



Annotated Bibliography - Women in Higher Education and STEM

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Colleges Must Redefine Leadership

Alcalde, M. C. (2021, December 17). Colleges Must Redefine Leadership. *Inside Higher Ed*. <https://www.insidehighered.com/advice/2021/12/17/colleges-should-support-women-faculty-color-leaders-opinion>

Women of color are doing much of the work that benefits institutions, yet they aren't being recognized or rewarded for it, writes M. Cristina Alcalde, citing three areas that should be addressed.

Insights: Ethnic Diversity in STEM in the United States

Beardsley, R., Halevi, G. (2022). Insights: Ethnic Diversity in STEM in the United States. *Institute for Scientific Information*. <https://dx.doi.org/10.14322/ISI.insight.1>

Diversity in academia can help foster innovations and broaden the scope of what is being studied. This analysis used bibliometric techniques alongside US Census data to examine author's ethnic identity in STEM papers published between 2010 to 2020 in the US only. White only authorship comprised 64% of all papers found. Most areas of study in the US have a sustained underrepresentation of minority groups (specifically Black only and Hispanic only authors) across this study's 10 year observed period. This demonstrates there have been no significant changes in diversity of authorship over the last 10 years, despite increased awareness for the need.

Nevertheless She Persisted? Gender Peer Effects in Doctoral STEM Programs

Bostwick, V., & Weinberg, B. (2022). Nevertheless She Persisted? Gender Peer Effects in Doctoral STEM Programs. *Journal of Labor Economics*, 40(2), 397–436. <https://doi-org.ezproxy.umsl.edu/10.1086/714921>

With data from Academic Analytics Research Center (AARC), these authors followed STEM Ph.D. students throughout their degrees. Tracking their peer's gender composition to find an association with dropout rates among the students. Women who entered graduate cohorts with no female peers were 11.7% less likely than their male classmates to graduate in six years. It took only 1 standard deviation increase in the amount of women classmates to raise the likelihood of women graduating by 4.4%. Cohort composition effected dropout rates in the first year more than other years. These findings show a climate mechanism; female peers create a more female friendly environment to foster learning.

U.S. Women Faculty in the Social Sciences Also Face Gender Inequalities

Casad, B., Garasky, C., Jancetic, T., Brown, A., Franks, J., & Bach, C. (2022). US Women Faculty in the Social Sciences Also Face Gender Inequalities. *Frontiers in Psychology*, 13. [https://www.frontiersin.org/articles/10.3389/fpsyg.2022.792756/full?&utm_source=Email_to_authors_&utm_medium=Email&utm_content=T1_11.5e1_author&utm_campaign=Email_publication&field=&journalName=Frontiers in Psychology&id=792756](https://www.frontiersin.org/articles/10.3389/fpsyg.2022.792756/full?&utm_source=Email_to_authors_&utm_medium=Email&utm_content=T1_11.5e1_author&utm_campaign=Email_publication&field=&journalName=Frontiers%20in%20Psychology&id=792756)

This article looks at gender inequality experienced by women faculty in the social sciences; fields where they are well represented but continue to be treated unequally. The authors use public datasets to examine five different social science fields in the United States. This analysis found several possible reasons for differences in salary, promotion, tenure, publications, etc. for women compared to men in these disciplines. One is that when women are represented equally in lower ranks it can appear as gender parity and therefore not require equality solutions.

The Giant Plan to Track Diversity in Research Journals

Else, H., Perkel, J. (2022, February 23). The Giant Plan to Track Diversity in Research Journals. *Nature*. <https://www.nature.com/articles/d41586-022-00426-7>

Journals all over the globe will begin asking scientists who submit publications about their gender and ethnicity for submission records on diversity. Previously, some journals tracked race and ethnicity but not gender. Creating a standard set of questions is hard since these concepts vary by country. Work of this kind has already shown publication biases. There is pressure on these journals to have diverse staff.

How Identity Shapes Science

Flaherty, C. (2022, January 4). How Identity Shapes Science. *Inside Higher Ed*. <https://www.insidehighered.com/news/2022/01/04/new-data-how-race-and-gender-shape-science>

A new study of millions of academic papers and the scholars who wrote them finds a connection between lead authors' racial and gender identities and their research topics—and that underrepresented groups are overrepresented in topics with relatively low citation counts.

The study's authors say these trends limit both individual and scientific advancement. They urge more access to science for nonwhite scholars and women, plus more funding for the research they pursue.

Defying a Gendered 'Narrative'

Flaherty, C. (2022, March 9). Defying a Gendered 'Narrative'. *Inside Higher Ed*. <https://www.insidehighered.com/news/2022/03/09/study-challenges-gender-bias-letters-recommendation#.YjCel17Ep2E.link>

This study looked at recommendation letters for candidates applying for an assistant professor position. The fields ranged from experimental particle physics to developmental psychology and sociology. This study did not support previous findings that male candidates were described more agentic and female candidates more communally. Researchers found differences for the tendency of the fields to use these types of words, however, they were used equally between the candidates about whom they were writing. They did find that the words "scientist" and "physicist" were used more often for men than women. These study authors still warn against the idea that this process is free of bias.

A Win For Academic Mothers

Flaherty, C. (2022, March 16). A Win For Academic Mothers. *Inside Higher Ed*. <https://www.insidehighered.com/news/2022/03/16/ut-austin-must-pay-professor-3m-sex-discrimination-case>

Professor Evdokia Nikolova was denied tenure due to discrimination based on sex and pregnancy. She sued the university and won a \$3 million lawsuit for discrimination. Professors who study bias and stereotyping believe that the loss of favor for women in rigorous fields, such as academic science, is due to the ideal worker and the ideal mother seemingly not being the same person. The ideal father image does not clash with the ideal male worker, therefore becoming a father works in favor of men. Nikolova worked in a department with 53 tenure professors, four of whom being women.

The 'Difficult' Name Penalty

Flaterly, C. (2022, June 29). The 'Difficult' Name Penalty. *Inside Higher Ed*. <https://www.insidehighered.com/news/2022/06/29/new-paper-finds-evidence-name-discrimination-phds>

These researchers found that, after receiving a Ph. D in Economics, people with names that were difficult for native English speakers to pronounce had poorer job placements compared to candidates with easier to pronounce names. Candidates whose names took longer for hiring committee members to say had a lower likelihood of placement in an academic job or receiving a tenure track position. When they were placed into a job, those were most often at universities with lower research productivity. The researchers speculate the source could be when hiring committees discuss potential candidates, there might be a subconscious bias against names that they have trouble pronouncing and/or remembering.

Ratings and Gender Bias Over Time

Flaterly, C. (2022, October 31). Ratings and Gender Bias Over Time. *Inside Higher Ed*. [Ratings and bias against women, over time \(insidehighered.com\)](https://www.insidehighered.com/news/2022/10/31/ratings-and-gender-bias-over-time)

Female instructors face more backlash from students for negative feedback than male instructors. Older female instructors were rated even more harshly compared to younger female instructors. Male instructors do not replicate the negative association between student ratings and age. These two studies suggest that more negative evaluations are punishments for violating gender norms. These student biases increased after receiving the first set of grades. The study comparing female and male instructors used students enrolled in an intro to economics course across five institutions. The ageism study used thousands of student evaluations of business professors and graduate professors. Researchers show a significant decline in women's teaching evaluations from young adulthood to middle age, with a rebound from middle age to older adulthood. Women's ratings bottomed out at age 47, on average.

Faculty Diversification Must Accelerate, Report Says

Flaterly, C. (2022, December 6). Faculty Diversification Must Accelerate, Report Says. *Inside Higher Ed*. <https://www.insidehighered.com/news/2022/12/06/study-finds-true-faculty-diversity-possible-2050#.Y5Dj1IXKroY.link>

Researchers estimate higher education could reach demographic parity by 2050 by collectively increasing underrepresented faculty by one percentage point per year. Coordinated innovation, along with funding, is required to move forward. Colleges and universities must acknowledge their history of exclusion and take responsibility for this past across all institutions. At the current rate of diversification, higher education will never achieve demographic parity among tenure-track faculty. We need to diversify faculty around 3.5 times our current pace to reflect the U.S. population by 2050 in terms of race. Researchers also state that using the 'leaky pipeline' analogy underestimates the number of people that leave and re-enter academic pathways.

Who gets to use NASA's James Webb Space Telescope? Astronomers work to fight bias

Greenfieldboyce, N. (2022, January 11). Who gets to use NASA's James Webb Space Telescope? Astronomers work to fight bias. *In NPR*. <https://www.npr.org/2022/01/11/1071752559/who-gets-to-use-nasas-james-webb-space-telescope-astronomers-work-to-fight-bias>

Women-led research proposals to use the Hubble telescope have historically been approved at lower rates than those led by men. The gap has narrowed since the proposal process became anonymous in 2018.

Effects of Repeated Implicit Bias Training in a North American University

Betsy Lehman, Karen Colbert, Sonia Goltz, Audrey Mayer & Mark Rouleau (2022): Effects of repeated implicit bias training in a North American university, *Journal of Higher Education Policy and Management*, DOI: 10.1080/1360080X.2022.2145927

This study examined the effects of a multi-week, mandatory, repeated implicit bias training at a STEM-focused, rural midwestern university. 478 academic and administrative staff participated. The focus of the training was implicit bias based on gender and reducing gender bias in personnel. It used a 41-item questionnaire that assessed cognitive knowledge of implicit bias, attitudes toward diversity, and behavioral intentions. This study found that the recency of training, not the repetitiveness, improves competency for implicit bias. Because of this, they recommend implicit bias training be administered at the beginning of a committee's service rather than on a fixed schedule. This way the concepts are fresh and retrievable. Experience with both promotion and hiring committee service increased behavioral intention by 0.461 points on average when compared to no service. Male-identified academics scored significantly lower in cognitive knowledge and attitudes regarding implicit bias than female-identified academics. However, the overrepresentation of women in the data suggests that women voluntarily engage more with the subject. Results further suggest that the completion of a training course doesn't necessarily generate competency. They recommend that universities refrain from things like "certifications" that imply that training completion has mitigated an individual's implicit biases.

Most US Professors are Trained at Same Few Elite Universities

Nowogrodzki, A. (2022, September 21). Most US Professors are Trained at Same Few Elite Universities. *Nature*. [Most US professors are trained at same few elite universities \(nature.com\)](https://www.nature.com/articles/d41586-022-02888-2)

This study found that universities hiring faculty members emphasize the prestige of the potential hire's graduate university as a proxy for the candidate's abilities. So much so that 1 in 8 US-trained faculty members came from just five universities: the University of California, Berkeley; Harvard University in Cambridge, Massachusetts; the University of Michigan in Ann Arbor; Stanford University in California; and the University of Wisconsin–Madison. This list does not include any historically Black colleges and universities or Hispanic-serving institutions. In an attempt to break this cycle, hiring committees should question prestige and instead emphasize what that potential faculty member could bring to the table.

When Two Bodies Are (Not) a Problem: Gender and Relationship Status Discrimination in Academic hiring

Rivera, L. A. (2017). When two bodies are (not) a problem: Gender and relationship status discrimination in academic hiring. *American Sociological Review*, 82(6), 1111-1138. <https://advance.charlotte.edu/sites/advance.charlotte.edu/files/media/Relationship%20Status%20and%20Hiring.pdf>

Hiring committee members at a metropolitan university used female (but not male) applicant's relationship status when making decisions of who to hire for the position of interest. They relied on stereotypes that women's primary duty was to the family, while her husband's was to his work. This would mean the husband would most likely be unwilling to move if she got a good job offer elsewhere. That made women more risky to extend a job offer to. On the other hand, since they stereotyped men's primary duty as being to his work, his wife would not have a problem moving with him if he received a job offer out of state. This significantly impacted hiring decisions.

Does Gender Bias Still Affect Women in Science?

Roper, R. (2019, July 17). Does Gender Bias Still Affect Women in Science? *Microbiology and Molecular Biology Reviews*, *ASM Journals*, 83(3). <https://journals.asm.org/doi/10.1128/MMBR.00018-19>

Despite women's increased numbers in the scientific and medical fields, there is still evidence of gender bias in faculty and students. Numerous studies show that participants are more likely to hire a male versus a female when given identical resumes, even when the male's scores are lower in

comparison to the female's scores. These biases were also demonstrated to impair a woman's ability to receive equal pay and grant funding. Both male and female students hold a bias against their female classmates. Several of the factors involved in making tenure are subject to these gender biases. There is also the issue of sexual harassment affecting professional success. These biases are largely unconscious and may be combatted with explicit training and mentoring.

Why Search Committees Struggle to Diversify the Faculty

Ross, A. (2022, March 30). Why Search Committees Struggle to Diversify the Faculty. *The Chronicle of Higher Education*.

<https://www.chronicle.com/article/why-search-committees-struggle-to-diversify-the-faculty>

Diversity efforts in university settings often fall to the faculty search committees hiring for open positions. Obstacles of diversity efforts often are outside of awareness for these search committees. When there are unspecified standards expected of the potential new faculty members, this lets committee members define the standards and evaluation criteria. Here is where biases can leak in. Committee members spoke differently about diversity and equity based on their own lens as well as if they were tenured or not. Junior faculty often deferred to senior faculty's views on the topic. The solutions were to clarify standards and hold each other accountable. Build this conversation into all aspects of the institution.

To Advance Equity for Women, Use the Evidence

Ryan, M. (2022, April 19). To Advance Equity for Women, Use the Evidence. *Nature* 604, 403.

<https://www.nature.com/articles/d41586-022-01045-y>

This article proposes three mistakes that we are currently making that stand in the way of equality. First, there is an over-emphasis on quantity. Hitting a metric does not show differences in award quality. This is explained using the glass cliff phenomenon; women may receive a promotion, but they are more likely to get promoted to risky positions that are potentially doomed to fail. Second mistake, emphasizing individual trainings instead of overhauling the system or culture. Individual fixes are temporary and could reinforce a negative culture. Third mistake, over-optimism. Both men and women overestimate women's representation. It was found that men who overestimated women's representation were less likely to support equal opportunity initiatives and more likely to pay women less than men.

Women Scientists at Famed Oceanography Institute Have Half the Lab Space of Men.

Wadman, M. (2023, January 23). Women Scientists at Famed Oceanography Institute Have Half the Lab Space of Men. *Nature*. [Women-scientists-famed-oceanography-institute-have-half-lab-space-men](https://www.nature.com/articles/d41586-023-01045-y)

Scripps Institution of Oceanography (SIO) at the University of California, San Diego (UCSD) recently discovered that their female scientists only control 17% of the space allotted to researchers. SIO's 56 women scientists have, on average, half as much research space and one-third the storage space compared to their 157 male counterparts. Also, out of 32 storage containers on site—as opposed to at less convenient, remote locations—31 are assigned to men. The differences in space allocation could not be explained by the researcher's funding, seniority, research group size, or discipline. A common practice that helps explain this finding is departing principal investigators assigning their space to someone they choose. This practice has disproportionately benefited men. This was a thorough statistical analysis that the university released to the public in a demonstration that they plan to fix this discriminatory injustice.