

Hot Topic Discussion

# Advancing Women in Science and Engineering

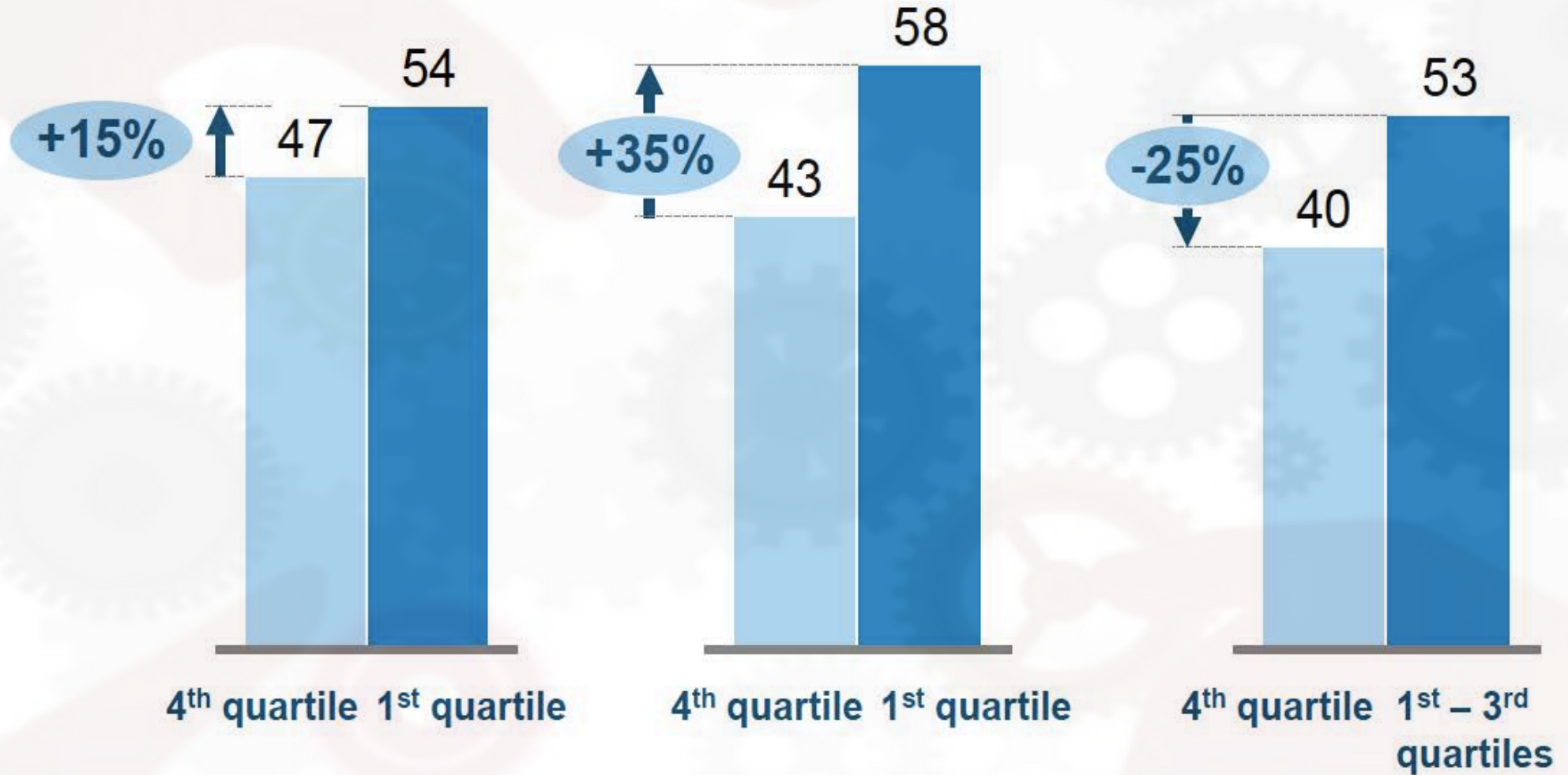
Drs. Kaitlyn Sadtler,  
Ritu Raman & Natalie Boehnke

January 22, 2018



# Likelihood of financial performance above national industry median, by diversity quartile

%



Gender diversity

Ethnic diversity

Gender and ethnic  
diversity

20%

undergraduate  
engineering  
degrees

40%

women earning  
engineering  
degrees quit or do  
not enter the field

13%

engineering  
workforce

women in engineering  
are paid on average only

82%

of what their male  
counterparts are paid

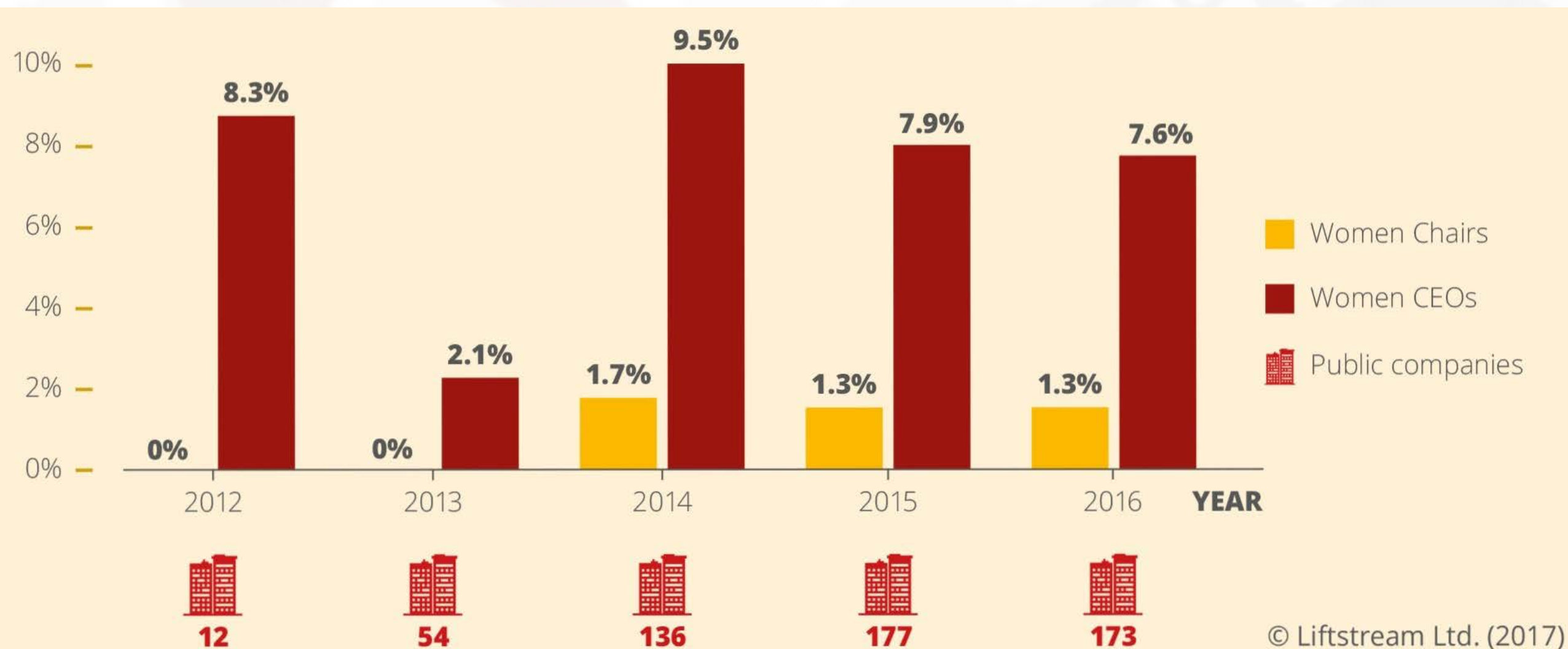
<20%

engineering / science  
faculty in U.S. institutions

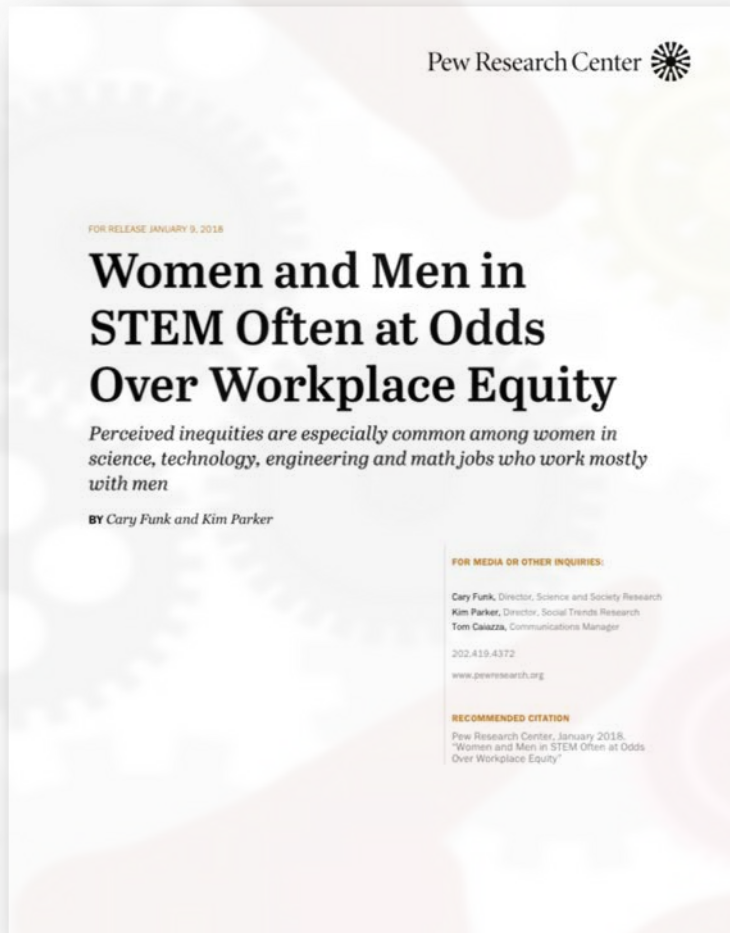
11%

board seats in biotechs

Cumulative analysis of companies that conducted an IPO between 2012-2015 shows that ultimately women held <8% of CEO positions and <2% of Chairperson positions

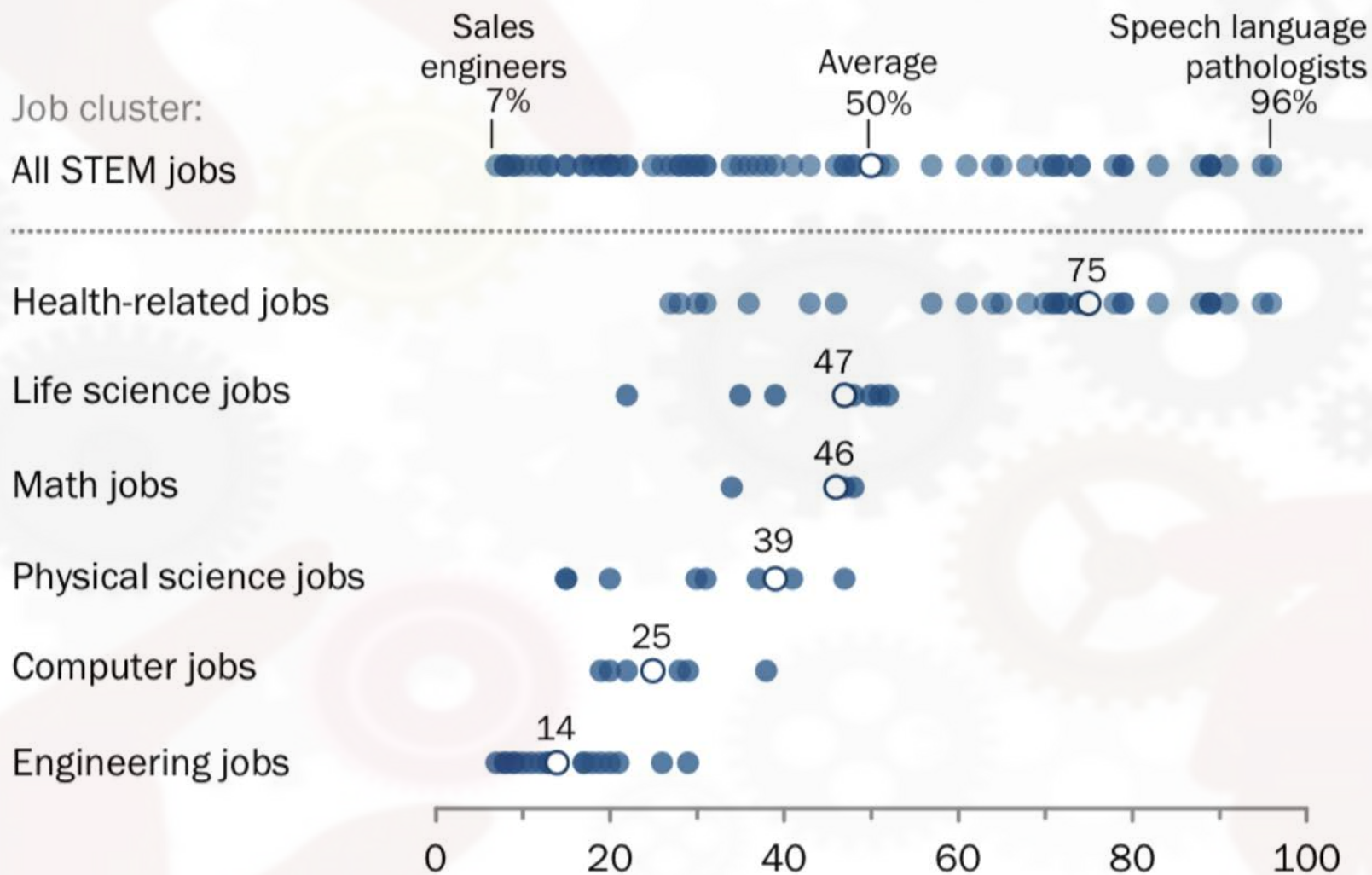


# Women and Men in STEM Often at Odds Over Workplace Equity



- Representation of women in STEM jobs continues to vary widely
- Most women in STEM jobs say they have experienced discrimination at work

# Women and Men in STEM Often at Odds Over Workplace Equity



# Other Challenges

- **Financial:** flexibility, [non-gender specific] child care support, salary gap, opportunities for promotion.
- **Cultural:** team dynamics, task allocations, recognition, recruitment.

# Actionable Strategies

- Flexible spending for family responsibilities
- Provide "extra hands" award (hire techs, admins, or postdocs, etc.) during transitional periods.
- Promote gender-balanced committees for speaker selection or peer review of grants.
- Gender awareness training for postdoc orientations and training of new PIs.
- Develop searchable databases of women in science, medicine, and engineering.
- Outreach!



# Resources

- Boardroom Ready Program: designed to fuel women's participation on corporate boards in the life sciences. (see also <https://theboardlist.com>)
- MassNextGen: a five-year initiative that will fund and support early stage biotech companies run by women
- MIT PDA's Postdoctoral Organization for Women Engaged in Research (POWER)
- Women in Nanoscience: [www.womeninnano.org](http://www.womeninnano.org)
- Database of women speakers for programming events and research conferences:
  - Women in Cell Bio (WICB): <http://www.ascb.org/wicb-speaker-referral-list/>
  - 500 Women Scientists: <https://500womenscientists.org/request-a-scientist/>
- MIT's resources for harassment and conflict (ombudsman, Title IX)
  - See [https://titleix.mit.edu/policies/employee\\_harassment](https://titleix.mit.edu/policies/employee_harassment)

# Discussion Questions

- Question 1: How can we identify 'implicit' biases? Any good strategies to account for/counteract these biases?

# Discussion Questions

- Question 2: How are biases against women in STEM affected or compounded by also being a member of other minority groups?

# Discussion Questions

- Question 3: What are effective strategies for recruitment, retention, and promotion of women in STEM?

# Take home

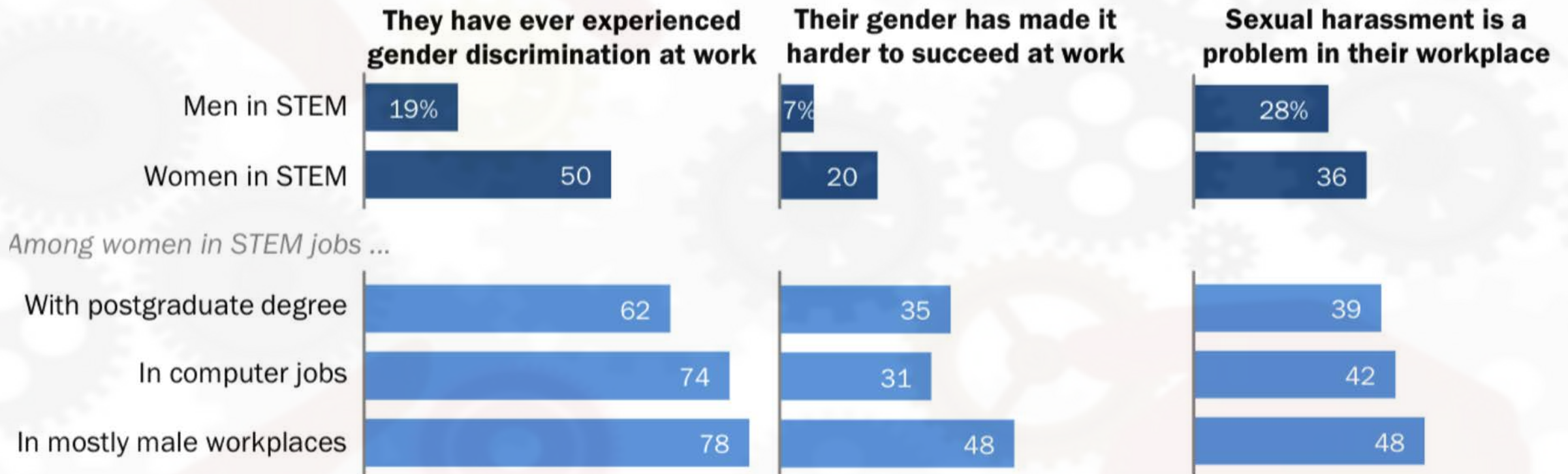


Illustration: Dave Cutler (2017)

- We have come a long way but need to do more to achieve gender equity in science.
- Need for strategies to overcome political, administrative, financial, and cultural challenges in the workplace.
- Create a database to highlight women speakers, job opps, etc.

BACK UP

# Women and Men in STEM Often at Odds Over Workplace Equity





# Gender pay gap persists

*US male PhD holders earn more than female counterparts across nearly every scientific field.*

Pay disparities between female and male PhD holders in the United States exist across almost all fields of science and engineering, according to a report from the US National Science Foundation (NSF). [The report examines annual salaries](#) for those who earned their doctorate in 2016 and had confirmed permanent employment in the life sciences, physical sciences, mathematics and computer sciences, psychology and social sciences, or engineering. Across all fields, the median salary of US\$92,000 for men was 24% higher than the \$74,000 median salary for women. In biomedical and biological sciences, women earned \$67,500 to men's \$77,000; in geosciences, atmospheric and ocean sciences, the figures were \$65,500 for women and \$71,000 for men; in physics and astronomy, women earned \$89,000 to men's \$100,000; and in engineering, women earned \$92,000 to their male counterparts' \$100,000. Women had lower salaries in all fields of social sciences, including psychology and economics. In health sciences, women and men disclosed equal salaries of \$80,000. The NSF report did not indicate whether the salaries reported were within or outside academia.



# The MIT Faculty Newsletter

Vol. XI No. 4

March 1999

## Special Edition

### A Study on the Status of Women Faculty in Science at MIT:

How a Committee on Women Faculty came to be established by the Dean of the School of Science, what the Committee and the Dean learned and accomplished, and recommendations for the future

#### Members of the First and Second Committees on Women Faculty in the School of Science

##### First Committee (1995-1997)

Sallie W. Chisholm - CEE and Biology  
Jerome I. Friedman - Physics (department Head)  
Nancy Hopkins - Biology (Committee Chair)  
Daniel Kleitman - Mathematics (former department Head)  
June L. Matthews - Physics  
Mary C. Potter - BCS  
Paola M. Rizzoli - EAPS (served 7/95-)  
Leigh Royden - EAPS (served 2/95-7/95)  
Robert J. Silbey - Chemistry (department Head)  
JoAnne Stubbe - Chemistry and Biology

##### Second Committee (1997-1999)

Sylvia T. Ceyer - Chemistry  
Sallie W. Chisholm - CEE and Biology  
Jerome I. Friedman - Physics (former department Head)  
Jacqueline N. Hewitt - Physics  
Kip V. Hodges - EAPS  
Nancy Hopkins - Biology  
Mary C. Potter - BCS (Committee Chair)  
Paola M. Rizzoli - EAPS  
Robert J. Silbey - Chemistry (former department Head)

#### Outline

- Abstract (P. 4)
- Introduction (P. 4)
- Establishing a Committee on Women Faculty in the School of Science (P. 5)
- Committee membership and how the Committee operated (P. 6)
- What the Committee learned (P. 7)
- What the Committee recommended (P. 10)
- Real progress: What the Dean did to improve the status and equitable treatment of senior women faculty and to increase the number of women faculty in the School of Science (P. 10)
- How did inequities come about? "Gender discrimination" in 1999 (P. 11)
- Long term solutions - "Affirmative actions" for 1999 (P. 12)
- Summary from the first report of the Committee on Women Faculty in the School of Science - 1996 (P. 13)
- Recommendations made to the MIT administration in the first report of the Committee on Women Faculty in the School of Science - 1996 (P. 14)

Introductory Comments: President Charles M. Vest — Page 2  
Introductory Comments: Dean Robert J. Birgeneau — Page 2  
From The Faculty Chair: Professor Lotte Bailyn — Page 3

<http://web.mit.edu/fnl>

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## The Psychology of Unconscious Gender Bias:

- Both men and women slightly over-value work if they think it was done by a man
- Both men and women slightly under-value work if they think it was done by a woman

SOS (2010)	# Full PROF	# in NAS	% in NAS
MEN	162	51	31%
WOMEN	30	12	40%

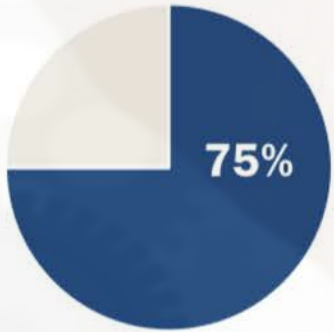
**“Top five” list of things you can do to improve gender diversity in biomedical engineering:**

- 1. Address the leaky pipeline by supporting and getting involved in mentoring programs, outreach, and promoting positive role models.**
- 2. Warm a “chilly climate” through workshops, networking activities, and raising awareness.**
- 3. Promote best practices for balancing between work and family by not scheduling meetings before 8 am or after 5 pm and developing family-friendly leave policies.**
- 4. Educate your community on unconscious bias and strategies to overcome “schemas.”**
- 5. Use the data provided here to educate your colleagues. It is not just a matter of time before things improve, it is a matter of effort.**

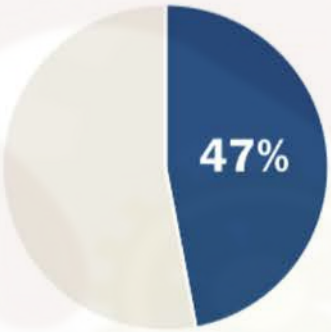
Slide adapted from Bhatia’s presentation at Utrecht Univ. (2017)

The Pipeline Still Leaks and More Than You Think:  
A Status Report on Gender Diversity in Biomedical Engineering  
Chesler NC, Barabino G, Bhatia SN, Richards-Kortum R  
Annals of Biomedical Engineering, Vol 38, No 5, May 2010

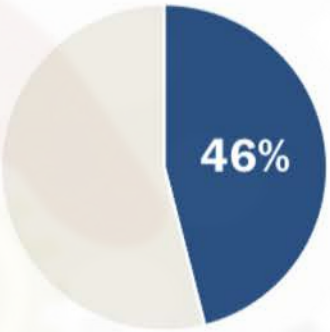
# Share of Women in Various STEM sectors since 1990



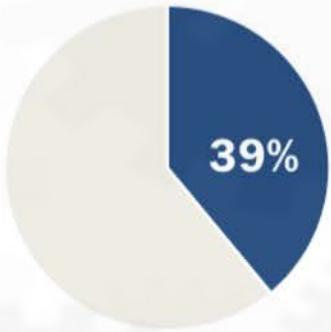
HEALTH-RELATED



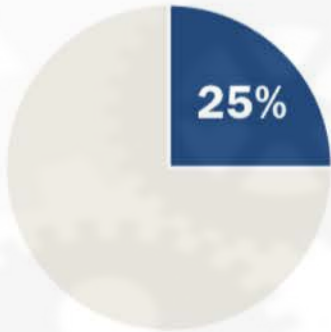
LIFE SCIENCE



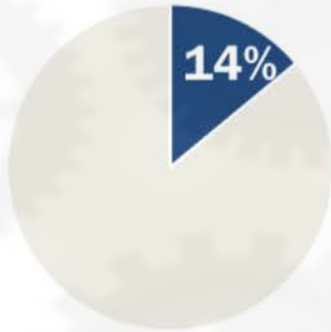
MATH



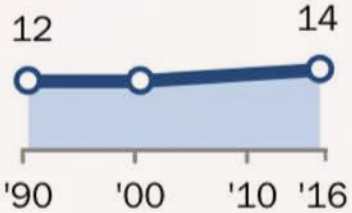
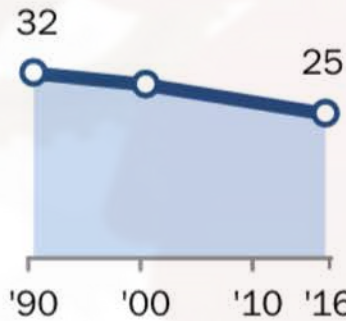
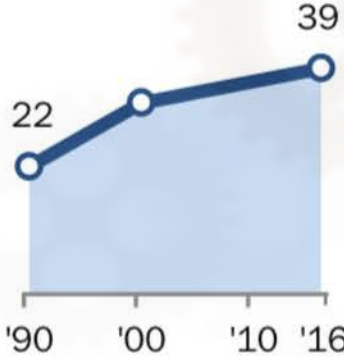
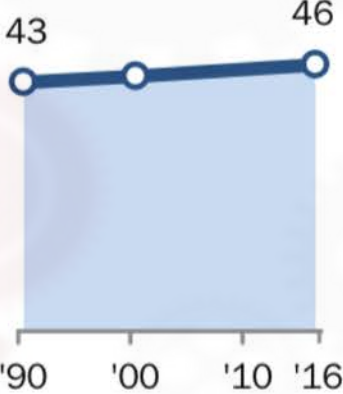
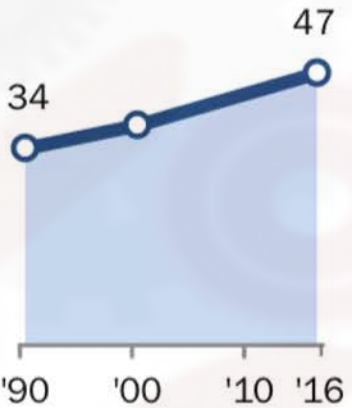
PHYSICAL SCIENCE



COMPUTER



ENGINEERING



Source: PEW Research Center (2018)