



How Diversity Matters in the U.S. Science and Engineering Workforce: Integration and Inclusion in Teams and Departments

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How Diversity Matters in the US Science and Engineering Workforce: A Critical Review Considering Integration in Teams, Fields, and Organizational Contexts

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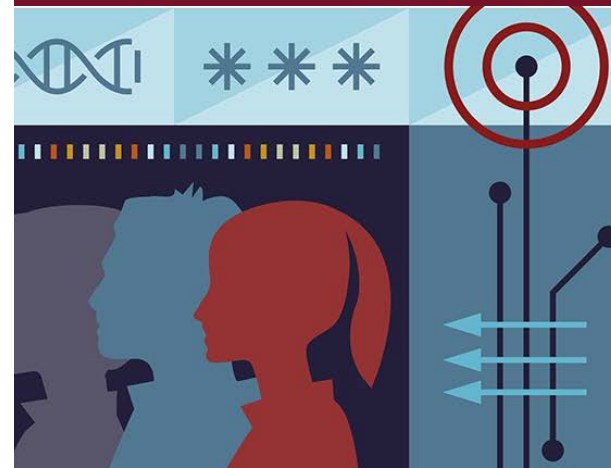
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Literature Overview

The evidence for demographic diversity is mixed.

Under certain conditions diversity promotes innovation, creative problem solving, higher quality work, and more productivity.

One common theme across the research is that diversity works best under conditions of equity/integration in the wider context (occupation, industry, discipline).

Why diversity in S&E matters:

Costs of getting research wrong

Between 1997 and 2000, 10 drugs were withdrawn from the U.S. market because of life-threatening health effects.

- Eight of these posed "greater health risks for women than for men" (U.S. GAO, 2001). (*Gendered Innovations*, Schiebinger 2008)
- Average cost of bringing drug to market \$5 billion



2021 update (Koning et al.)

- Life science teams led by women inventors are more likely to patent technologies that improve women's health

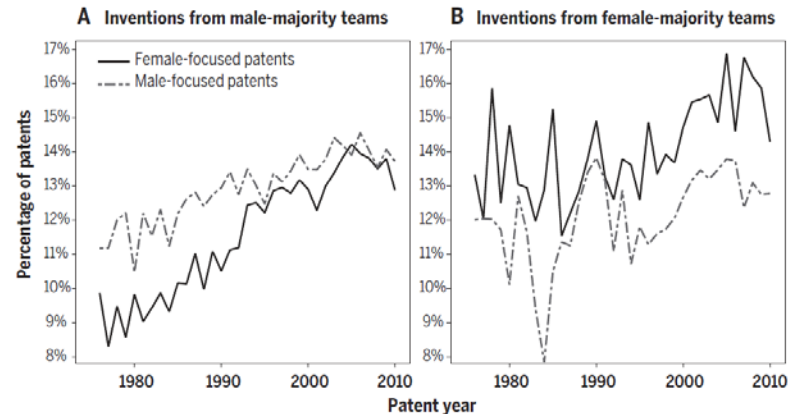
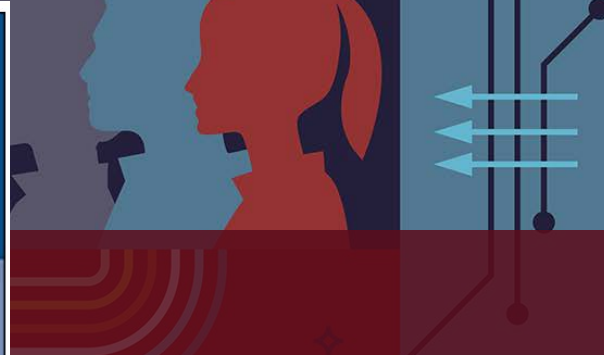


Fig. 2. Percentage of U.S. biomedical patents that are male-focused and female-focused broken out by the gender composition of the inventor team. (A) The percentages for patents with majority-male teams (>50% men). **(B)** The percentages for patents with majority-female teams ($\geq 50\%$ women).



Journal Article



Creating inclusive department climates in STEM fields: Multiple faculty perspectives on the same departments.

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Mechanisms of Inclusion

- Representation
- Collegiality & Mentoring
- Decision-Making & Leadership



Matched Interview Sample

- 57 respondents in 14 departments
- Interviewed in waves **matching participants to women of color in same department and rank**
- About half the sample are women, faculty of color, and foreign born

Our Typology

<p>Inclusive Representationally diverse; supportive environment; effective mentoring; conflicts addressed directly</p>	<p>Life sciences, social sciences</p>	<p>3</p>
<p>Improving Less diverse, but recent diverse hiring; variable environment; inconsistent mentoring; less voice in decision-making</p>	<p>Engineering, physical sciences, social sciences</p>	<p>5</p>
<p>Marginalizing Little diversity; exclusionary culture; isolation; little mentoring; little voice in decision-making; conflicts left unaddressed</p>	<p>Engineering, life sciences, physical sciences, social sciences</p>	<p>6</p>



Inclusive departments

That kind of diversity of different experiences is definitely appreciated in the department. . . as international scholars, we don't feel any problem with exclusion.

Chang,* Asian foreign born man

If your door is open, people will just step in and continue the conversation.

Tiana, Black foreign born woman

I know I feel like pretty supported in the department, maybe starting to spill outside of the department.

Carol, white foreign born woman

This is probably where there's also inequities because it's sort of, you know, do you feel comfortable or entitled to knock on people's doors or access people?

Wyatt, white US born man

*all names are pseudonyms

Improving departments

It's very, very few. Maybe less than, like, what you can count on one hand is very, very few. So, in terms of how included they feel? I'm not sure. Because there's so few, and we don't really talk about it. Alexis, Black US born woman



I don't live here and being a woman. . . and being also a racial minority. All this probably prevents me from feeling being more included. Niu, Asian foreign born woman

I mean, it's not perfect, but I think it's pretty, it's pretty good. Jane, white US born woman

Marginalizing departments

Some faculty of color, who, maybe for whom this is their first time being in a predominantly white institution. . . there's some tension there around, you know, just this new experience.

- Gabby, Black US born woman



Initially, I did approach people. I wouldn't say that the results were stellar, and I think I've more or less got the advice to just shut up and do my work.

Zach, white US born man

Conclusions & Implications

- Inclusive departments findings:
 - Diverse departments more likely to see themselves as inclusive
 - Collegial, informal mentoring is part of inclusive departments
 - Inclusive departments do not ignore conflict, but address it
- Barriers to inclusion cannot only be addressed at institutional level; departmental contexts are *key*
- *Investments in inclusion pay off for all faculty members and for science*



Comments and questions are welcome!

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