



STRATEGIES FOR IMPROVING GENDER DIVERSITY IN PHYSICS

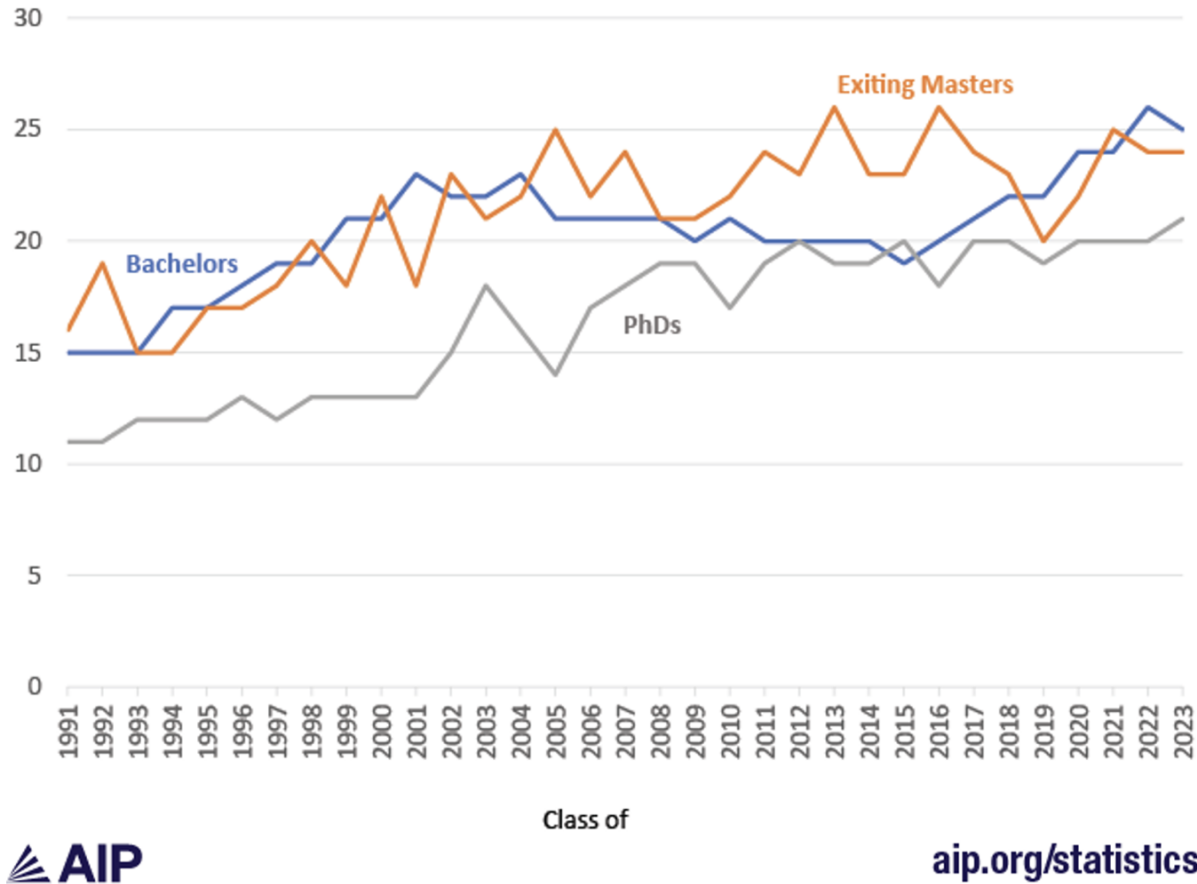
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WHY TALK ABOUT GENDER DIVERSITY IN PHYSICS?

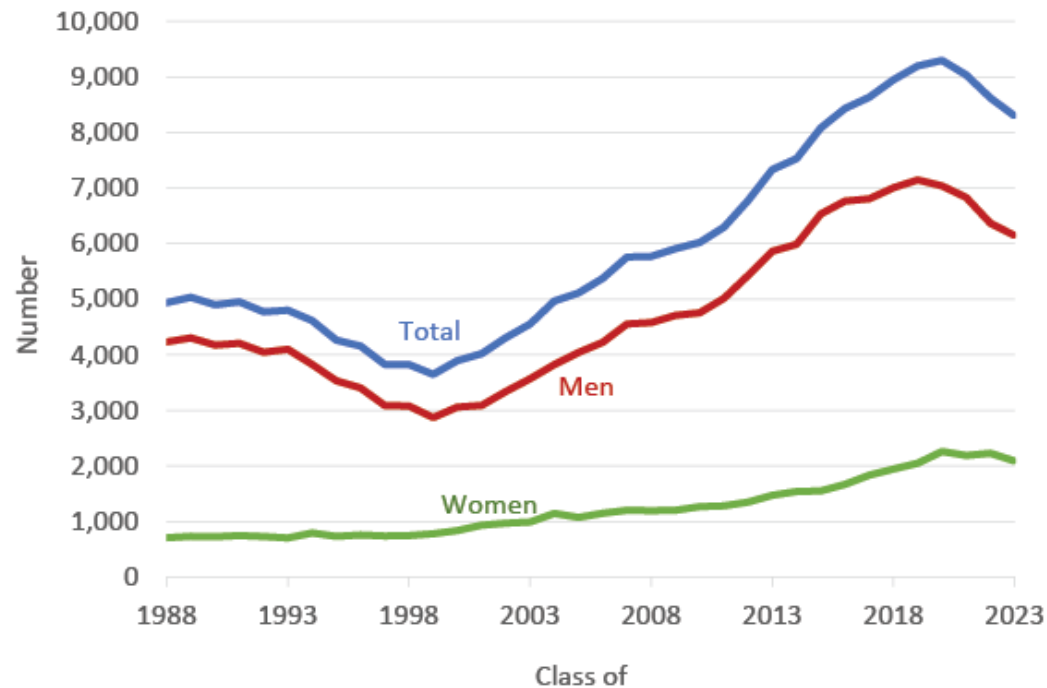


US PHYSICS DEGREES (CANADIAN #S INCOMPLETE)

Percent of Bachelor's, Master's and Doctorates in Physics
Earned by Women, Classes 1991 through 2023



Number of Bachelor's Degrees Earned in Physics, Classes 1988 through 2023



Physics departments reported <1% of their physics bachelor's degree recipients in the class of 2023 identify as a gender other than man or woman.

- Wasted potential

- How many ideas have been lost?
- How much faster could we have progressed?
- How many resources have been diverted from science?

- Moral issue

- Inequity is inherently problematic
- Social justice requires more of us
- Systemic issues such as racism, and sexism, cannot be addressed without data



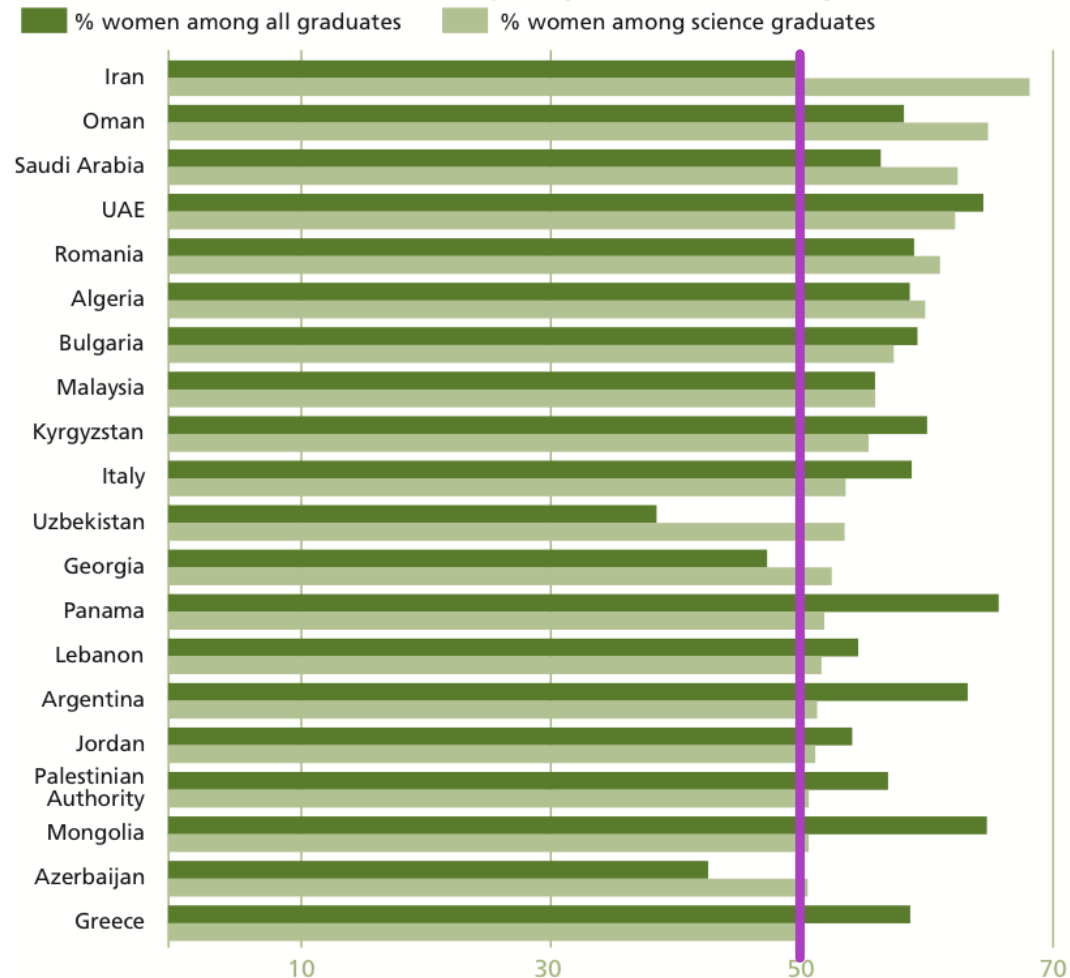
WHAT DO WE KNOW?



CULTURE!



Where women earn the majority of science degrees



Source: UNESCO Data Center, 2010

These are the countries in which women earn 50 percent or more of the science degrees awarded.

WHAT HELPS

Science Identity
Sense of belonging

Lewis et al. 2017 Psych. Women Quarterly
Hazari et al. 2013 J. College Science Teaching



WHAT HURTS

- Harassment*
(3/4 of US undergrad physics women!)
- Stereotype threat**
- Fixed mindset**
- Microaggressions***

*Aycock, Hazari, Brewe, Clancy, Hodapp, Goertzen. PHYSICAL REVIEW PHYSICS EDUCATION RESEARCH 15, 010121 (2019)

**https://www.ted.com/talks/russell_mcclain_implicit_bias_stereotype_threat_and_higher_education

***Barthelemy, McCormick, Henderson doi:10.1119/perc.2014.pr.005

IT'S ALL ABOUT THE BIAS

- Implicit/Unconscious/Unintentional/Unexamined bias
 - Growing up → culturally instilled values
 - Pervasive: everyone has them
 - Independent of explicit biases (can be same or different)
 - May differ from our declared beliefs
 - Tend to favor our own in-group
 - Malleable—thank goodness!

The End of Bias: A Beginning.
2021 Nordell



HOW CAN WE IMPROVE GENDER DIVERSITY IN PHYSICS?



WHAT CAN YOU DO?

- Figure out where you are on this path
 - Just starting to explore the issue
 - Interested in learning more
 - Exploring solutions
 - Frustrated at lack of change
 - Hardened veteran




WHAT CAN YOU DO?

- Identify your goal(s)
 - Who: Students? Colleagues? Administrators?
 - What: Enrollment? Retention? Promotion? Leadership? Policy? Curriculum?
 - How: Specifics
- Evaluation/Assessment:
What does success look like?



THE SPECIFICS: STARTING POINTS

- It's problem solving! There's a rubric:
 - Identify the problem  Where are you starting?
What's your goal?
 - Identify your resources
 - Propose a solution
 - Try it
 - Evaluate your solution

THE SPECIFICS: FOR STUDENTS

Sense of Belonging

Science/Physics Identity

- Safe, welcoming student lounge
- Training for advisors (consistency)
- Peer mentoring
- Research experiences
- Women in physics group
- Good introductory physics teaching



THE SPECIFICS: FOR EMPLOYEES

Sense of Belonging

Reduction of Bias

- Clear hiring policies and training
- Clear policies for promotion & tenure
- Mentors within & outside department/lab
- Transparency in reporting issues
- Equitable service requirements



THE SPECIFICS: CULTURE

Sense of Belonging

- Modernize language
 - Inclusion matters!
- Clear, visible process for complaints
- Hallway pictures/posters
- Humanize teachers/professors
- Be authentic at work/school



POTENTIAL PITFALLS

- Making it the women's job to fix the culture
- Assuming a single end goal
- Depression, anger, frustration without action
- Thinking you are a bad person because of unconscious bias
- Impatience with others
- Assuming intent instead of ignorance
- Focusing on past mistakes
- Wanting immediate visible changes



HOMEWORK

- Think about one way you can be more authentic and true to yourself at school/work.
- What is one action your club/study group can take to be more inclusive?
- What is one action to make your classroom more inclusive?
- What is one action to make a process more inclusive (hiring/tenure/performance evaluation)?



KEEP GOING!

- Set a time to meet with others—male allies are invaluable!
- Start a <D/E/I/J> committee
- Consider an APS Climate Site Visit
- Find webinars, TED talks, podcasts, research
- Invite others to help
- Connect with ally/affinity groups
- Get administrators involved

Women and Physics

Laura McCullough

SECOND
EDITION



IOP ebooks

THANK YOU!

Lauramccphd.com

