

**EQUITABLE SOLUTIONS
FOR RETAINING A ROBUST
STEM WORKFORCE
BEYOND BEST PRACTICES**

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FOR WOMEN
IN SCIENCE

EXECUTIVE SUMMARY



INTRODUCTION

In today's competitive environment, employers who resist tailoring workplace practices to retain the best talent of both genders will be increasingly unable to compete in a global marketplace. Many institutions and organizations have begun to recognize this reality. Of particular consequence to maintaining America's edge in the innovation economy is the importance of including women in the science, technology, engineering, and mathematical (STEM) fields. However, a number of complex cultural, social, and economic forces within this community and beyond can make inclusion and retention of women, and with increasing incidence, men challenging as our data shows.

Over the last 40 years, 42% of all STEM degrees have gone to women; however, women only make up 27% of the STEM workforce. While the number of women employed in biological and life sciences related occupations has inched up, women's employment in the mathematical and computer sciences has actually dwindled. Fortunately, evidence-based programs that address the work-life challenges of STEM employment, including dependent-care responsibilities, dual-career relationships, the need for mentoring, and the ability to travel to professional meetings are emerging to assist employers as they seek to maximize their talent pool.

The book *Equitable Solutions for Retaining a Robust STEM Workforce: Beyond Best Practices* aims to support movement in that direction by providing data and case studies of projects developed to address a variety of work-life challenges. To inform a rigorous dialogue on work-life integration and to prove best practices can have positive impact on the retention of working women, the largest survey ever undertaken of work-life options, access, and usage in the global STEM workplace was conducted in early Fall 2011 by Elsevier's research arm in collaboration with the Association for Women in Science (AWIS). As an eminent publisher of scientific, technical and medical information products and services, Elsevier has distinguished itself as a leader in fostering policy change to accommodate the new realities of the 21st century STEM workplace. The survey provides a snapshot of both men's and women's perspectives on work-life issues including workplace flexibility, family responsive policies, and dual-career issues.

SURVEY METHODS

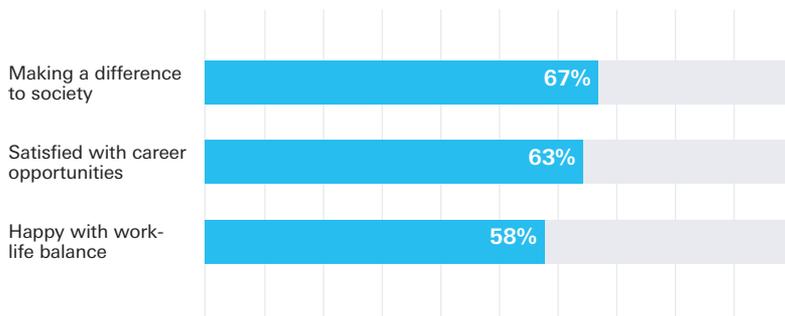
At AWIS, we know that good data can drive positive system transformation. Between December 2011 and January 2012, a total of 51,380 individuals were randomly selected from across 1.2 million international authors who had published in 2009. These authors were sent via e-mail an invitation to participate in the "Research Insights Index" survey, which included 15 questions on work-life issues plus demographic questions.

The online survey took approximately 12 to 15 minutes to complete. When the survey closed on January 31, 2012, a total of 4,225 scientists had responded, equal to a response rate of 9.5% (in proportion to the valid base of 44,351 individuals, from which 7,029 individuals were excluded because the e-mails were returned undeliverable). In order to ensure proportional representation by country and discipline, mailings were controlled. That is, if response was low from a certain group, then additional invitations were sent. Because representativeness was achieved via this managed mailing strategy, the data were not weighted. Results at the top level are based on 4,225 responses and have a margin of error that is +/- 1.3% at the 90% confidence level.

GLOBAL PERSPECTIVES ON CAREERS IN STEM

Survey respondents were working scientists and researchers who publish academically across all disciplines. Of the respondents, 80% were married or partnered, 70% were male, 64% worked at a university and 24% were from the United States. For purpose of analysis, the data were grouped into nine fields of endeavor: chemistry, computer science, earth and environmental science, engineering, life sciences, materials science, mathematics, medicine and allied health, physics and astronomy, plus a tenth category comprising social science, arts/humanities, and economics.

OVERALL PERCEPTIONS OF JOB SATISFACTION



1. Is scholarly research making a difference?

Two-thirds agreed that their research is making a difference to society. Agreement with this statement increases with age, presumably because older researchers have a larger body of work to reflect on than those at an earlier stage in their career. Specialties that

are more applied and dealing with people e.g. medicine, are more likely to report that their research is making a difference than those in more theoretical specialities such as mathematics, physics and computer science. There is also a difference in opinion by region/ country; researchers from Eurozone countries (e.g. Spain, Italy, Germany) are less likely to agree, perhaps due to funding cuts resulting from the economic crisis. Agreement was higher in North and Latin America.

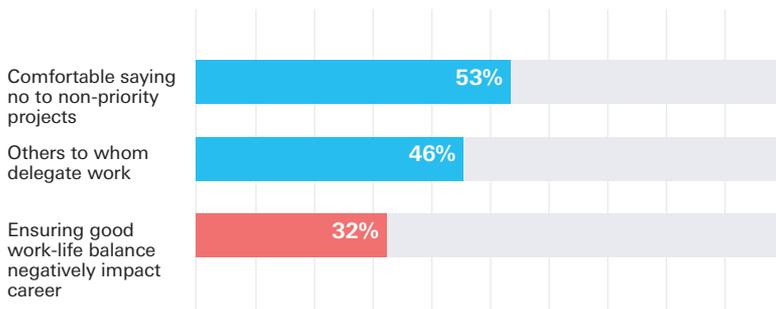
2. Satisfaction with career opportunities

Less than two-thirds of researchers are happy with their career opportunities. This also increases with age from 57% among those under 36 to 74% among those age 56 and over. Satisfaction is linked to job security (permanent positions), a clear progression path and having a good work-life balance. Those dissatisfied mention lack of permanent positions, low salary and lack of funding. Countries in which satisfaction was highest were USA (67%) and China (74%); conversely satisfaction was lowest in European countries e.g. Italy (46%), Spain (48%), Germany (53%) and the UK (53%).

3. Work-life balance

Less than three-fifths were happy with their work-life balance. Those who were happy successfully separate their work and personal lives, or are able to reduce their working hours or adopt flexible working hours. Those aged 56 and over were most happy (70%). Females were less likely than average to be happy with their work-life balance (52%) as were single respondents (51%) but having dependent children had no impact. Researchers in the UK and Germany were particularly unhappy with their work-life balance.

DIFFERENCES IN WORK-LIFE BALANCE ISSUES



1. Saying no to non-priority projects

Slightly more than half agreed that they were comfortable saying no to projects that they did not consider to be a priority. Agreement was less closely linked to seniority than was having others to delegate to. A key factor was whether a researcher had a permanent position (tenure) which ensures they have more freedom in decision making. Those disagreeing were not in a position to decide priorities and felt that saying no would damage their careers or their working relationship with colleagues.

Female researchers were less likely to agree than males (47% compared with 55%). Likewise agreement increased with age (47% of those under 36 agreed vs. 65% aged 56 and over). Researchers in North America were more likely to agree (58%) while those in Japan were least likely (29%).

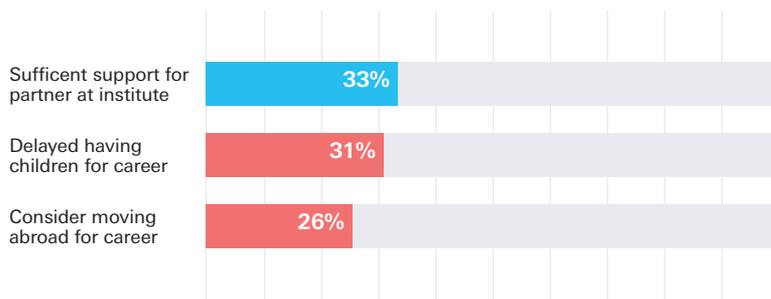
2. Delegation is a matter of seniority ... and gender

Just less than half of researchers (46%) agreed that there are others at work to whom they can delegate tasks. Those agreeing typically have assistants or work within a team, while those disagreeing do not. Those disagreeing also mention that colleagues may not have the specialized knowledge required to undertake tasks. Agreement increased with seniority: three-fifths (59%) of department heads agreed compared with 53% of senior researchers and 37% of researchers. Those under 36 were less likely to agree (38%), as were female researchers (40%) and those working in the UK (35%) and Italy (38%). Conversely, researchers aged 36 and over (48%), male (49%) and working in Germany (58%) were more likely to agree.

3. One-third report a negative impact on career if striving for a good work-life balance

Agreement was higher among those with dependent children (36%), and particularly female researchers with children (46%). It was evident from verbatim comments that having family commitments limited ability to relocate for better research positions and that to be successful in research they had to be focused on their career. Those disagreeing noted there was no negative impact from having a good work-life balance or that it enhanced their career performance. Agreement was highest in the UK (39%), Canada (36%) and China (41%), but lowest in Italy (23%) and Brazil (13%). More than half of all scientists and researchers said that work demands conflict with their personal lives at least 2-3 times per week.

DIFFERENCES IMPACT ON CAREER / LIFE DECISIONS



1. How family friendly are institutional employment policies?

Given that it is not uncommon for researchers to need to relocate for research positions, only a third of researchers agreed that their institute provided sufficient support for their spouse. Of those agreeing, some report that their institution has a spousal hire policy while others note that flexible working or benefit plans support their spouse. Those disagreeing (also 33%) indicate that their institution does not have a spousal hire policy or that such policies or other types of support are not available because of funding cuts. Agreement is lower than average in North America and Western Europe (28% each) while it is highest in the Asia Pacific Region (45%) and Latin America (42%).

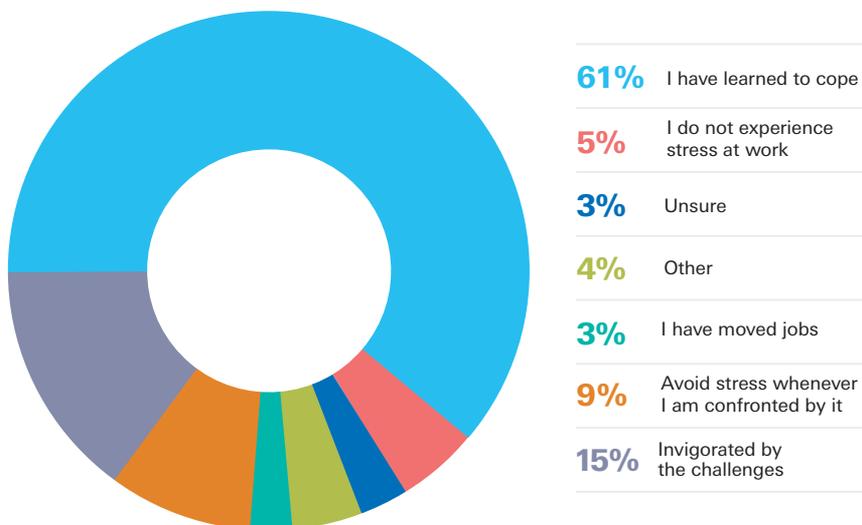
2. More than one-third of female researchers have delayed having children in order to pursue their research career

39% of females agreed with this statement compared with 27% of males. Agreement also decreased with age. Those agreeing were waiting until they had a permanent position or noted that they could not afford to start a family on their current wage. Only a third of researchers agreed they work for family friendly institutions. Only 29% of scientists in the USA who responded said that their spouse or partner receives sufficient support from their institution. By comparison, 65% of Chinese scientists felt that their spouses or partners were receiving sufficient support.

3. A quarter would consider moving abroad to further their career

This was particularly the case for young (45% aged under 36) or single (41%) researchers as well as those specializing in hard sciences such as computer science (38%) and researchers in China (37%) and the Eurozone. Drivers of agreement were the expectation of more opportunities / funding / permanent positions available abroad. Agreement was notably low in the USA (13%).

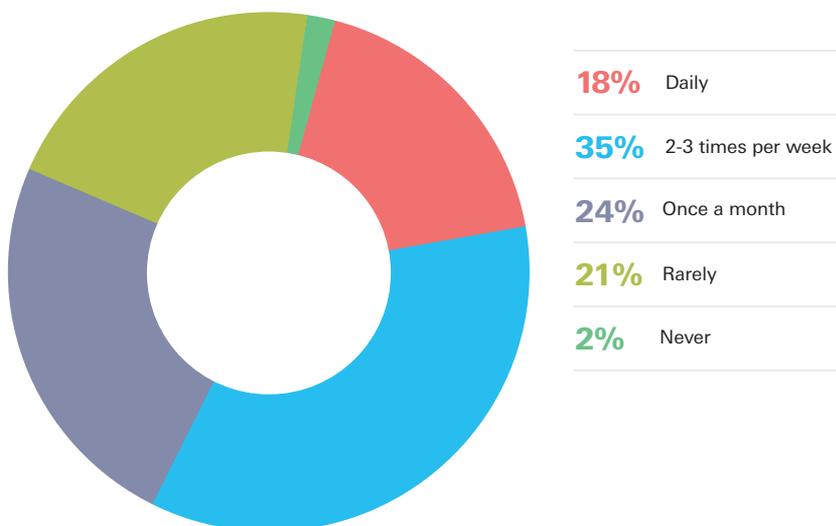
MAJORITY ARE COPING WITH STRESS



The vast majority of researchers experience stress at work and the majority (61%) report they have learned to cope with it. Only a small minority (15%) reported that they responded positively to stress, seeing it as an invigorating challenge.

Female researchers and those with children are slightly more likely to state they have learned to cope as were researchers in Canada (75%), the UK (70%) and the USA (66%). Italian researchers were the most likely to be invigorated by the challenge (26%). Only 3% had moved jobs because of stress.

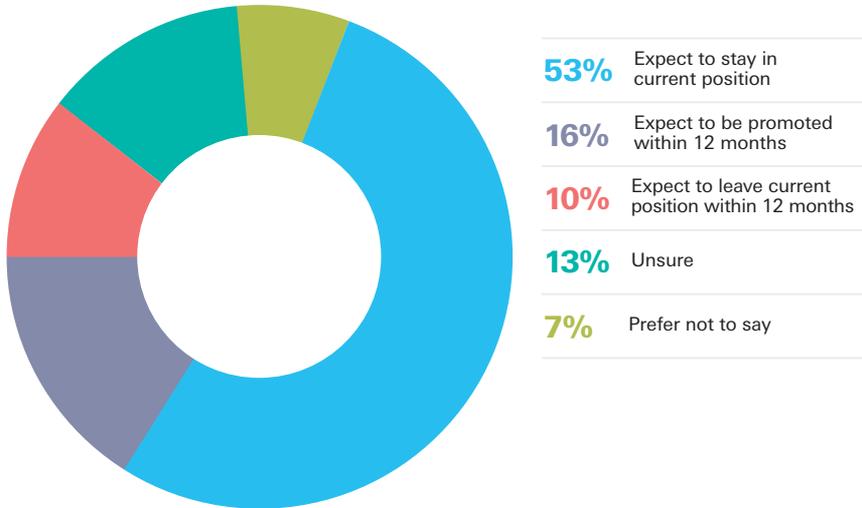
HOW OFTEN DO WORK AND LIFE DEMANDS CONFLICT?



A conflict of work and life demands is a weekly occurrence for more than half of researchers, though is slightly more common for those with children (61%) and for females (58%) (note that even among females without dependent children it is more common).

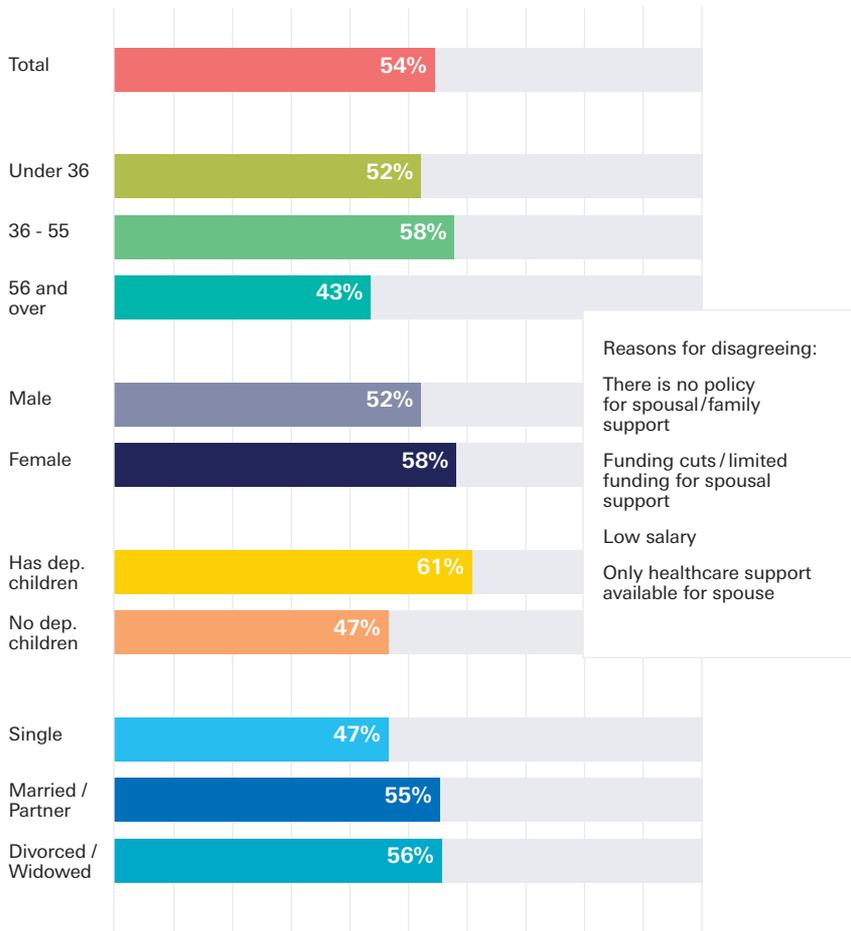
Researchers in the USA (60%), Canada (68%) and the UK (62%) were most likely to experience a conflict between work and their personal life at least weekly. Specialists in medicine and allied health were the most likely to report a conflict at least weekly (63%).

MOST RESEARCHERS INTEND TO STAY OR EXPECT PROMOTION



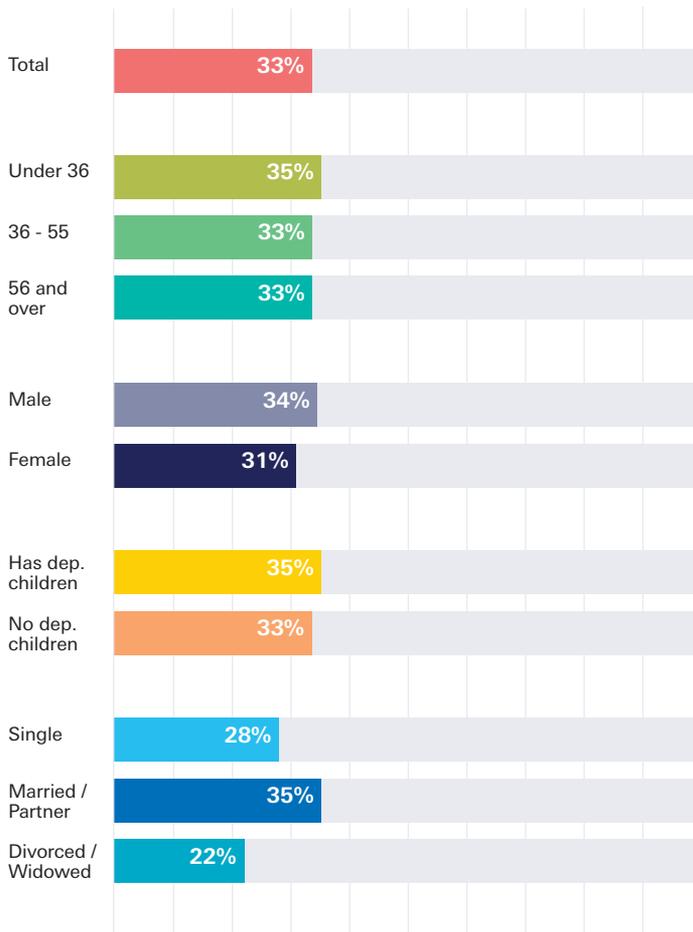
Around half of researchers expected to stay in the same position and a further 16% expected to be promoted. One in ten expect to leave their current position while 13% were uncertain. These expectations vary considerably by age; three quarters of those aged 56 and over expected to stay in the same position, and of those expecting to leave it was due to retirement.

WORK DEMANDS FREQUENTLY CONFLICT WITH LIFE DEMANDS



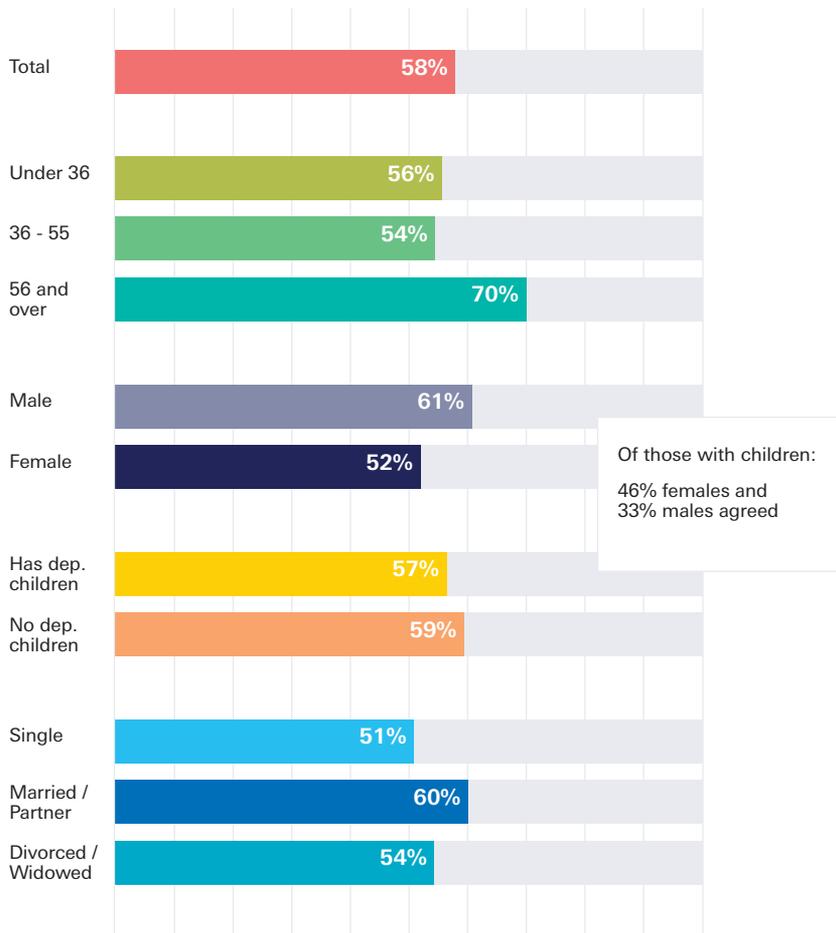
More than half (54%) of all scientists and researchers said that work demands conflict with their personal lives at least 2-3 times per week.

THERE IS SUFFICIENT SUPPORT FOR MY PARTNER / SPOUSE AT MY INSTITUTE



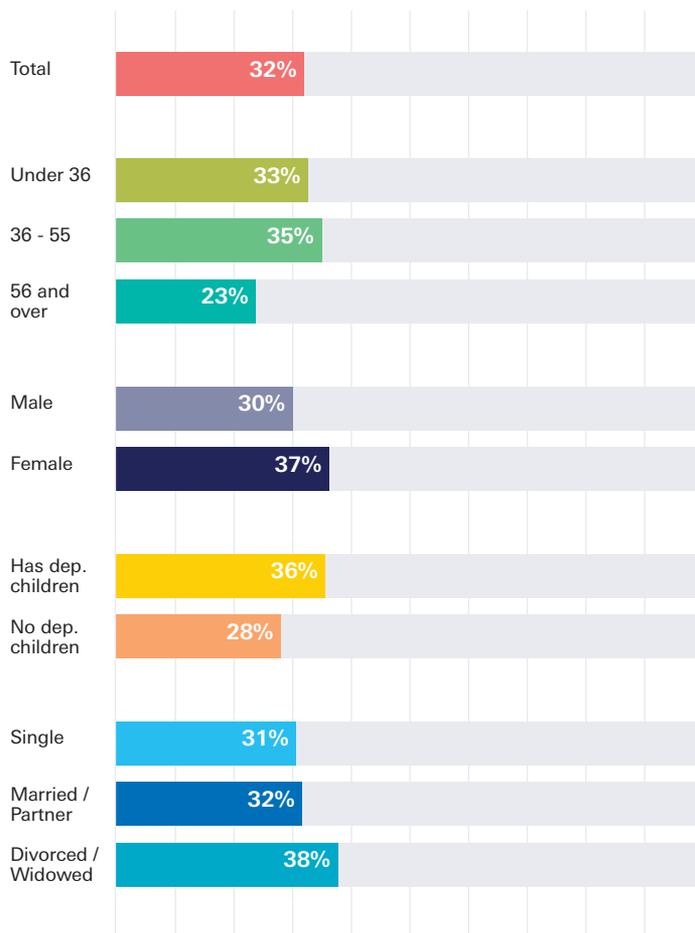
Only one-third of researchers agreed they work for family friendly institutions. A number said that their employers do not have spousal hire policies or that such policies are not available because of funding cuts.

I AM CURRENTLY HAPPY WITH MY WORK-LIFE BALANCE



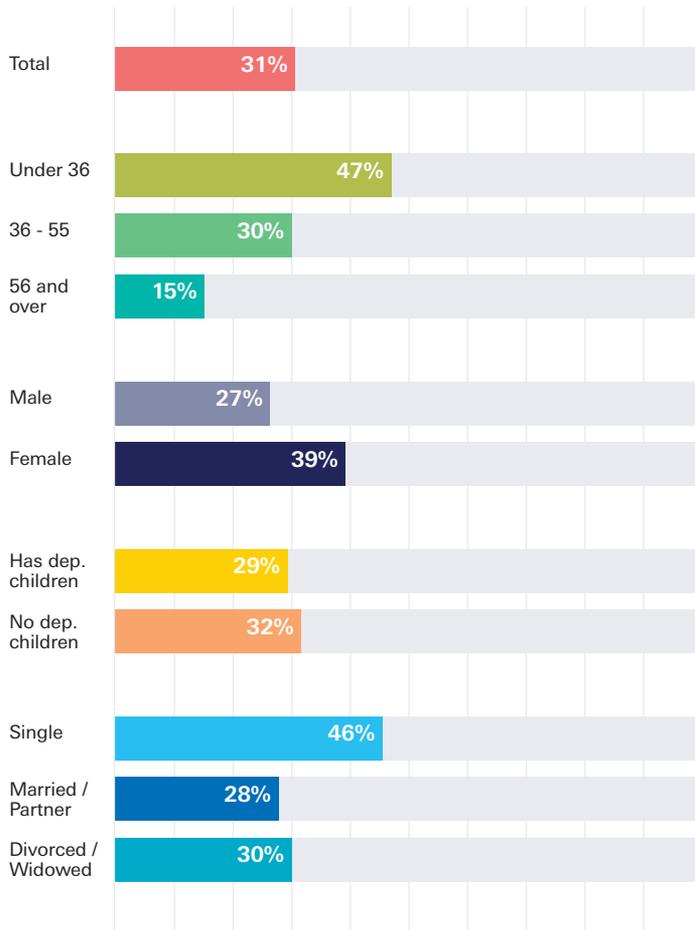
Only half of the women (52%) reported that they are happy with their work-life integration, compared with 61% of men working in research across all fields.

ENSURING I HAVE A GOOD WORK-LIFE BALANCE HAS NEGATIVELY IMPACTED MY CAREER



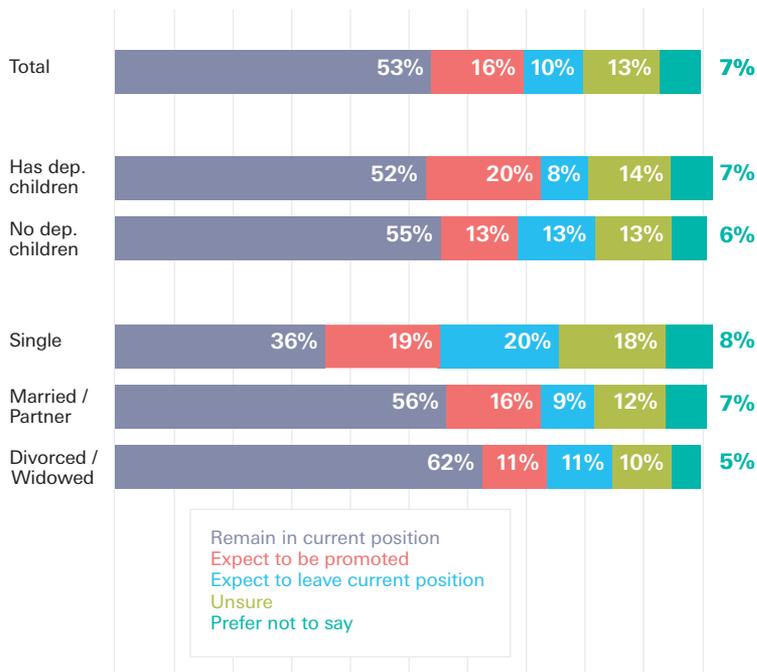
One-third of researchers say that ensuring good work-life integration has negatively impacted their careers and women (37%) were more likely than men (30%) to say this was the case. For those researchers with dependent children, 36% reported career problems.

I HAVE DELAYED HAVING CHILDREN IN ORDER TO PURSUE MY CAREER IN RESEARCH



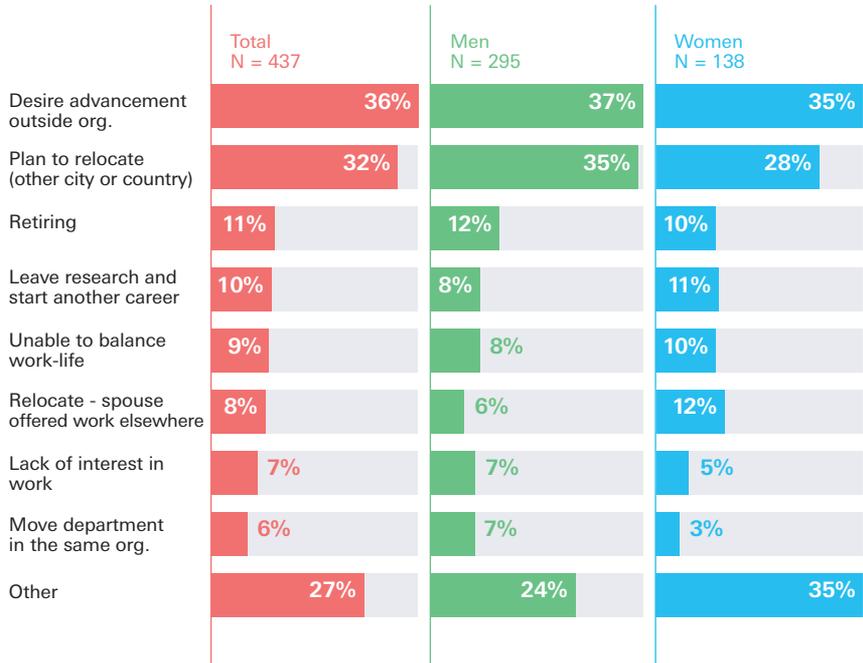
Nearly 40% of women respondents have delayed having children because of their careers, while 27% of males indicated the same situation. A number of women mentioned waiting until they had a permanent position to get pregnant or noted that they could not afford to start a family on their wages.

HOW DO YOU SEE YOUR POSITION CHANGING OVER THE NEXT 12 MONTHS?



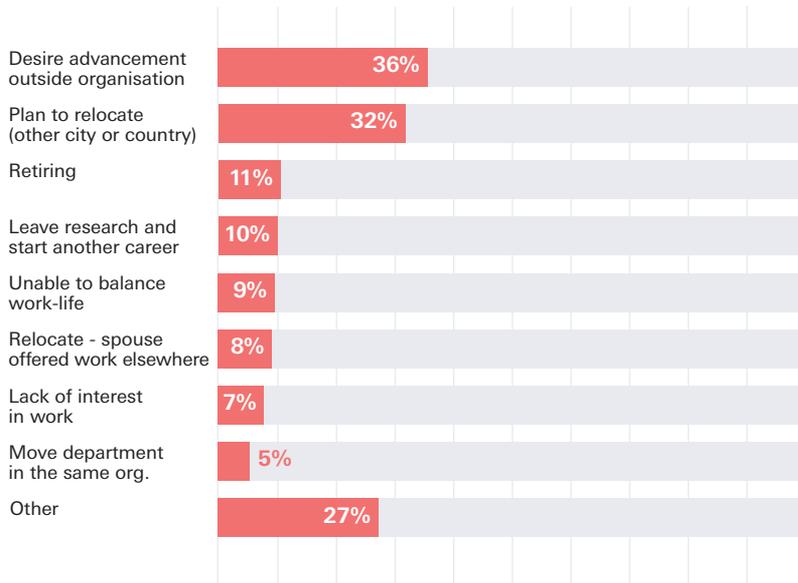
One in 10 researchers indicated that they expected to leave their current job within the next year. Responses varied considerably by age. The older the respondent, the more likely they were to indicate that they would be remaining in their current position. Married and divorced/widowed respondents were far more likely to indicate that they would be remaining in their current position than single respondents. Having children did not have a significant effect on response.

WHY EXPECTING TO LEAVE CURRENT ROLE: GENDER DIFFERENCES



Of those intending to leave, females were twice as likely (12%) as males (6%) to cite a spouse's job offer or relocation as the reason.

YOU INDICATED THAT YOU EXPECT TO LEAVE YOUR CURRENT ROLE. PLEASE IDENTIFY THE MAJOR REASONS



Of researchers intending to leave, 9% indicated it was because they were unable to balance work-life integration.

SUMMARY

Developing and sustaining a viable community of STEM professionals is a challenge faced not only by individual countries, but also by all national and regional participants in the global marketplace. As noted in the analyses above, countries and global regions are beginning to recognize the necessity of moving toward gender equity and of developing policies that support full inclusion of both women and men in the STEM enterprise.

This survey forms the framework for the workplace challenges faced by research scientists around the world. To obtain more detailed information on retaining a robust workforce, purchase the book *Equitable Solutions for Retaining a Robust STEM Workforce: Beyond Best Practices*. Visit www.awis.org for purchasing information.

AN OVERVIEW OF THE GLOBAL HIGHLIGHTS

China

- 76% of Chinese researchers are satisfied with their career opportunities
- 41% of Chinese researchers state that they had delayed childbearing.

Japan

- Saying “no” to non-priority projects was reported by 29% of Japanese researchers.
- One-quarter of Japanese researchers said that ensuring a good work-life balance has negatively impacted their careers.

United Kingdom

- Only 45% of UK researchers are satisfied with their work-life balance.
- Less than one-fifth of UK researchers (16%) indicated that there is sufficient support for their spouse/partner at their institution.

Germany

- Their balance between work and life is satisfactory for 51% of German researchers.
- 58% of German researchers can delegate tasks to others in their workplaces.

USA

- Only 13% of US researchers would consider moving to another country to further their careers.
- More than three-fourths (77%) of US researchers believe the work they are doing is making a difference to society.

France

- 90% of French researchers undertake research because of the joy of discovery.
- Slightly more than one-quarter (27%) of French researchers have delayed having children to pursue their careers.

Canada

- 61% of Canadians are comfortable saying no to work or projects that they do not consider a priority.
- Moving to another country to further career advancement is an interest of only 16% of Canadian researchers.

Italy

- 60% of Italian researchers report satisfaction with their work-life balance.
- Only 46% of Italian researchers are satisfied with their career opportunities.

Spain

- 61% of Spanish researchers are satisfied with their work-life balance.
- A desire to move to another country to further their career was reported by 32% of Spanish researchers.

Brazil

- 78% of Brazilian researchers feel that their work is making a difference to society.
- Only 13% of Brazilian researchers report that ensuring a good work-life balance has negatively impacted their careers.

AWIS experts on work-life integration are available for media interviews, workshops, and presentations. Contact awis@awis.org to get more information. Visit us online at www.awis.org. For more detailed analysis on this survey and access to case studies and best practices for retaining a robust staff force, purchase the book *Equitable Solutions for Retaining a Robust STEM Workforce: Beyond Best Practices*.

Visit www.awis.org for more information.

ABOUT THE AUTHORS:

Donna J. Dean, Ph.D., is a consultant on leadership and talent development. She has presented more than 80 workshops and seminars at universities and professional meetings in the past four years on those topics, many in her roles as Executive Consultant to the Association for Women in Science and Career Consultant to the American Chemical Society. Prior to 2010, she was Senior Science Advisor for five years with Lewis-Burke Associates LLC, a government relations firm. She has 27 years of experience in research and science policy at the U.S. National Institutes of Health and the Food and Drug Administration. Her training includes the B.A. in chemistry (Berea College), Ph.D. in biochemistry (Duke), postdoctoral research (Princeton), and executive leadership (Harvard JFK School of Government). Recent honors include the Berea College Distinguished Alumnus Award for her career achievements in the public sector and advocacy for underrepresented groups in science and engineering.

She is a fellow of the Association for Women in Science, AAAS, American Institute for Medical and Biological Engineering, and Washington Academy of Sciences. Dr. Dean has been a pivotal leader on scientific and technical workforce issues, in women's health, and in career development strategies for young scientist. She has written two books, *Getting the Most out of Your Mentoring Relationships: A Handbook for Women in Stem* (Springer 2009) and *Equitable Solutions for Retaining a Robust STEM Workforce: Beyond Best Practices* (Academic Press, 2014). She currently is on the Advisory Board for the AAAS Center for Advancing Science and Engineering Capacity and the Senior Women's STEM Council, University of Maryland.

Janet Bandows Koster, Executive Director and Chief Executive Officer, Association for Women in Science has served as executive director and chief executive officer of the Association for Women in Science (AWIS) since July 2006. She has over 25 years of experience leading organizations in both the United States and overseas with particular expertise in global gender and workforce issues. A significant facet implicit to the mission of AWIS is the transformation of outmoded workplace structures.

As Executive Director and CEO of AWIS, Bandows Koster has authored numerous reports and presented at professional meetings about issues at the nexus of gender and science, technology, engineering, and mathematics (STEM). She is Principal Investigator and Co-Principal Investigator on several federal grants including AWARDS (Advancing Ways of Awarding Recognition in Disciplinary Societies) which partners with 20 disciplinary societies to increase women's contribution to the research enterprise. Bandows Koster holds degrees in international relations as well as an MBA in international business. Most recently, she has served two terms on the Board of Directors of the Society of Women Engineers as Director of International Initiatives. She is a Certified Association Executive, a member of the American Society of Association Executives and the Council of Engineering and Scientific Society Executives.

About AWIS

The Association for Women in Science (AWIS) is the largest multi-discipline organization for women in science, technology, engineering, and mathematics (STEM) dedicated to achieving equity and full participation of women in all disciplines and across all employment sectors. AWIS reaches more than 20,000 professionals in STEM with members and chapters nationwide. Membership is open to any individual who supports the vision and mission of AWIS. Visit www.awis.org for more information about AWIS and the book *Equitable Solutions for Retaining a Robust STEM Workforce*.





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