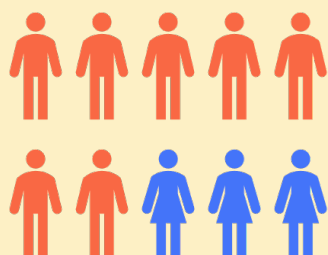
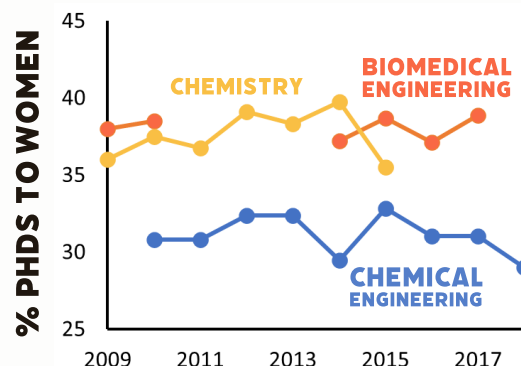
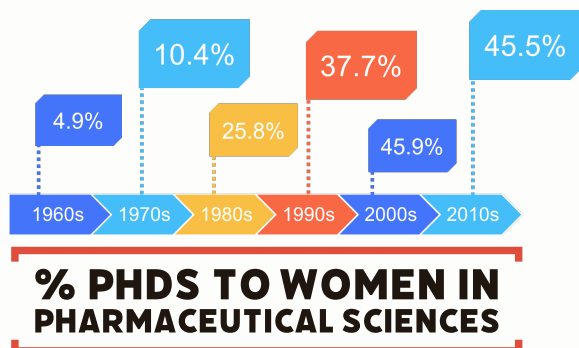


# GENDER IN DRUG DELIVERY RESEARCH

## THE PIPELINE

29-45% of PhDs given in disciplines related to drug delivery are to women.

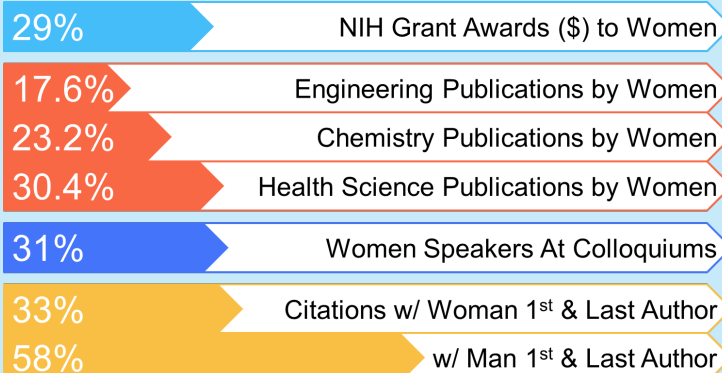


<30% of Pharma CEOs are women

## VIEW FROM THE TOP

In academia and Pharma, women make up <30% of senior positions.

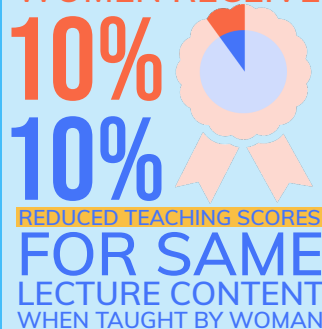
Women Professors	Assistant Professors	Associate Professors	Full Professors
All	49%	42%	29%
Pharmacy	59%	45%	24%
Chemistry	27%	30%	15%
Engineering	29%	29%	NA



## DIFFERENCES THAT AFFECT PROMOTION

Women have fewer publications that are cited less. They also receive lower teaching scores, fewer awards, and grant \$.

## PHARMACY AWARDS WOMEN RECEIVE

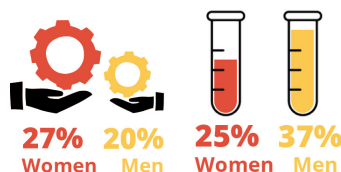


AT THE BEGINNING OF A PHD, THE NUMBER OF WOMEN = MEN THAT WANT ACADEMIA

BY THE END, WOMEN 2X MEN DON'T WANT TO PURSUE ACADEMIA

## GULLY OF SERVICE

TIME SPENT ON SERVICE & RESEARCH



## "SPECTER OF MOTHERHOOD"

THE MISBELIEF THAT HAVING A CHILD RESULTS IN A LESS COMMITTED OR PRODUCTIVE PERSON.

IN HIGH DEMANDING JOBS MOTHERS HAVE BEEN SHOWN TO BE NO LESS COMMITTED OR PRODUCTIVE THAN FATHERS OR CHILDLESS PEERS.

## WHY?

There is a perception, often enforced by mentors, that women are incapable of being productive with children. Women also carry a higher service load, often without serving as committee chair. Further females are harassed at higher rates.

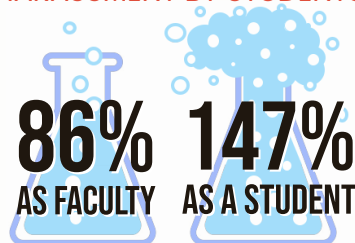
## LINK TO FLYER



<https://unc.live/3OPDuXZ>

References: Draugalis JR et al. The status of women in US academic pharmacy. Am J Pharm Educ. 2014 • Barabino et al. (2020). Solutions to Gender Balance in STEM Fields Through Support, Training, Education and Mentoring • Wang & Widener. The struggle to keep women in academia. C&EN. 2019 • Tom et al. Empowering Women in Chemical Sciences and Engineering through Outreach: A Platform to Explore Careers in the Pharmaceutical Industry. J. Chem. Educ. 2022 • Gumpertz et al. Retention and promotion of women and underrepresented minority faculty in science and engineering at four large land grant institutions. PlosOne 2017 • Iyer. From the boardroom to the consulting room, we need women in pharma. World Economic Forum. 2020 • Nittrouer et al. Gender disparities in colloquium speakers at top universities. PNAS. 2017 • Peterson et al. Mitigating gender bias in student evaluations of teaching. Plos One. 2019 • Huang et al. Historical comparison of gender inequality in scientific careers across countries and disciplines. PNAS. 2020 • NIH.gov • Chatterjee & Werner. Gender Disparity in Citations in High-Impact Journal Articles. JAMA Open Network. 2021 • Thebaud & Taylor. Women face motherhood penalty in STEM careers long before they actually become mothers. The conversation. 2020 • Kmec. Are motherhood penalties and fatherhood bonuses warranted? Comparing pro-work behaviors and conditions of mothers, fathers, and non-parents. Social Science Research 2011 • Misra et al. The ivory ceiling of service work. Retrieved April 21, 2016 • Wood et al. Sexual Harassment at Institutions of Higher Education: Prevalence, Risk, and Extent. Journal of Interpersonal Violence 2018.

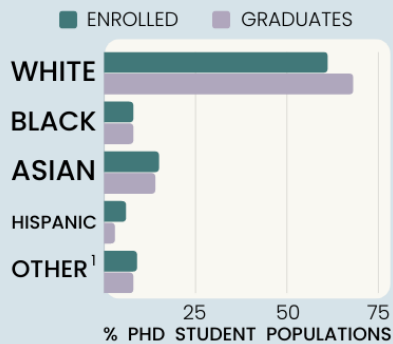
## BEING FEMALE INCREASES SEXUAL HARASSMENT BY STUDENTS



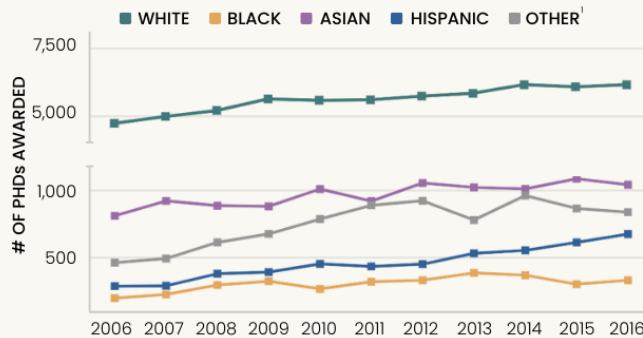
# UNDERREPRESENTED GROUPS IN

# DRUG DELIVERY

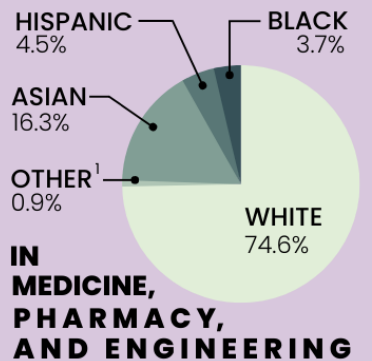
## RACE & ETHNICITY OF PHARMACEUTICAL SCIENCES



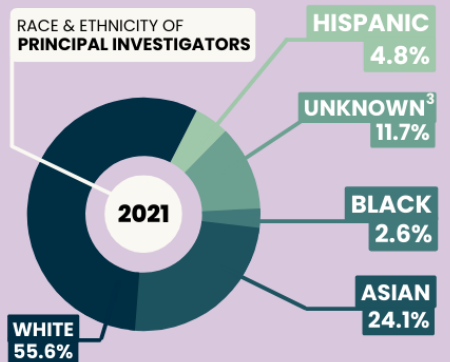
## PHDs AWARDED IN DRUG DELIVERY ATTRIBUTES<sup>2</sup>



## DIVERSITY OF FACULTY



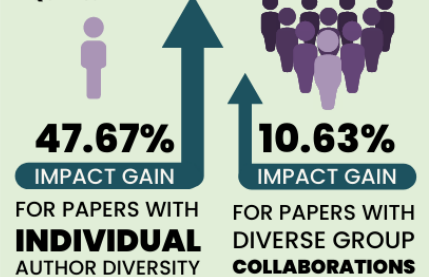
## NIH RESEARCH GRANT APPLICATIONS



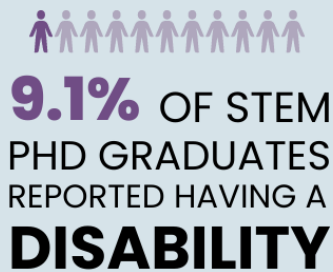
## PROPORTION OF R01 GRANT FUNDS BY RACE & ETHNICITY OF PIs



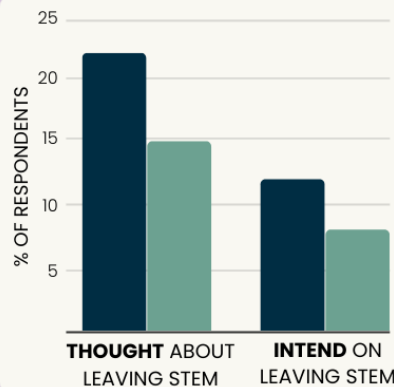
## ETHNIC DIVERSITY OF SCIENTIFIC PAPERS & AUTHORS EQUALS:



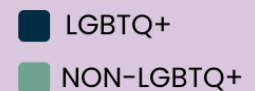
## DISABILITY AWARENESS



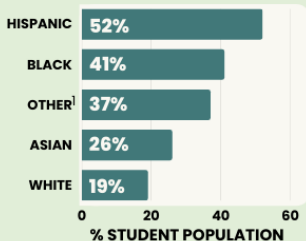
## LGBTQ+ STEM PROFESSIONALS ARE



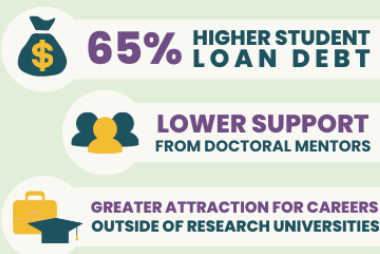
## LGBTQ+ STEM EMPLOYEES ARE MORE LIKELY TO CONSIDER LEAVING STEM CAREERS THAN NON-LGBTQ+ EMPLOYEES



## 27% OF PHD STUDENTS ARE FIRST GENERATION



## FIRST GENERATION PHD STUDENTS:



## REFERENCES

- National Center for Science and Engineering Statistics. 2021. Women, Minorities, and Persons with Disabilities in Science and Engineering: 2021. Special Report NSF 21-321. Alexandria, VA: National Science Foundation. Available at <https://nces.nsf.gov/wmpd>.
- <https://diversity.nih.gov/building-evidence/racial-disparities-nih-funding>
- Cech, E.A. and T.J. Waidunas, Systemic inequalities for LGBTQ professionals in STEM. Science Advances. 2021. 7(3): p. eabe0933.
- Ginther, D. K., Schaffer, W. T., Schnell, J., Masimore, B., Liu, F., Haak, L. L., & Kingston, R. (2011). Race, ethnicity, and NIH research awards. Science (New York, N.Y.), 333(6045), 1015-1019. <https://doi.org/10.1126/science.1196783>
- <https://www.zippia.com/engineering-professor-jobs/>
- Stevens KR, Masters KS, Imoukhuede PI, et al. Fund Black scientists. Cell. 2021;184(3):561-565. doi:10.1016/j.cell.2021.01.011
- AlShebli, B.K., Rahwan, T. & Woon, W.L. The preeminence of ethnic diversity in scientific collaboration. Nat Commun 9, 5163 (2018). <https://doi.org/10.1038/s41467-018-07634-8>
- <https://cgnet.org/research-brief/insights-into-first-generation-doctoral-students/>

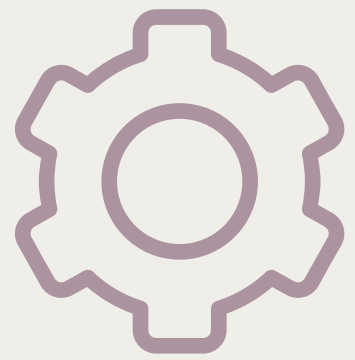


## FOOTNOTES

1. OTHER - includes Native Hawaiian/Other Pacific Islander, American Indian/Alaska Native, two or more races, unknown, and international/foreign
2. DRUG DELIVERY ATTRIBUTES - Biology, Chemistry, Chemical and Materials Engineering
3. UNKNOWN - did not include race/ethnicity in field response



# NOTABLE EXAMPLES OF INCLUSION



Diverse teams lead to more innovative and impactful research. Hofstra et al. shows that URM students innovate more but are less likely to gain recognition. AlShebi et al. cite a greater gain in paper and collaboration impact with a diverse team.

## Including examples of LGBTQ+ & people of color in classroom examples.

With an inclusive curriculum, 66.9% of LGBTQ+ students reported feeling more accepted by classmates compared to 37.9% with non-inclusive teaching.



Set aside \$\$ for support (e.g. grants, tutoring), recruitment & retention of URM.

Rethink your biases & encourage others to as well.



Establishment of a trained care team for academic, well-being, professionalism, discrimination, or harassment referrals by faculty, staff & trainees.

UMBC Meyerhoff Graduate Fellows: 80% URM retention compared to 50% national average. Works by:

1. Identifying high-achieving students
2. Providing \$ aid, tutoring & other support
3. Fostering teamwork & teambuilding

Although UMBC's funding came from NIH, HHMI have supported programs at UNC & Penn State and actively want to sponsor more.



Anonymous community culture & climate reporter systems that serves to collect data on things like microaggressions, recognize trends & recommend training.



URM faculty training & teaching URM students & post docs.

Universally requiring culturally competency training.



## REFERENCES:

Hofstra et al. The Diversity-Innovation Paradox in Science. PNAS 2020.  
AlShebli et al. The preeminence of ethnic diversity in scientific collaboration. Nat Comm 2018.  
Kosciw et al. The 2019 National School Climate Survey: The experiences of lesbian, gay, bisexual, transgender, and queer youth in our nation's schools.  
Lisa Lebovitz et al. Trends in Research and Graduate Affairs in Schools and Colleges of Pharmacy, Part 3: Underrepresented Minorities. AJPE 2020.  
Chubin et al. Diversifying the Engineering Workforce. J Eng Ed 2013.  
Stevens et al. Fund Black Scientists. Cell. 2021.

Kristy Ainslie &  
Ryan Woodring  
University of North  
Carolina  
July 2022



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More great examples are  
here: <https://bit.ly/3uuauwy>

# POTENTIAL ACTIONABLE POINTS

What are your thoughts? Could these work? Would this be something you would support or implement? What are the barriers to doing these?

Extend NIH early stage investigator (ESI) bump for URM and push for council to fund more URM investigators

Seek out training to understand bias through campus LGBTQ+ center & other resources

Score black, women & URM grants well

Push for URM grants that are triaged to be discussed at study section

Create proactive & substantive funding mechanisms to help black & other URM faculty, particularly early on

Ensure promotion & tenure (P&T) committee training for cultural competency, racism, & implicit bias

Call out racist or sexist comments on review panels & discussions of students & faculty candidates

Diversity of the team should be a score driving criterion for grants

Be inclusive of URM & women in writing grants & papers, establishing collaborations, coordinating conferences, building grant review panels & inviting seminar speakers.

Implement financial support for strategic plans & mission statements that promote diversity, equity, & inclusion

Create a climate reporting tool to track repeat offenders & trends at your department

Engage & recruit URM students & faculty

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<https://bit.ly/3Av9LPQ>

EQUITY