In these uncertain times, it is vital that scientists and science enthusiasts draw attention to the immeasurable contributions of science to society as a whole; and in doing so in a public display, inspire future generations to uphold the values of curiosity, free speech, free inquiry, and critical thinking."

—Susanne Nonekowski, Northwestern Ohio Chapter

"I am marching to increase awareness of the importance of science in everyone's lives, from the daily weather forecast to the cell phone they can't live without, and to shed light on the need to include marginalized groups in science."

—Amy Keesee, West Virginia Chapter

"I marched for the future of science, to give a voice to underrepresented groups, and because science is global and can unify us all."

—Adriana Bankston, Kentucky Affiliate Group

"I marched to encourage lawmakers to maintain evidence-based policies and to continue funding important research institutions, such as NSF and NIH. I also marched to show my support of the ever-accumulating evidence for climate change, and why we need to do something about it!"

— Amanda Dermer, Emory University Affiliate Group

"It's important to me that I contribute to the collective of the science community to defend not only our work, but our voices as well. Though it's no recent phenomenon that science has been used as a tool for political and social gains, the gold standard of discovering truth and evidence-based research—sad to say, in this day and age—needs to be retained and acknowledged by our politicians, regardless of ideological differences."

—Allison Quach, East Bay Chapter

Gender Equality in Global Science, Technology, and Innovation

UN WOMEN
United Nations Entity for Gender Equality and the Empowerment of Women

UNESCO
United Nations Educational, Scientific and Cultural Organization

WIPO
WORLD INTELLECTUAL PROPERTY ORGANIZATION

AWIS Executive Director and CEO, Janet Bandows Koster, and National Governing Board Councilor, Dr. Pamela McCauley, recently participated in an Expert Meeting at the United Nations (UN) in New York City, sharing their ideas on achieving the UN's 2030 Sustainable Development Goals (SDGs) specific to gender equality in the fields of science, technology, and innovation (STI). The meeting was organized by the World Intellectual Property Organization (WIPO), the United Nations Educational, Scientific, and Cultural Organization (UNESCO), and UN Women.

The initiative—***Science, Technology and Innovation: Closing the Gender Gap to Meet the SDGs***— brought together diverse experts, who focused on "progress sought to be made in the participation of women and girls in the fields of science, technology, and innovation by 2030" and on "planning backward to determine what steps need to be taken in the short- and medium-term future for countries to achieve that goal," as noted by the organizers.

2030 Sustainable Development Agenda and SDGs

In 2015, the UN General Assembly adopted the 2030 Agenda as a global sustainable development plan aimed at eradicating poverty in all forms around the world. The 2030 Agenda is supported by seventeen SDGs that aim to broadly cover the sustainable development needs of all people in developing and developed countries alike, and to balance the "economic, social, and environmental" dimensions of sustainable development according to UN General Assembly resolution 70/1. The SDGs are described as universal (in that they apply to all countries), interlinked, and indivisible.

The SDGs provide a framework to assist countries to develop policies and mechanisms to achieve these goals: in order to ensure that the implementation of the SDGs is measurable and accountable, the UN member states agreed on 169 targets that attach to the goals, and a series of indicators are being negotiated within the UN Statistical Commission to assist in monitoring progress. While the development of the targets and indicators is influenced by political considerations, as well as by pragmatic considerations related to statistical capacities and to the availability of data and methodologies at the global level, they are widely acknowledged to be less than complete in their measurement of the progress needed in some fields to attain the SDGs.

There is broad recognition that gender equality is fundamentally integral to the success of the majority of the SDGs. As

Addressing gender equality in STI for the SDGs is particularly significant, because the contributions of girls and women in STI are instrumental for achieving a majority of the SDGs and targets, since women represent not only half of the population but contribute greatly to their communities.

such, there is a gender goal, SDG 5, but also the expectation that gender is mainstreamed throughout other SDGs. Sometimes this is made explicit in targets and indicators. For example, the goal on climate change (SDG13) includes a target on raising capacity for effective climate change-related planning and management, with a focus on women (and other groups).

Each year a High Level Political Forum (HLPF) at the UN assesses a cluster of SDGs. In 2017, the HLPF will review six goals, including SDG 5 (gender equality) and SDG 9 (industry, innovation, and infrastructure). The initiative launched by UN Women, UNESCO, and WIPO on gender equality, science, technology, and innovation is designed to take advantage of the unique focus on these two goals in 2017.

Gender, STI, entrepreneurship, and the SDGs

Science, technology, and innovation are key components of economic and social development and are widely acknowledged to be an important public policy consideration for both developing and developed countries. Addressing gender equality in STI for the SDGs is particularly significant, because the contributions of girls and women in STI are instrumental for achieving a majority of the SDGs and targets, since women represent not only half of the population but contribute greatly to their communities. Addressing gender equality is also significant, because there are a number of driving forces that impact its attainment in STI. Studies have shown that women who are involved in STI fields leave at disproportionately higher rates than men at different stages of the STI cycle for a number of different social, cultural, and institutional factors, resulting in the effect we know as the "leaky pipeline."

Factors that contribute to the rate of women entering or eventually leaving STIs include: access to and quality of education; opportunities in the job market; pay equity; stereotypes; lack of role models, mentorship, and sponsorship; women with disabilities; and workplace culture and work-life balance, including being primarily responsible for family care. The leaky pipeline phenomenon occurs in various areas of the cycle, from education to entrepreneurship.

UN Women, UNESCO, and WIPO Initiative: Moving Forward on Gender Equality in the STI Sectors for the SDGs

The purpose of this interagency initiative is to identify and elaborate practical strategies that could be used by countries and the UN system to reach the goals set by the SDGs for women and girls in STI, particularly for their economic empowerment. The deliverables should assist governments, the private sector, and other institutions to develop and implement policies and plans from

2017–2030, with a view to achieve gender parity in STI, particularly focusing on entrepreneurship for the SDGs in line with the goals set by the 2030 Agenda. ✪

AWIS Presents Work-Life Satisfaction Workshop at Los Alamos National Laboratory

AWIS Past President and Executive Consultant Dr. Donna Dean and AWIS Chief Business Development Officer Cindy Simpson recently presented an AWIS workshop on "Improving Your Work-Life Satisfaction" to the AWIS LANL Atomic Women affiliate group. Laura McClellan, LANL Atomic Women Group Coordinator, stated that "this workshop shifted our paradigm from a balance mindset to enhancing satisfaction, realizing that there are times when work-life is not in balance and that's alright. The workshop presented recent studies to support the realization that work-life satisfaction is challenging for almost everyone and a comprehensive seven element platform to help enhance work-life satisfaction. Cindy and Donna provided examples and realistic scenarios that invoked some great discussions. Coupling the AWIS research and workshop structure with the scenarios and discussion provided for an interactive, learning environment!"

Drawing upon the global research and data collected by AWIS, the workshop was well received by the participants. Olga Martin, LANL Atomic Women Group Coordinator, said afterwards that "the AWIS workshop on Life-Work Satisfaction was well worth the effort. Our LANL Atomic Women group truly enjoyed and learned from the interactions with Cindy and Dona, and from the interesting exercises and scenarios that they involved us in. The workshop provided much food for thought for all of us, as we are juggling the demands of our families and professional lives." ✪

For further information on AWIS workshops, contact Cindy Simpson at simpson@awis.org.

Cindy and Donna provided examples and realistic scenarios that invoked some great discussions. Coupling the AWIS research and workshop structure with the scenarios and discussion provided for an interactive, learning environment!"

"From the Cover" continued from page 3

provide a stronger evidence base from which organizations can draw and from which they can design and implement change. We're also taking a lesson from our own playbook: have data, use data. We're developing a tool for our publishing department which will run on an even more extensive data set than we were able to put forward in this report. There is a pilot initiative to enhance gender diversity of our journal editorial boards. To support and help expand those efforts, the new tool will provide quantitative information to publishers about men and women researchers in all the fields our journals support. ✪

Holly J. Falk-Krzesinski, PhD, *is Vice President Global Strategic Networks at Elsevier where she is focused on how insight from data and analytics guide strategic planning for the research enterprise. Falk-Krzesinski's engagement activities emphasize building partnerships around important issues related to: research analytics, economic development, scholarly communication, open science, information management; expertise discovery & collaboration, and research metrics. Dr. Falk-Krzesinski is also broadly involved in promoting early career researchers and women leaders in STEM, serving on the NIH's BEST program External Scientific Panel and as Editor-in-Chief for the Association for Women in Science's* AWIS Magazine. *She also serves as a board-alternate for ORCID. She has been an AWIS member since 1994.*

Dr. Falk-Krzesinski is a graduate of the University of Illinois, Chicago with a BS in Biological Sciences and Chemistry. She earned her Ph.D. in Microbiology and Immunology at Loyola University Chicago Stritch School of Medicine and a Certificate in Nonprofit Management from Northwestern's Kellogg School of Management. She has retained a faculty appointment at Northwestern University where she continues to teach grantsmanship courses in the Philanthropy and Nonprofit program.

I could learn unconscious bias from her lecture very deeply, which included "Orchestrating Impartiality," as well as "Are Emily and Greg More Employable than Lakisha and Jamal?" and so on.

"Featured Member: Dr. Ohtsubo" continued from page 19

other was the activity that had been done in MIT by her and her colleagues during 1990s. Her talk made so strong an impact, telling us that the strongest and the most important tool is the data-based evidence. Since then, she gave me suggestions whenever I needed.

Dr. Machi Dilworth: OIST VP at present, former director of NSF Tokyo Office:
In 2009, I met Dr. Machi Dilworth, who was a director of NSF Tokyo Office at that time. This was the really fortunate occasion for us Japanese female researchers. She introduced ADVANCE program to us and encouraged me to attend 2009 ADVANCE annual meeting at Alexandria. This was the first time we recognized the importance of this program. Since then, "Beyond Bias and Barrier (we often call it BBB!) became catchword among us.

Prof. Patricia Rankin at UC Boulder:
We first met each other in a workshop that Dr. Dilworth organized in early spring 2009 at Hokkaido University. Since then, I invited her twice to NU as a keynote lecturer of international symposium on "Leadership Development." In addition to those, she invited us to join in her course at University of Colorado Boulder via CIRTLE Network. The subjects of these webinars are "Bias and Barrier" and "Leadership Development." The class continued during two semesters, which was the first time for us to learn "Bias and Barrier" and "Leadership Development" in systematic way. It was the winter of 2009 to early summer of 2010. I could learn unconscious bias from her lecture very deeply, which included "Orchestrating Impartiality," as well as "Are Emily and Greg More Employable than Lakisha and Jamal?" and so on. "Top Ten Tips" for the recruitment of the faculty members, developed by University Wisconsin-Madison, was also presented in her lecture. No other person had such experiences like me. I have been making efforts to spread their thoughts to the STEM people in Japan for these several years by giving lectures and so on. I owe these people and Japanese colleagues for my accomplishments. ✪

"Expatriate Assignment" continued from page 17

willing to work internationally may actually benefit women in this regard, because they may have greater latitude in turning down an expat assignment without it being perceived as a psychological contract breach. However, whether male or female, it may be more difficult to get away with saying no to an international posting when you have specialized skills that are needed at an overseas site.

If you do choose to decline an expatriate assignment, be aware that your commitment to the company may be questioned. As such, it is probably a good idea to remind your managers of the ways you have demonstrated your dedication in the past (e.g., by taking on special assignments or being willing to relocate domestically) and to find other ways of showing your loyalty to the organization in the present and the future. It may also be possible to find alternative ways of fulfilling the goals of a forgone international assignment, for instance through more frequent international travel, a short-term assignment, or via virtual technology and electronic communication.

It may also be possible to find alternative ways of fulfilling the goals of a forgone international assignment, for instance through more frequent international travel, a short-term assignment, or via virtual technology and electronic communication.

How Declining Expatriation Can Affect Other Women's Opportunities to Do So

As noted earlier, international assignments can often create pathways to the upper echelons of organizations. However, according to the latest *Global Relocations Trend Report*[4], only 25% of expatriates are women. Although this number has been rising, it still means that a critical avenue to the top of many organizations is disproportionately composed of men. This can make it more difficult to shatter the glass ceiling, especially when companies expect their leaders to possess global knowledge and skills developed while working in other cultures. Given that women are less likely to be offered the chance to work internationally, those who want to take on an expatriate assignment should be proactive and explicit in expressing their interest to their direct managers, mobility managers, and other decision makers in their organization. As we have described, for female professionals who cannot (or would prefer not to) relocate abroad, our research suggests that managers may actually be more understanding when women decline a foreign assignment than when men do so. However, it is possible that women who choose not to work abroad will inadvertently contribute to the disproven myth that women are less interested and less willing to take on international assignments than men. Consequently, organizational leaders should be aware of the unique cross-cultural strengths that female expatriates possess relative to their male peers, as well as the unique challenges that women face relative to their male counterparts when it comes to turning down a foreign posting. In addition, to allow all women to more fully maximize their potential and more companies to reap the benefits of their employees' talents, organizations should craft career development strategies that allow women to advance both inside and outside of their home country, whether they accept or decline an international assignment

Let Your Voice Be Heard

Have you declined an international assignment? If so, we want to hear your story. Please contact the first author at mbolino@ou.edu for details. ✪

Mark C. Bolino, PhD, *is the Michael F. Price Chair in International Business at the Price College of Business at the University of Oklahoma. His research focuses on employees' willingness to go the extra mile for their organizations, impression management in the workplace, global careers, and the psychological contracts between employers and their employees. Bolino received his PhD from the University of South Carolina.*

Anthony C. Klotz, PhD, *is an assistant professor of management in the College of Business at Oregon State University. His primary research involves studying how and why employees balance their good deeds and bad deeds at work, investigating the different ways that employees resign and the causes and effects of different resignation styles, and exploring the conditions under which team conflict benefits team performance. Klotz received his PhD in Organizational Behavior from the University of Oklahoma in May 2013.*

William H. Turnley, PhD, *is the Sam and Karen Forrer Chair in Business Ethics at Kansas State University. Turnley conducts research in the areas of organizational behavior, human resource management and business ethics. He received his PhD in Organizational Behavior from the University of South Carolina in 1996.*

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"Professional Associations" continued from page 35

students and researchers to come to the United States. These efforts should include lobbying funding agencies and policy makers, as well as research and public education about the value and benefit of international collaboration, and about the gendered and elitist construction of global science and its implications for women and minorities in the United States and the world.

Promoting Inclusive Global Science

When professional associations promote inclusive internationalization in order to build an inclusive world of global science, they benefit science, academia, and women in the United States and globally. Our goal should not just be to make better use of women's talents to strengthen the competitive position of U.S. science globally, but to engage more women in science across the globe. Similarly, the underrepresentation of women in many STEM fields is not merely a national issue, but in part a consequence of selective mechanisms in international networks that have created less access for women academics. Women's successes in academia are intertwined and interconnected across national borders. Thus, the goal of integrating women into STEM and academia more broadly cannot be separated from the globalization of science and higher education.

Debates on advancing women in science and research on gender and academia too often do not take into account the globalization of academia; they implicitly assume that U.S. academics are born in the United States, have been educated in the United States, work only in the United States, have only U.S. collaborators, and are on national career paths. But today, engagement in global science is crucial for the advancement of scientific knowledge and for higher education overall. Regardless of the current political climate, it is essential to build inclusive partnerships and collaborations across national borders, to support women in surmounting the glass fences that keep them from crossing those borders, and to work to tear down those fences altogether. ✪

When professional associations promote inclusive internationalization in order to build an inclusive world of global science, they benefit science, academia, and women in the United States and globally.

Kathrin Zippel, PhD, *is associate professor of sociology at Northeastern University, and author of the books* Women in Global Science: Advancing Careers through International Collaboration *(2017, SUP) and* The Politics of Sexual Harassment: A Comparative Study of the United States, the European Union, and Germany *(2006, CUP), winner of the APSA Victoria Schuck Award.*

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Recent Blogs:

Zippel, K. (2017). "Here's one way to help women in science: Support international collaborations." https://www.washingtonpost.com/news/monkey-cage/wp/2017/04/22/heres-one-way-to-help-women-in-science-support-international-collaborations/?utm_term=.1aa0b0137cb2

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"Vera Rubin" Continued from page 43

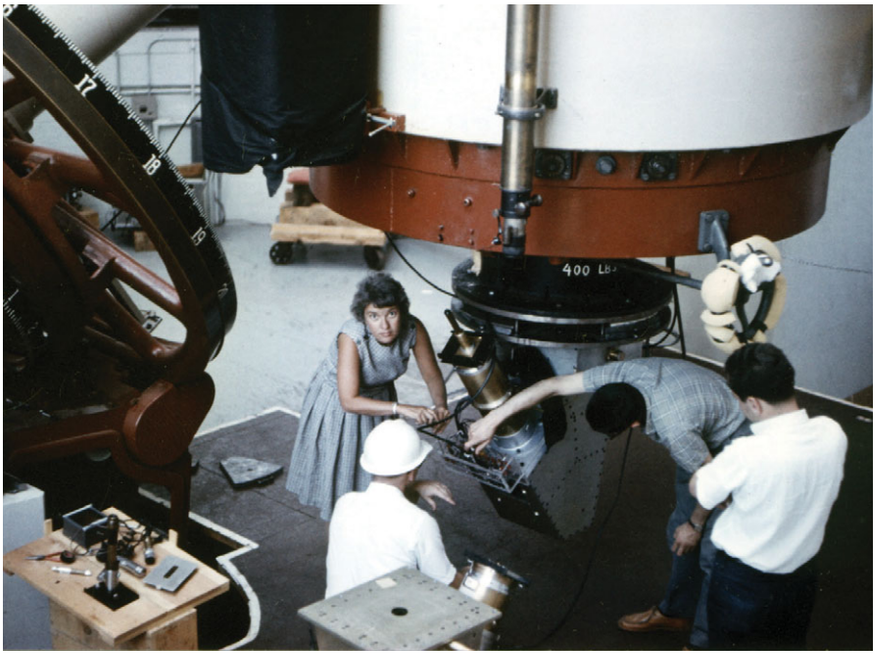
U.S. National Medal of Science, the Gold Medal of the Royal Astronomical Society in London, the James Craig Watson Medal of the U.S. National Academy of Sciences (she was also elected to membership in 1981), the Cosmos Club Award, and the Gruber International Cosmology Prize, in addition to numerous other awards and honorary degrees.

Dr. Rubin spent her entire career trailblazing her way through an academic system that perpetually slammed doors in her face and ignored her results, yet she persisted and ultimately triumphed as a scientist and working mother of four. A committed feminist, she was an outspoken advocate for the inclusion and advancement of women in science and a lifelong mentor, joining AWIS in 1971 and becoming a Fellow in 1996. Meg Urry, Israel Munson Professor of Physics and Astronomy at Yale University and AWIS Fellow, calls Dr. Rubin "the ultimate role model. She did amazing science and always turned around to make sure other women were following behind her. Her spirit remains undimmed among us, especially among women in science, whom she helped so much."

Dr. Rubin liked to say that she lived and worked with three basic assumptions:

1) There is no problem in science that can be solved by a man that cannot be solved by a woman.
2) Worldwide, half of all brains are in women.
3) We all need permission to do science, but, for reasons that are deeply ingrained in history, this permission is more often given to men than to women.

Besides her remarkable accomplishments, she was much liked and admired by her fellow astronomers. Says Robert Kirshner, Clowes Research Professor of Science at Harvard University, "Vera was a very productive and happy person, full of enthusiasm for her own work and truly interested in finding out about yours. Without bitterness, she helped us all raise our sights and try harder to make astronomy more inclusive."



In 1965, Carnegie scientist Vera Rubin was performing space observations at Lowell Observatory in Flagstaff, Arizona, and Kitt Peak National Observatory near Tucson, Arizona. She and Carnegie scientist W. Kitt Ford used radio-telescopes to observe quasars (quasi-stellar radio sources), the faintest and most distant objects known.

Close friend and fellow astronomer Goetz Oertel remembers her this way: "Humans have long admired the beauty of the night sky, studied its nature, and sought what it may mean or what it may tell us. Vera soared from wonder to exceptionally serious, deeply curious observation and study. Through her pioneering work, and tireless mentoring of young astronomers, Vera effectively broke the gender barrier in that field, and ultimately for all women in science. She carried the gender equality banner gently but firmly and won countless battles for that cause." ✪

Nancy Forbes *provides subject matter expertise, technical leadership, management, and guidance to the Networking and Information Technology Research and Development (NITRD) Program, including identifying opportunities for coordination and collaboration among the NITRD Agencies at the National Coordination Office for Networking and Information Technology Research and Development. Ms. Forbes has over 25 years' experience with a broad range of science and technology-related programs in both the military and civilian sectors, as well as in the Intelligence Community (IC), ranging from management and technical oversight of R&D programs (R&D) to intelligence analysis, technology assessment, acquisition and systems engineering.*

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"ACA's Marketplace Coverage" continued from page 41

marketplace plans to include a sufficient number and geographic distribution of private practitioners, such as obstetrician-gynecologists and nurse-midwives, who provide reproductive health services.

The ACA further requires all marketplace plans to contract with so-called essential community providers. These are providers that primarily serve low income, medically underserved individuals who are likely to experience difficulty accessing care—in large part, the very demographic targeted by the ACA's coverage expansions. In states that opted for the federal government to administer their ACA marketplaces, plans are held to standards for contracting with essential community providers set by the Department of Health and Human Services: Currently, a plan offered through these marketplaces must contract with at least 30% of the available essential community providers in its service area and offer contracts to at least one safety-net family planning provider in each of the counties that make up the plan's service area (where available). Many states that chose to administer their own ACA marketplaces have adopted these same federally defined standards, and some have even stronger contracting requirements.

The ACA's coverage advances are being felt within the family planning safety net. A recent analysis of data from 28 safety-net family planning providers across the country found that the overall proportion of uninsured client visits decreased from 44% in the last three quarters of 2013 to 33% during the same period in 2015. This drop was the result of increases in both visits paid for by Medicaid and those paid for by private insurance.

Dismantling marketplace coverage would harm sexual and reproductive health

Continuing a years-long crusade, conservative policymakers in Congress have been working to dismantle the ACA, including some of its key provisions that advance the accessibility and quality of coverage available on the health insurance marketplaces and in private insurance more broadly.

For instance, conservatives are seeking to drastically scale back federal subsidies that help make private coverage affordable. The American Health Care Act, passed by the House in May, has the backing of President Trump and seeks to undermine the ACA in part by doing away with cost-sharing subsidies and overhauling the ACA's premium tax credits, largely basing the amount of help people could receive on their age, rather than on their income and the cost of coverage. This would result in considerable declines in tax credits for lower income individuals and those living in states and counties with high-cost plans. Analyses—including from the Congressional Budget Office—have suggested that together, these changes would result in millions fewer individuals having coverage in the individual market, and in health plans that would be less comprehensive and would have higher copays and deductibles.

In a concession to the most conservative members of the House, the final iteration of the bill seeks to eliminate the requirement that marketplace and other private plans must cover the 10 essential health benefits, including maternity care. Doing so would have broad consequences for sexual and reproductive health. For instance, prior to the ACA, only a handful of states required coverage of maternity care, and plans frequently offered no or limited maternity coverage or refused to cover women who were already pregnant—classifying pregnancy as a "preexisting condition." Repealing these minimum coverage requirements would result in more plans with paltry coverage, jeopardize the health of women and infants, and cost women more for truly comprehensive coverage they can actually use.

In addition, the newly installed secretary of the Department of Health and Human Services, Tom Price, has long vociferously opposed the ACA and its contraceptive coverage guarantee specifically. His agency can undermine or eliminate that guarantee, with or without congressional action—and, as of early June, seemed poised to do so imminently. Although private plans widely covered contraception prior to the ACA, many failed to cover all methods, and most required copayments that put certain methods—and potentially any method—out of reach for many women.

Moreover, the Trump administration is already moving to weaken provider network requirements, by proposing that the proportion of essential community providers with which plans on the federal marketplace are required to contract be reduced from its current minimum of 30% to 20%. That is the opposite direction such standards should be going to ensure that lower income enrollees in particular are able to access the family planning and related care they need.

At the beginning of his term, President Trump issued a decree that his administration do as little as possible to support the systems and standards required to facilitate the ACA and its marketplaces. Trump has asserted that the ACA's marketplaces will "explode" on their own—a signal to many observers that his administration might actively sabotage the law from within. Taken together, all of these actions make it clear that the Trump administration and Congress are poised to take affordable, comprehensive private health coverage—including coverage of much-needed sexual and reproductive health services—away from millions. If they succeed, it would be much to the detriment of the health and well-being of individuals, families and the nation's public health.

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Johnna Frierson, PhD

Director of Diversity and Inclusion
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What is your favorite word?
Strategic. It's more than a word to me—more like a philosophy. On great days when I have achieved a goal that I'm particularly proud of, I can reflect on this idea and be proud of the strategic steps that I took to allow me to obtain my goal. On challenging days, it becomes a reminder to focus on the things that I can control—much easier said than done!—and devote my time and energy to determining how I can effectively and efficiently get things back on the right track.

How do you define it?
For me, "strategic" means acting with intent and purpose and being ready for the opportunity that has yet to even present itself. In my professional life this means striving to find a balance between being fully present and engaged in the moment, while continuously assessing my environment for opportunities to grow. This could be an opportunity to develop a new skill, identify an opportunity for collaboration, or gain fresh insight through listening to a different perspective. As scientists, we're trained to think critically in a methodical, strategic manner, and I believe this to be one of my strongest assets, because it means that no matter what I'm faced with, I'm confident I can obtain the information and resources needed to develop a plan of action to move forward.

Has your word influenced you during your career, or is it a word that you have chosen retrospectively?
This word is one that has steadily emerged over the years and has definitely influenced me during my career, even through the times when I've been uncertain of where my next step may lead me. The most rewarding experiences and biggest victories I've experienced professionally have come as a result of working and thinking strategically.

What other interests do you have?
I really enjoy spending time with my family, listening to music, and attending concerts when I am able to do so. I love many genres, but one of my favorites is '70s funk/soul music exemplified by bands like Earth, Wind, and Fire. I recently began learning to play the bass guitar out of a desire to do something new, and to have a greater connection with my favorite classic funk songs. ✪

Johnna Frierson, PhD, *is Director of the Office of Diversity and Inclusion in the Pratt School of Engineering at Duke University. A native of Rock Hill, SC, she received her bachelor's degree in biology at Furman University, and her PhD in microbiology and immunology at Vanderbilt University. Her interests and expertise lie in examining and identifying solutions to challenges at the intersection of STEM, education, and diversity. Dr. Frierson translates this expertise into developing innovative programs and initiatives to enhance recruitment and retention of students and faculty from underrepresented backgrounds, support student development, and expand community outreach to inspire the next generation of STEM scholars.*

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