



Women in STEM, Globally

**AAUW -CA Program Committee International
Advocacy Presentation**

Host & Organizer: Indrani Chatterjee



Women in STEM, Globally

AAUW Mission

Advancing equity for women and girls through advocacy, education, philanthropy, and research. AAUW has been empowering women as individuals and as a community since 1881 (136 years)

Role in STEM Education

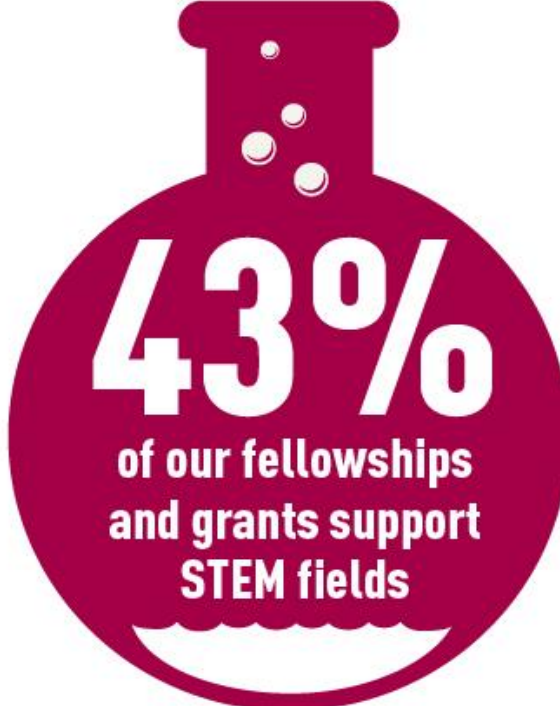
The STEM fields are rapidly becoming the most in-demand and lucrative in the world. Despite this demand, at almost every step of the STEM education path women and girls walk away. By middle school many girls are ambivalent toward these fields, and by the end of high school fewer girls than boys plan to pursue STEM studies in college.

AAUW has developed educational programs to encourage the Girls to join STEM Field thru Tech Trek Camps (middle school girls), Tech Savvy and STEM packs.

AAUW gives \$3.7 Million to Students and Grassroots projects every year
43% of Fellowships and grants support women in STEM Field every year
12000 Women and girls are empowered by the Community Action Grant projects

Women in STEM, Globally


\$3.7 MILLION
HOW MUCH WE GIVE
TO STUDENTS AND
GRASSROOTS PROJECTS
EVERY YEAR



43%
of our fellowships
and grants support
STEM fields



12,000 WOMEN & GIRLS
are empowered by the Community
Action Grant projects we support





Women in STEM, Globally

Speakers Introduction

Anasua Kusari, Ph.D.



Dr. Anasua Kusari is a scientist and Molecular Biology Core Manager at DaVinci Biosciences. She has decades of expertise in cell signaling and protein-protein interactions in mammalian cells. Currently, Dr. Kusari is working on developing a better understanding of the differentiation of cartilage from bone marrow stromal cells at the molecular level. She was invited speaker at the World Congress on Anti-Aging Medicine several times in 2015-2016. Prior to joining this company, she was teaching at the Keck Graduate Institute (KGI, Claremont, CA) which is designed to educate leaders for the biotechnology, pharmaceutical and healthcare products. Dr. Kusari obtained her PhD in molecular biology under the direct supervision of Professor Asis Datta, considered by some the most senior scientist in biotechnology in India, who has been the chief science advisor to the Prime Minister of India for many years.



Women in STEM, Globally

Chelsey Jurado, Software Engineer

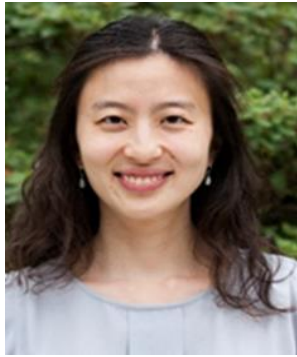


Chelsey Jurado is a Software Engineer at Symantec. She graduated from the University of Texas at El Paso (UTEP) with a Bachelor's of Science in Computer Science. As a student, she was a member of her local ACM-W chapter. Through ACM-W, she participated in various outreach events such as visiting local elementary schools. At these events she taught students to solve problems logically by using basic programming skills i.e. loops and if-statements. Chelsey was a research assistant at the Interactive Systems Group (ISG). Her research focused on developing a model to predict gaze-aversion in dyadic conversation over video chats. In 2017, she joined the Norton Secure Login (NSL) team where she is a full-stack developer. As a member of the team, she helps improve the NSL framework by implementing new features i.e. integrating FIDO Security Key as a method of Two Factor Authentication.



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Melody Man Hing Li, Ph.D.



Dr. Melody Li is an Assistant Professor in Department of Microbiology, Immunology and Molecular Genetics at University of California, Los Angeles since Fall 2017. Dr. Li received her Ph.D. in Microbiology from University of Washington, Seattle in 2011. She studied to elucidate the consequences of human polymorphisms in APOBEC3H, an inhibitory factor against HIV-1. Her work was among the first studies to establish an antiviral role for human APOBEC3H in vivo. Dr. Li subsequently completed her postdoctoral work at The Rockefeller University. As a postdoctoral fellow, Dr. Li was an ambassador for the Women & Science Initiative at The Rockefeller University, which was created in 1998 to support and showcase the contributions of women scientists. She learned that by sharing her journey through science, she could advocate for women scientists and empower others to pursue science. Dr. Li takes an active role in recruiting and mentoring female scientists in her lab.



Women in STEM, Globally

Ingrid Oakley-Girvan, Ph.D.



Dr. Ingrid Oakley-Girvan holds a primary research faculty appointment at the Cancer Prevention Institute of California and will soon be a Visiting Scholar at the Keck School of Medicine at USC. She has served as a co-President of an education foundation, successfully fundraised and initiated STEM education projects and acted as an Art Docent in her local community. She currently also serves as VP of Strategy for a technology start-up (Medable) based in Palo Alto, CA. In 2002 she has completed her Ph.D. at Stanford in the School of Medicine. She was awarded her first independent funding by NCI just prior to completing her Ph.D. She has combined behavioral interventions with biomarkers, genetics, epidemiologic data and multi-disciplinary team science in order to more effectively evaluate disparities in cancer incidence and survival. Recently, she began working with biosensors and HIPAA compliant mobile platforms to improve delivery of health care data for meaningful and relevant clinical impact.



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Discussion Questions

Q 1:

Challenges while pursuing your

- ❖ Education
- ❖ Building your career

Success Story

- ❖ Overcoming the challenges
- ❖ Achieving the goal



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Discussion Questions

Q 2:

Trend Analysis

Women participation in STEM field

❖ Education

❖ Career

Women in STEM Globally

Dr. Anasua Kusari
Scientist

Current Trends

About half of all biology graduate students are women, and 40 percent of biology postdocs are female.

At Salk Institute the lab where I worked had more women postdoctoral fellows than men.

However, these numbers drop dramatically among faculty members: Nationwide, only 36 percent of assistant professors and 18 percent of full professors are women.

Salk has 28 tenured male professors and 4 tenured female professors as of 2017 report (12.5%).

Pharma, biotech and healthcare industries gender and salary gap

A report of the pharma and biotech industry show that women in senior management roles, decreased globally from 18.9 percent in 2014 to 15.5 percent in 2016.

JOB TYPE	MALE	FEMALE
Academic	\$98,374	\$73,923
Industry	\$142,248	\$106,588
Nonacademic	\$102,898	\$92,793

The biotech and healthcare industry is experiencing a shortage of women in leadership positions.

<https://www.news-medical.net/news/20170713/Pharma-biotech-and-healthcare-industries-gender-gap.aspx>

Need more women in STEM

Bias of hiring authorities: women are less competent, not skilled for leadership

Policies need to change: offer flexible hours, women should not be discouraged just because they want to balance work and family

Need more mentors to encourage women to continue in STEM

Successful female role models will inspire more girls to stay in this field

Offer financial resources and stop the salary gap

Future of STEM depends on diversity

Diverse teams make better decisions, teams work more efficiently and think more creatively to find solutions.

Increasing opportunities for women in STEM will increase diversity.

This will lead to economic success and equality across the board.

More participation of women in workforce will bring unique qualities on board. This will help in fine tuning products intended for women.



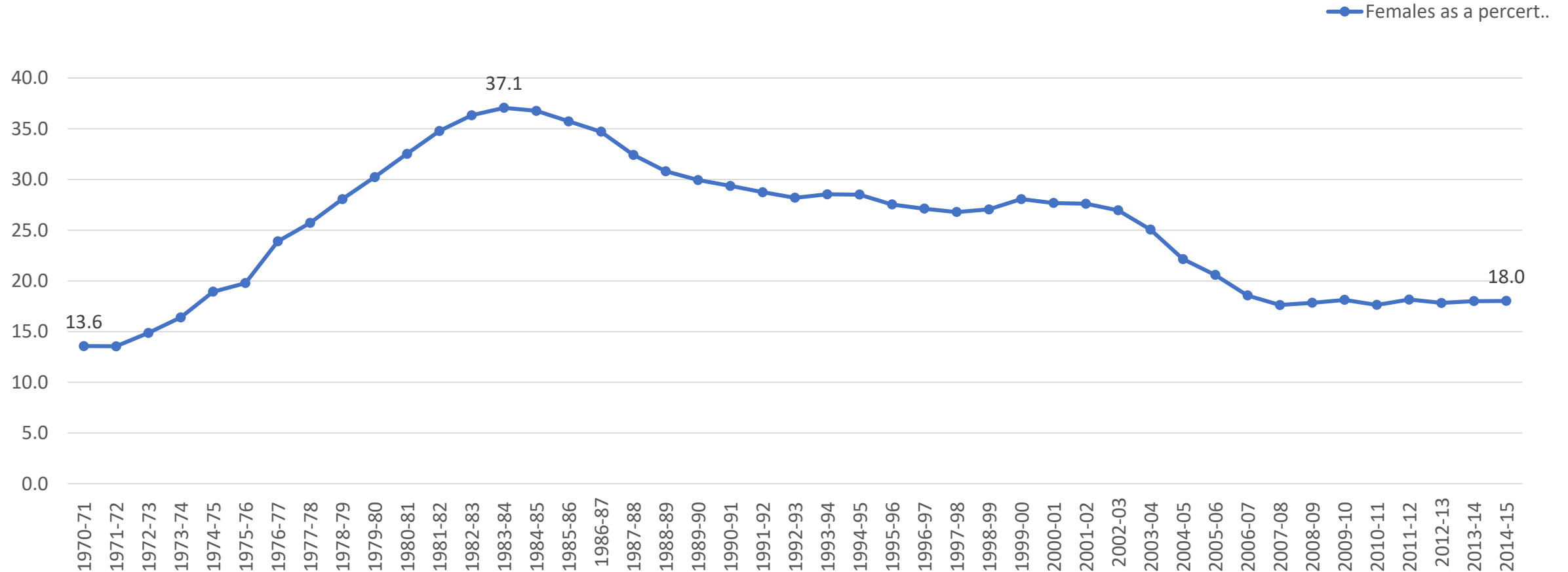
Trends in Computer Science/Software Engineering

Chelsey Jurado

Software Engineer



Computer and Information Sciences Bachelor's Degrees Given by Postsecondary Institutions



SOURCE: U.S. Department of Education, National Center for Education Statistics, Higher Education General Information Survey (HEGIS), "Degrees and Other Formal Awards Conferred" surveys, 1970-71 through 1985-86; Integrated Postsecondary Education Data System (IPEDS), "Completions Survey" (IPEDS-C:87-99); and IPEDS Fall 2000 through Fall 2015, Completions component. (This table was prepared January 2017.)

Melody Man Hing Li, Ph.D

Assistant Professor, Microbiology, UCLA



WOMEN IN SCIENCE: MANY HURDLES AHEAD

The number of women studying and practising science has risen sharply, but women are disproportionately driven away from scientific careers.

KEY

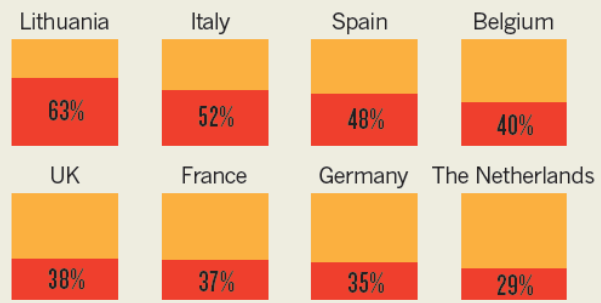
GRADUATE SCHOOL

The fraction of women gaining doctorates in science has more than doubled in the United States since 1980 and is now nearing equity. In some European countries, women outnumber men in science degrees but there is significant variation between nations and fields.

US FEMALE DOCTORAL RECIPIENTS IN SCIENCE AND ENGINEERING



FEMALE DOCTORAL RECIPIENTS IN SCIENCE IN EUROPE (2006)

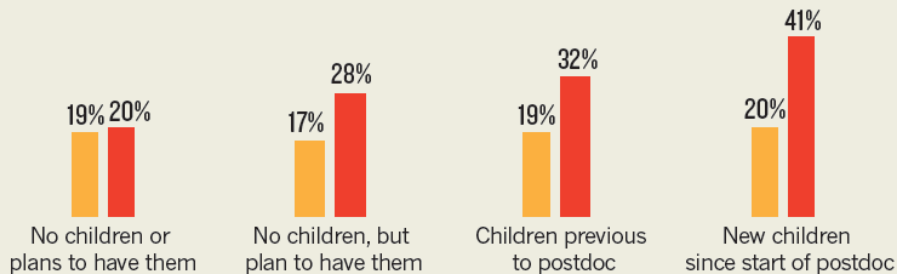


NSF/European Commission. *She Figures 2009* (European Communities, 2009)

POSTGRADUATE POSITIONS

A 2009 survey of postdoctoral fellows at the University of California showed that women who had children or planned to have them were more likely to consider leaving research.

POSTDOCS WHO DECIDED AGAINST CAREERS AS RESEARCH FACULTY MEMBERS (2009)



“The plan to have children in the future, or already having them, is responsible for an enormous drop-off in the women who apply for tenure-track jobs.”

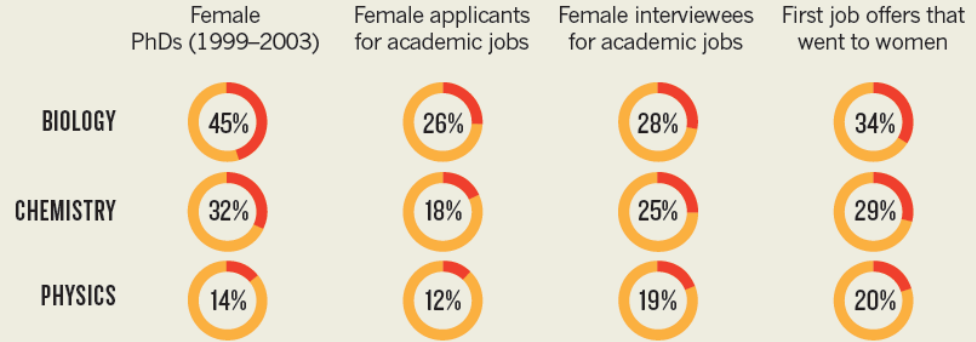
Wendy Williams, Cornell University

EARLY CAREER

Female representation among science and engineering faculty members in the United States has lagged behind gains in graduate education, in part because many women do not apply for tenure-track jobs. But women who do apply are more likely than men to receive interviews and offers.

“At least part of the lack of applications is due to the fact that women look at these careers and don’t see people like themselves.”

Hannah Valentine,
Stanford University



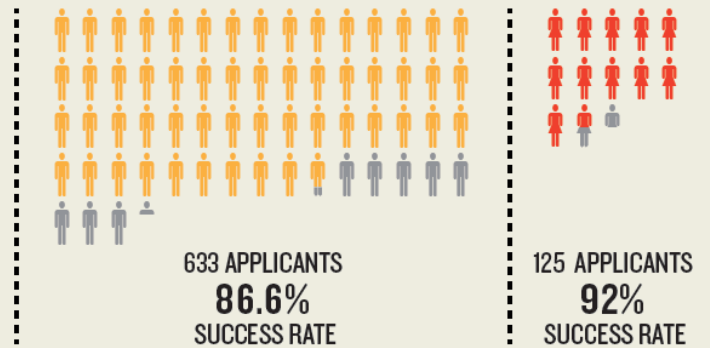
NSF/WebCASPAR

RISING IN THE RANKS

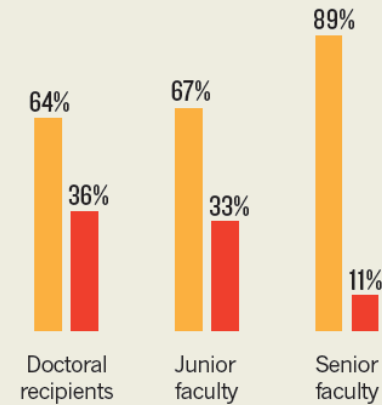
A study of US science departments showed that women were more successful than men in gaining tenure between 2002 and 2004. In Europe as in the United States, the gender gap is greater among senior than among junior faculty members.

US TENURE DECISIONS 2002–04

♂ / ♀ = 10 PEOPLE



GENDER GAP AMONG SCIENTISTS IN EUROPEAN UNIVERSITIES (2006)



National Research Council Gender Differences at Critical Transitions in the Careers of Science, Engineering, and Mathematics Faculty (National Academies, 2010)/ European Commission. She Figures 2009 (European Communities, 2009)

Do you know any Scientists?

Real life stories – the power of one

Ingrid Oakley-Girvan PhD MPH

Girls evolving idea of “scientists”*

- 1966-77 $28/5000 = 0.6\%$ women
- 1985-2016 $5600/20000 = 28\%$ women

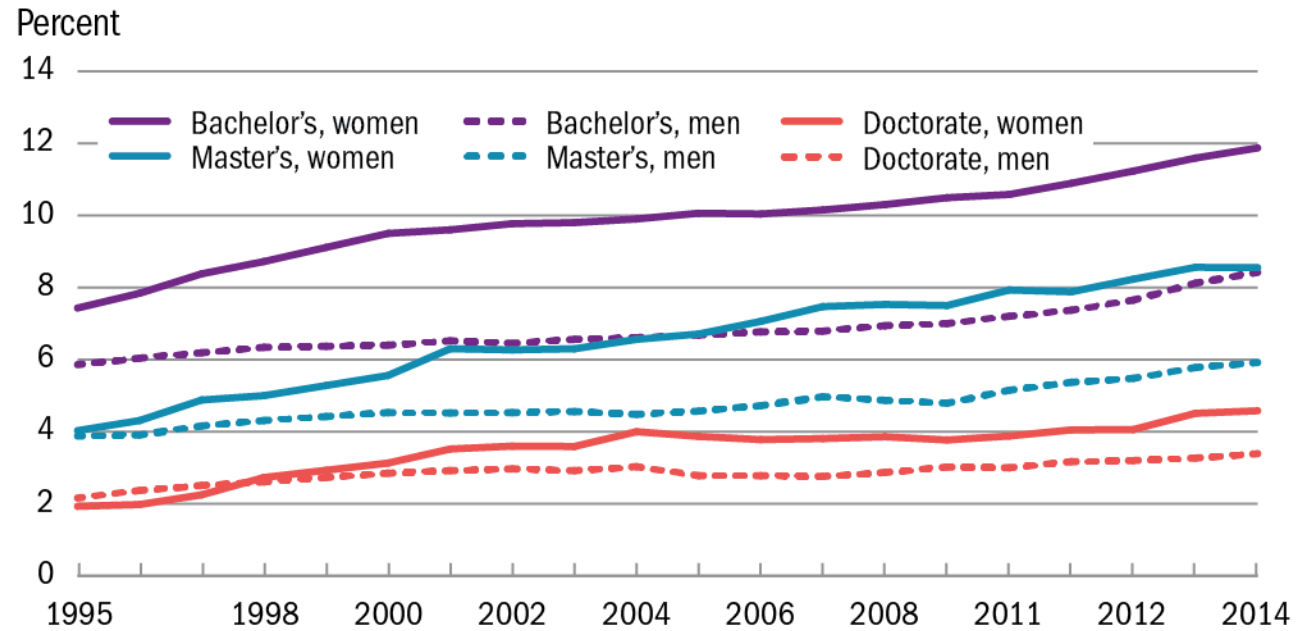
- At age 6 → 70% female scientists
- At age 16 → 25% female scientists

*Miller 3/20/18 *Child Development*

Data from NSF

- <https://www.nsf.gov/statistics/2017/nsf17310/data.cfm>
- See Digest Figures PDF under downloads

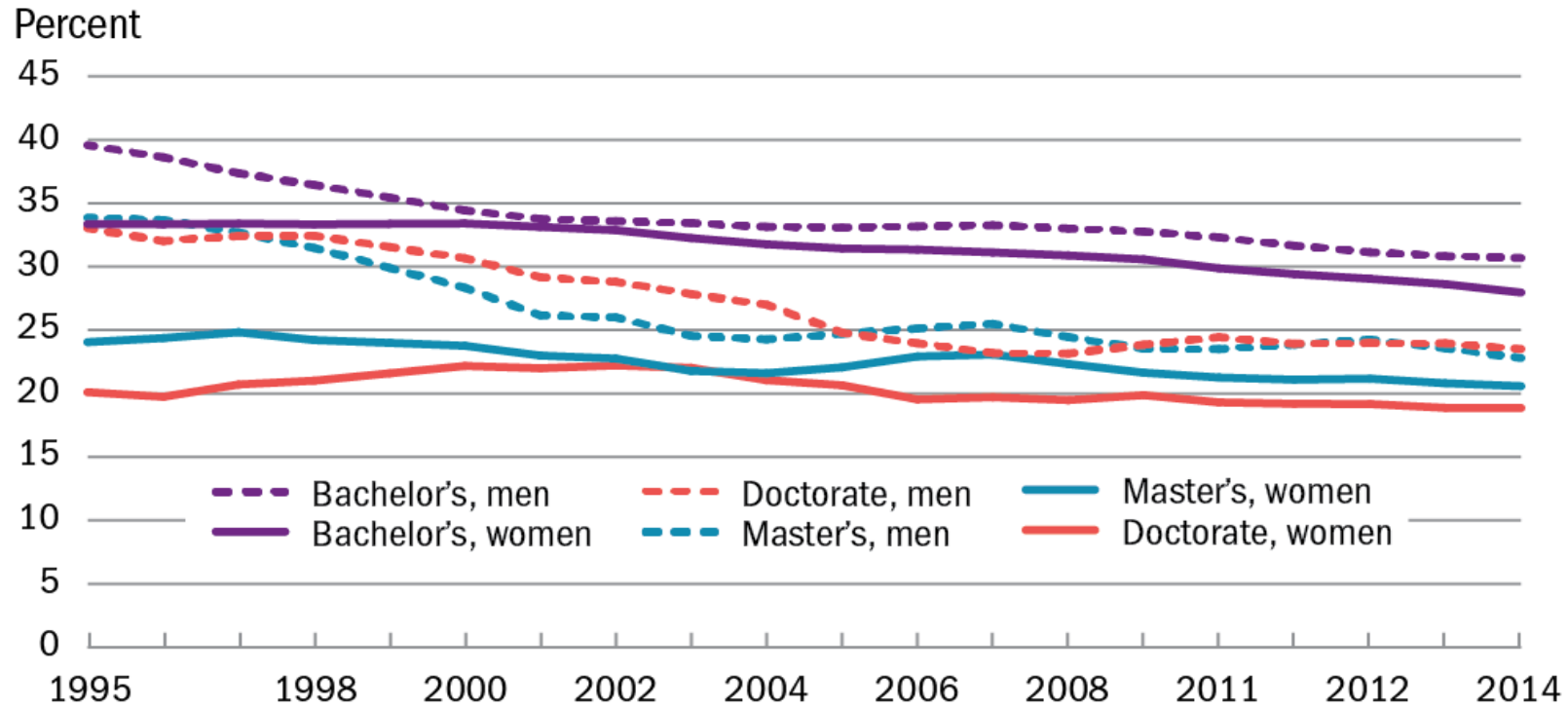
Science and engineering degrees earned by underrepresented minority women and men: 1995-2014



NOTE: Data not available for 1999.

Women, Minorities, and Persons with Disabilities in Science and Engineering: 2017

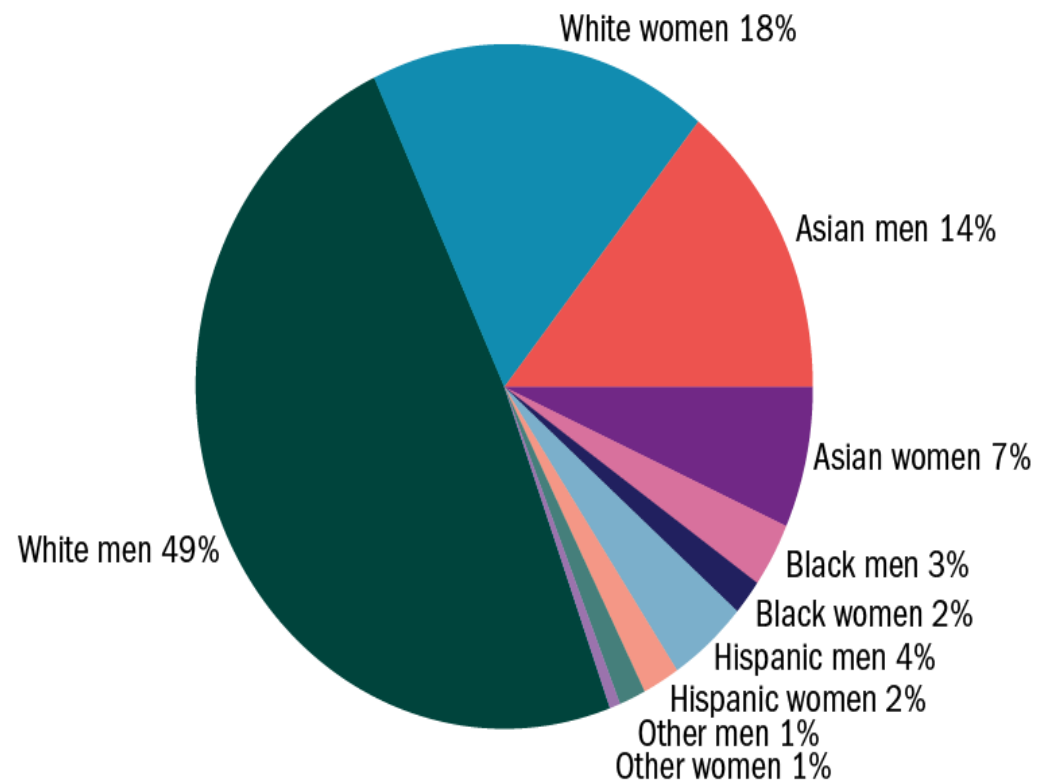
Science and engineering degrees earned by white women and men: 1995–2014



NOTE: Data not available for 1999.

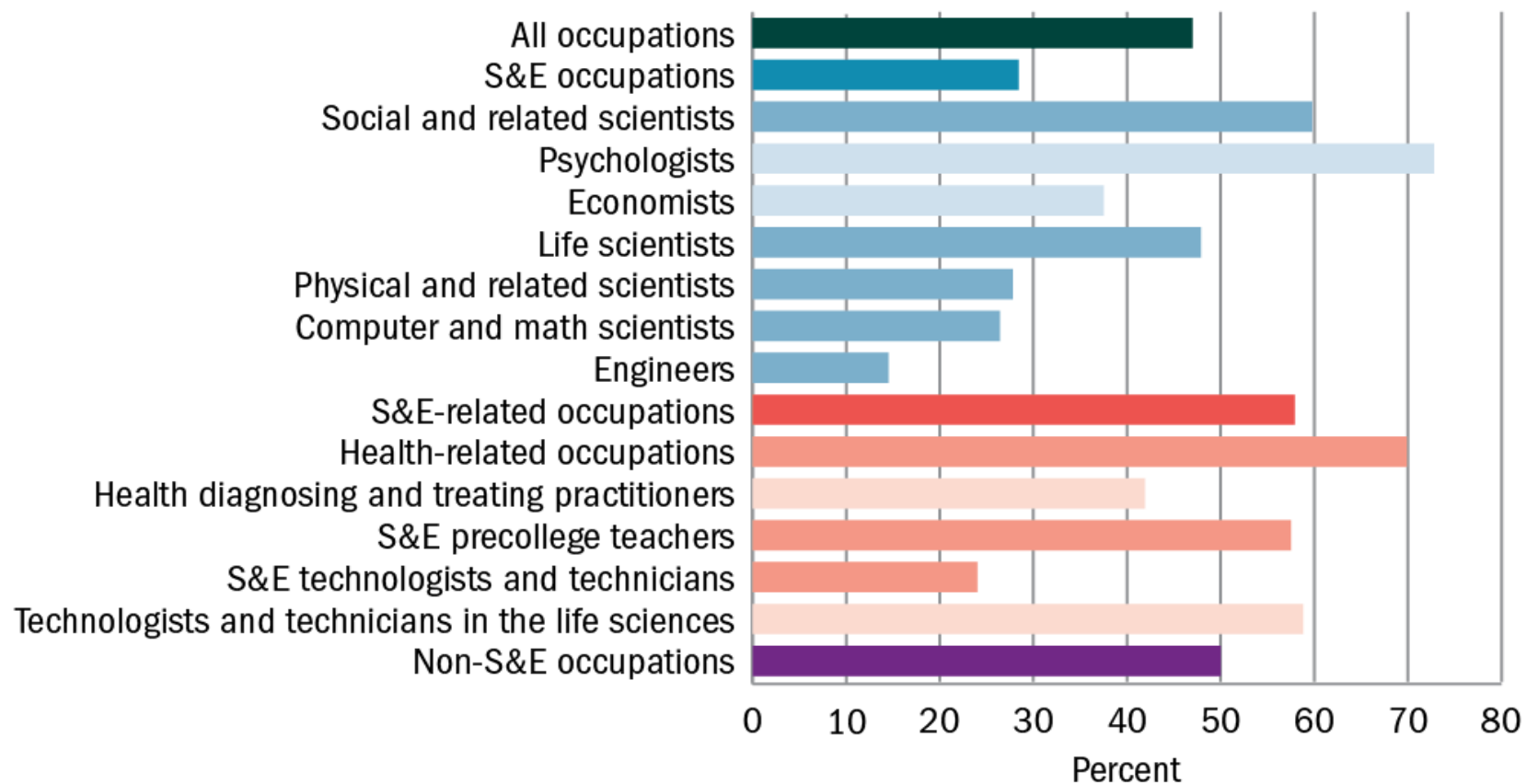
Women, Minorities, and Persons with Disabilities in Science and Engineering: 2017

Scientists and engineers working in science and engineering occupations: 2015



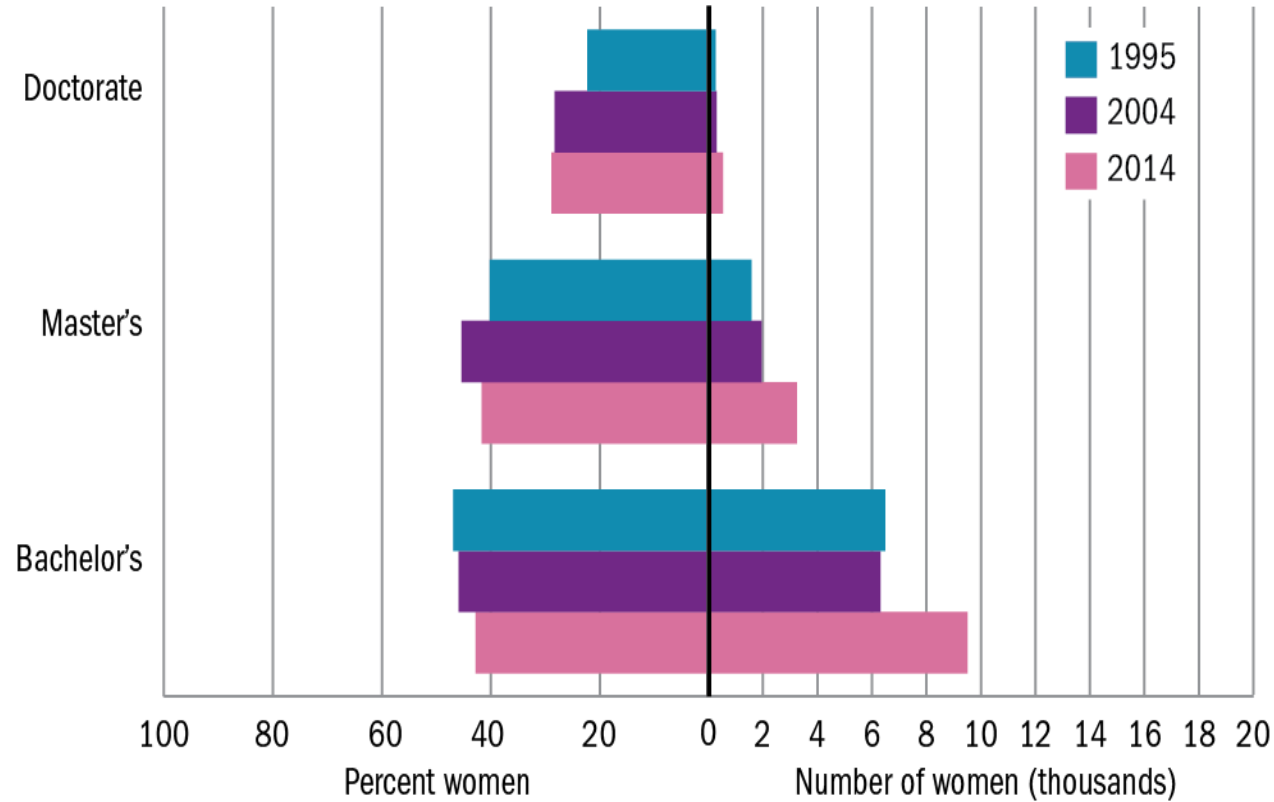
NOTES: Hispanic may be any race. Other includes American Indian or Alaska Native, Native Hawaiian or Other Pacific Islander, and multiple race.
Women, Minorities, and Persons with Disabilities in Science and Engineering: 2017

Employed women scientists and engineers, as a percentage of selected occupations: 2015



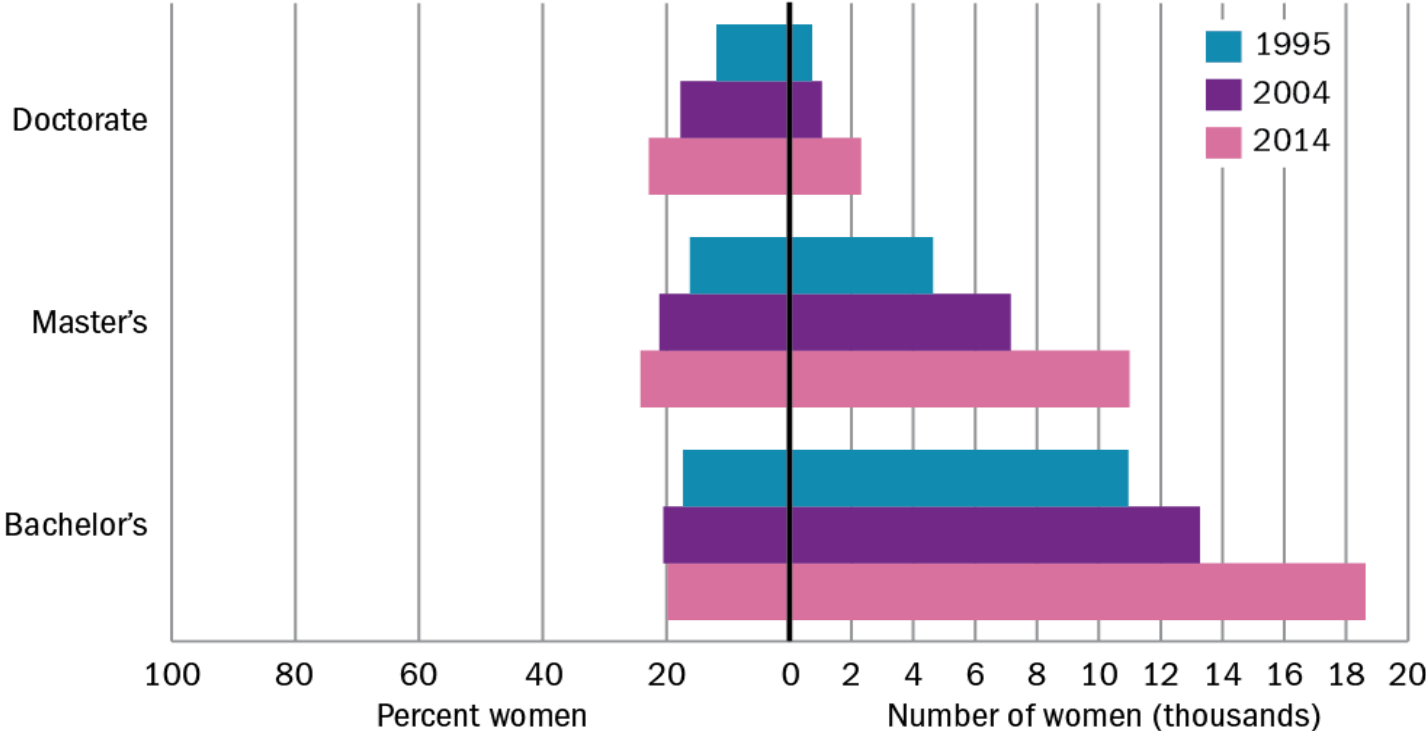
Women, Minorities, and Persons with Disabilities in Science and Engineering: 2017

Low participation field for women: Mathematics and statistics, 1995, 2004, 2014



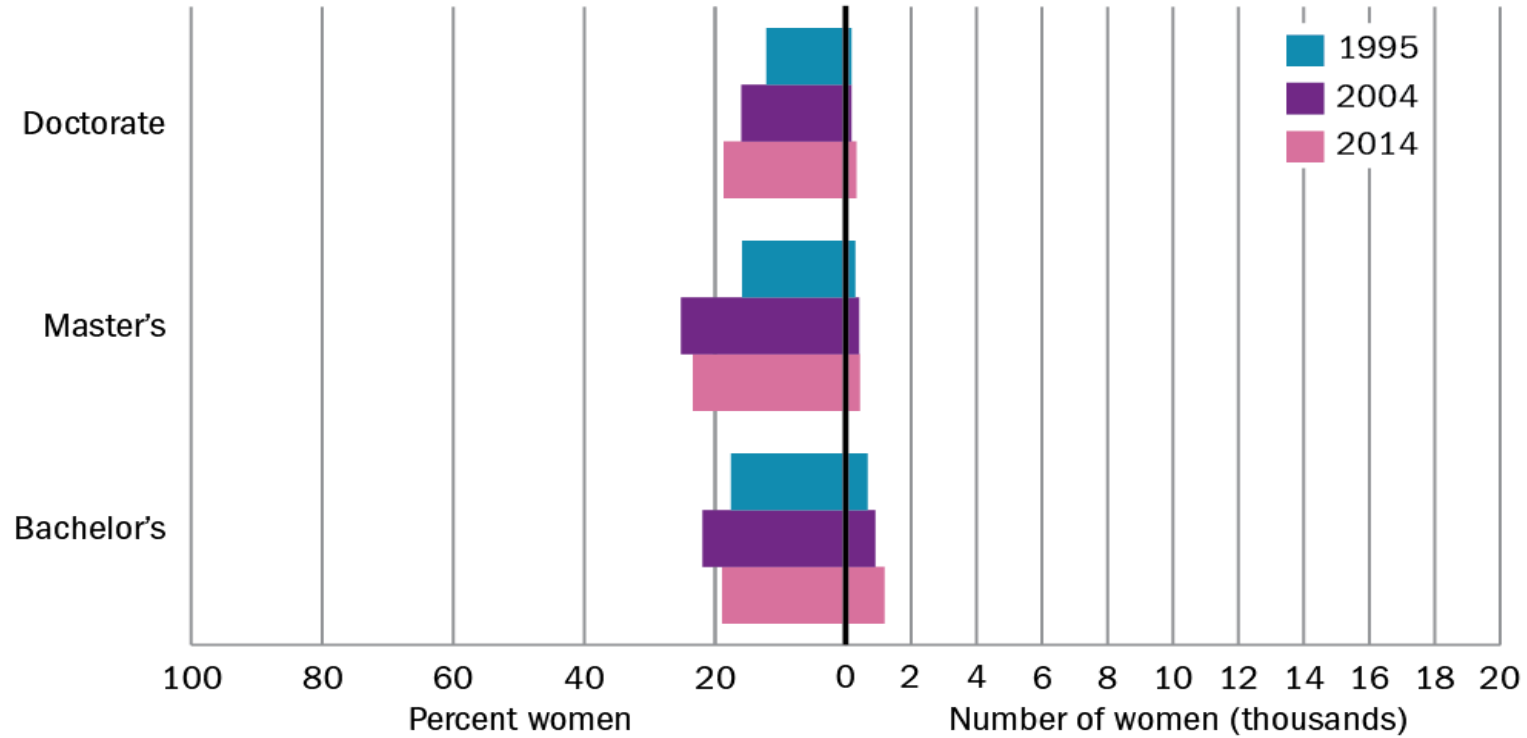
Women, Minorities, and Persons with Disabilities in Science and Engineering: 2017

Low participation field for women: Engineering, 1995, 2004, 2014



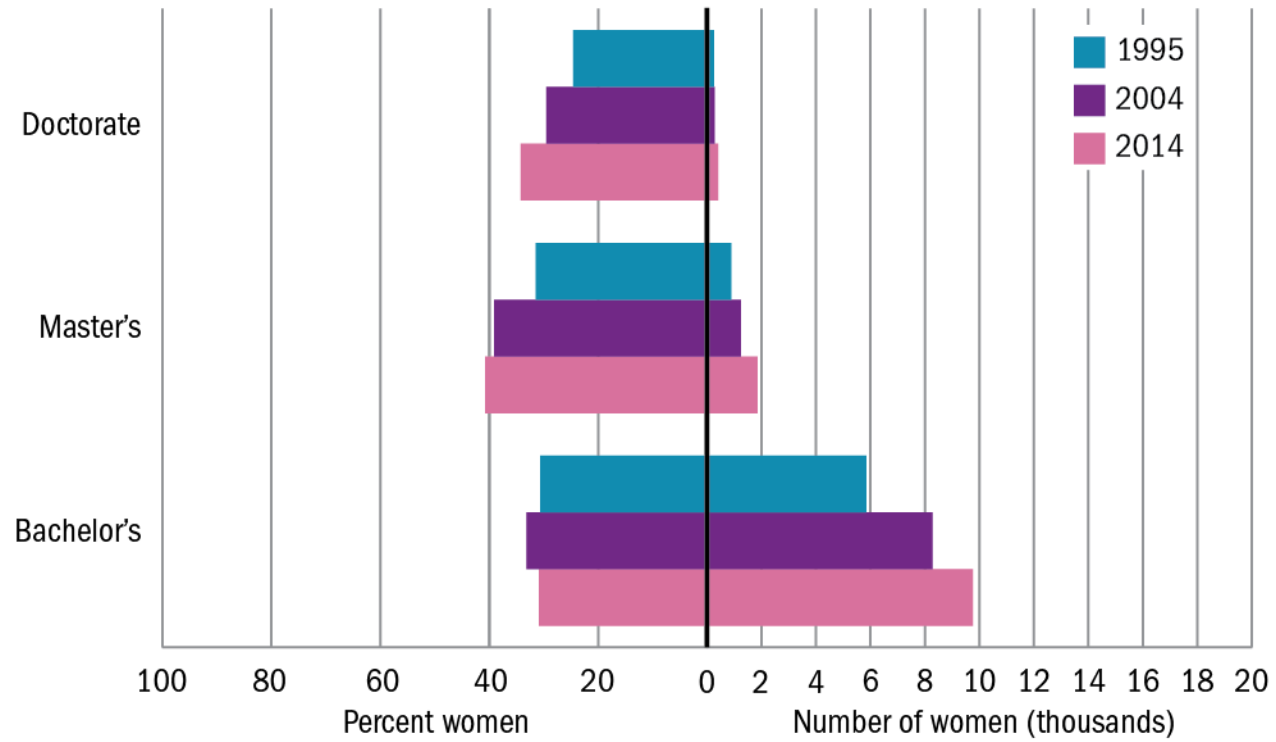
Women, Minorities, and Persons with Disabilities in Science and Engineering: 2017

Low participation field for women: Physics, 1995, 2004, 2014



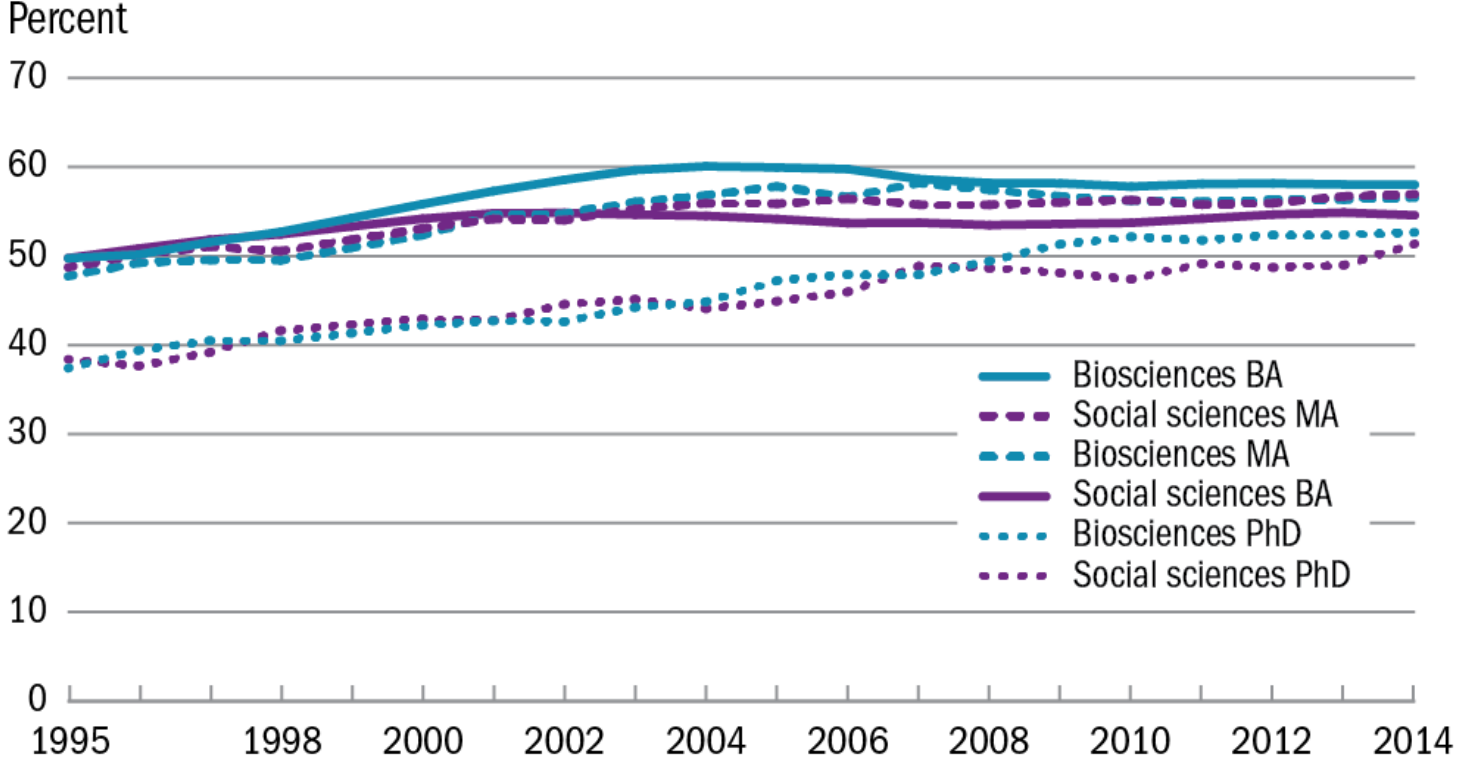
Women, Minorities, and Persons with Disabilities in Science and Engineering: 2017

Low participation field for women: Economics, 1995, 2004, 2014



Women, Minorities, and Persons with Disabilities in Science and Engineering: 2017

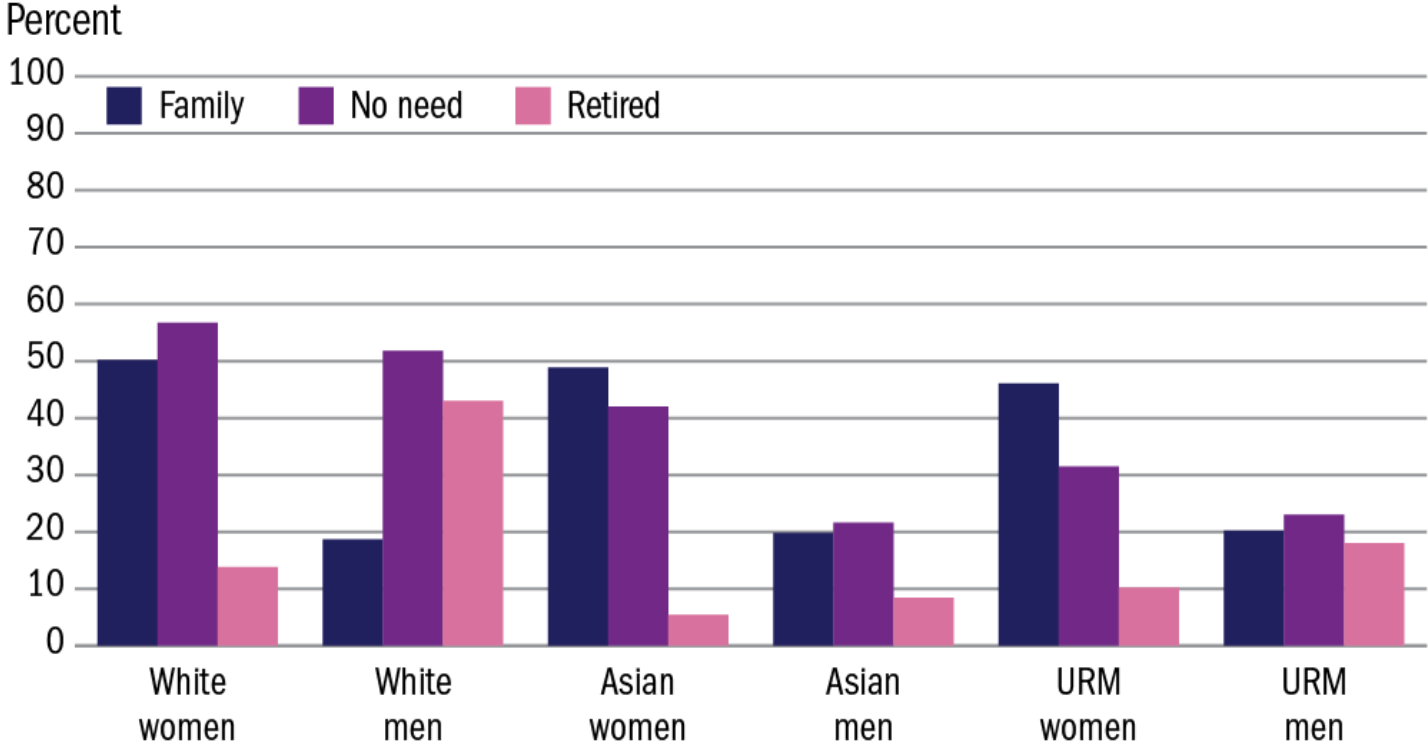
High participation fields for women: Biosciences and social sciences, 1995-2014



NOTE: Data not available for 1999.

Women, Minorities, and Persons with Disabilities in Science and Engineering: 2017

Reasons for part-time employment among scientists and engineers: 2015

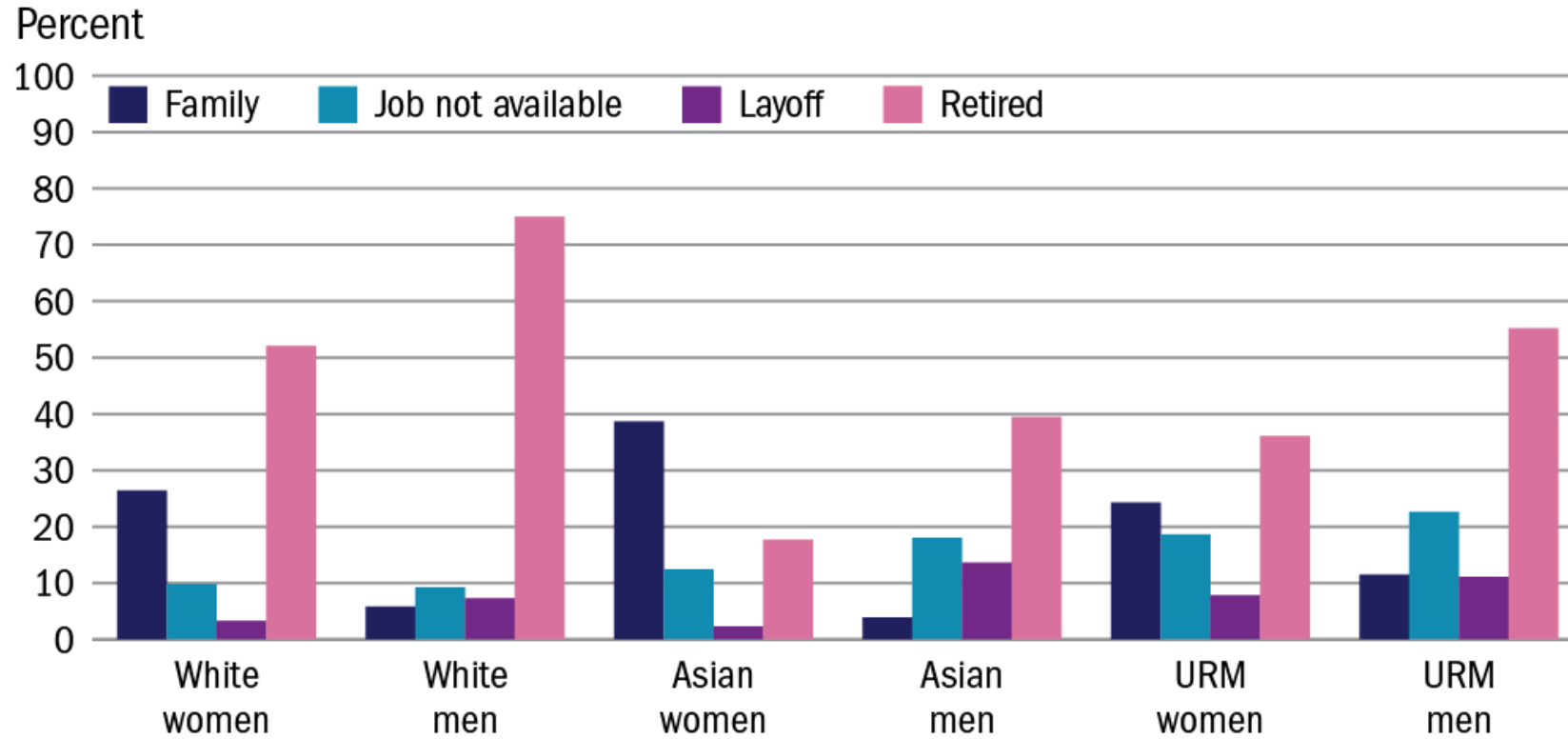


URM = underrepresented minority.

NOTE: Not all reasons are shown; respondents could select more than one reason.

Women, Minorities, and Persons with Disabilities in Science and Engineering: 2017

Reasons for not working among scientists and engineers: 2015



URM = underrepresented minority.

NOTE: Not all reasons are shown; respondents could select more than one reason.

Women, Minorities, and Persons with Disabilities in Science and Engineering: 2017

Genetics: impacts how you look and your health - phenotype variation-

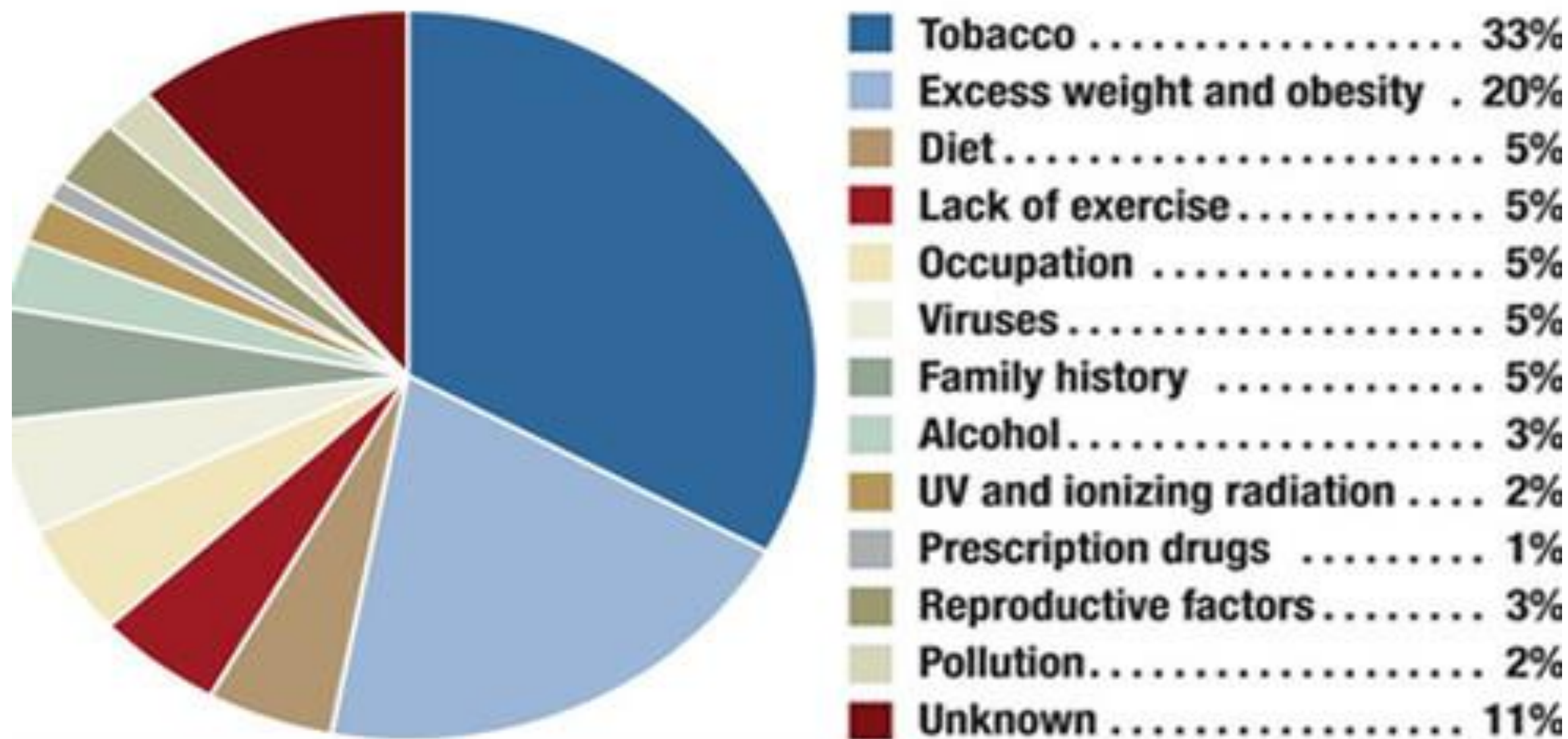


Genetic Identity



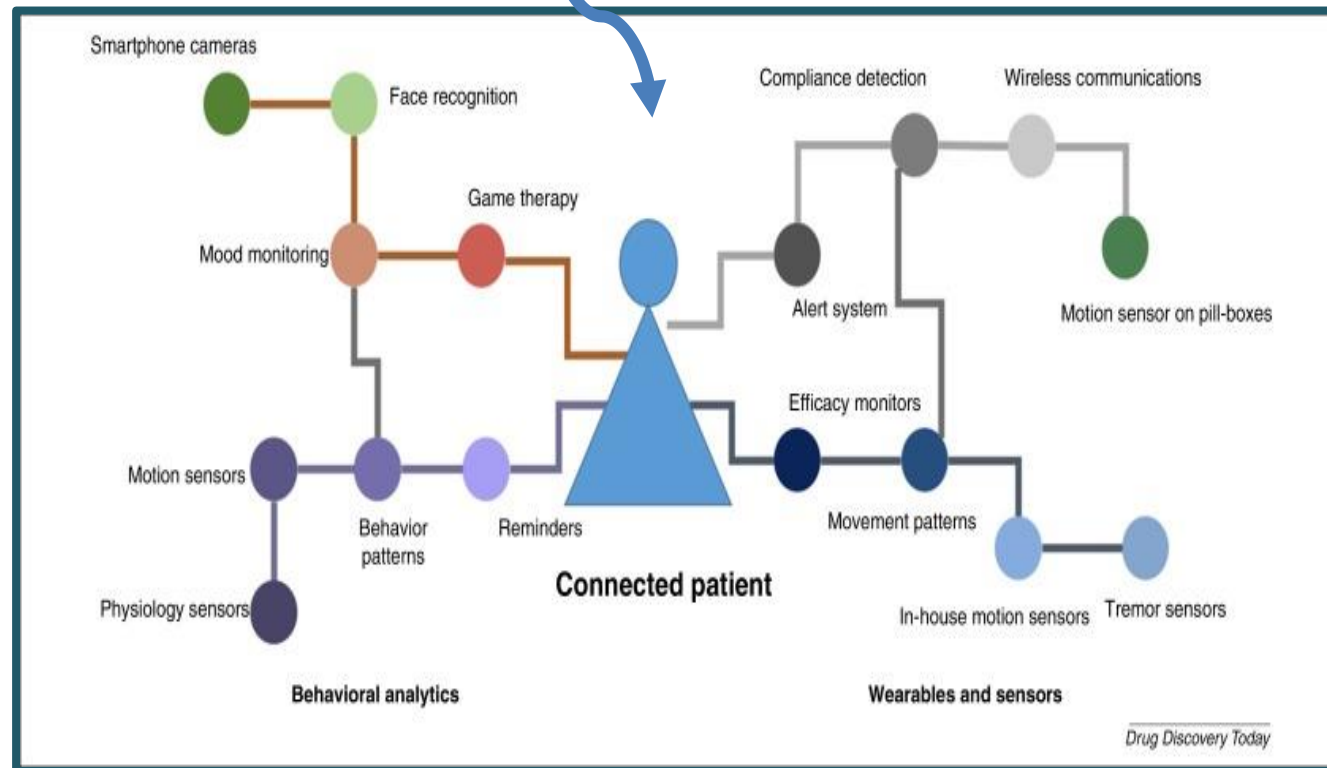
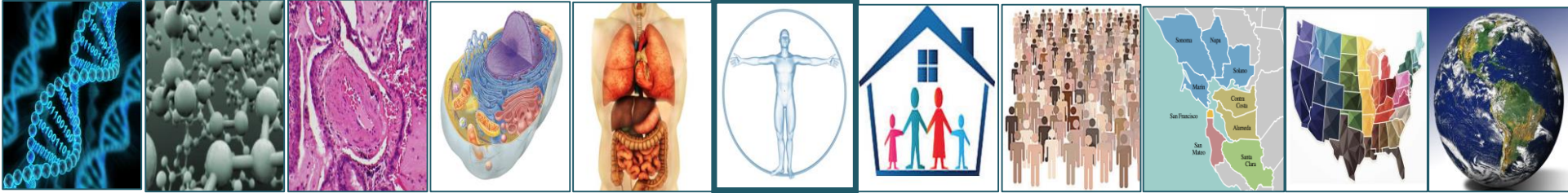
Genetic Diversity

Estimated Percentage of Cancer Cases Caused by Identifiable and/or Potentially Preventable Factors





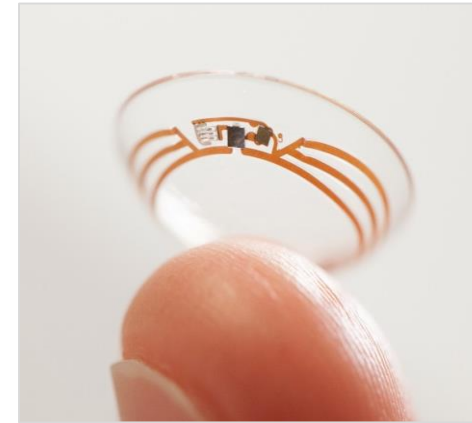
Measuring Health



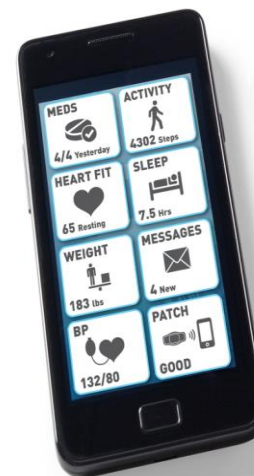
Teen World: Mobile and Digital Health



skin printed sensors



glucose detecting contact lens



digital pills



Do you know any Scientists?

- **Individual**

- Talk about science
- Present science
- Make it personal
- Connection to every day life technology impacts

- **Policy**

- Scientists in every elementary school
- Engage –Socialmedia + movies & TV
- Tech companies as partners - testimonials



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Discussion Questions

Q 3:

Women hold only 24% of STEM jobs in USA compare with 40% in EU-28 (<http://www.catalyst.org/knowledge>)

- ❖ What are the reasons- Motivation, Education or Funding?
- ❖ How to improve the ratio?



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Discussion Questions

Q 4:

AAUW has developed educational programs to encourage Girls to join STEM Field thru Tech Trek Camps (middle school girls), Tech Savvy and STEM packs outside the classroom

❖ **What are the missing approaches should be included in the STEM program?**

Q & A Session



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Closing Statement

Dr. Oakley- Girvan has outlined a few solutions:

- Early Science Education in Elementary School
- Make it Personal
- Talk about Science
- Connection to everyday life technology impacts

Both Dr. Kusari and Dr. Li have highlighted the discussion as follows:

- Pay Equity
- Research Funding Access
- Work place Equality



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Closing Statement

Chelsey Jurado, Software Engineer from Symantec also addressed the gender gap at her work place - regarding her egalitarian boss, who is male. 27% women at Symantec. Her team, almost 50% women. Discussed stereotyping in computer science.

India: Women graduate with undergraduate degrees in science (50.1%), and in IT and computer (47.7%), but are underrepresented in engineering and technology (31.9%) in 2015-16.

Women filled **47** percent of all **U.S.** jobs in 2015 but held only **24** percent of STEM jobs.

Only **15.3%** of **Japan's** researchers in science and technology were women in 2016.

Global: Women accounted for less than a third (28.8%) of those employed in scientific research and development in 2014.

www.catalyst.org/knowledge/women-science-technology-engineering-and-mathematics

<http://www.esa.doc.gov/reports/women-stem-2017-update>



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Marine Science Tech Trek Camp- Torrance Branch 2017





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Special Acknowledgement

Jane Niemeier

AAUW-CA President Elect & Co-Chair, Program Committee

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Soma Sarkar

President, BSC

Trisha Hailstone

Symantec Corporation

AAUW Members

Support & Participation



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Special Appreciation

Speakers

Anasua Kusari

Chelsey Jurado

Ingrid Oakley-Girvan

Melody Man Hing Li

Moderator

Michele Freck



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Thank you **AAUW-CA Program Committee** to include STEM workshop in the convention schedule. Women filled **47** percent of all **U.S.** jobs in 2015 but held only **24** percent of STEM jobs. (www.esa.doc.gov)

Therefore, our work will continue to promote STEM education.



Indrani Chatterjee,
AAUW-CA Program Committee Member
President, Torrance Branch

