

Professional Cultures and Inequality in STEM



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Overview

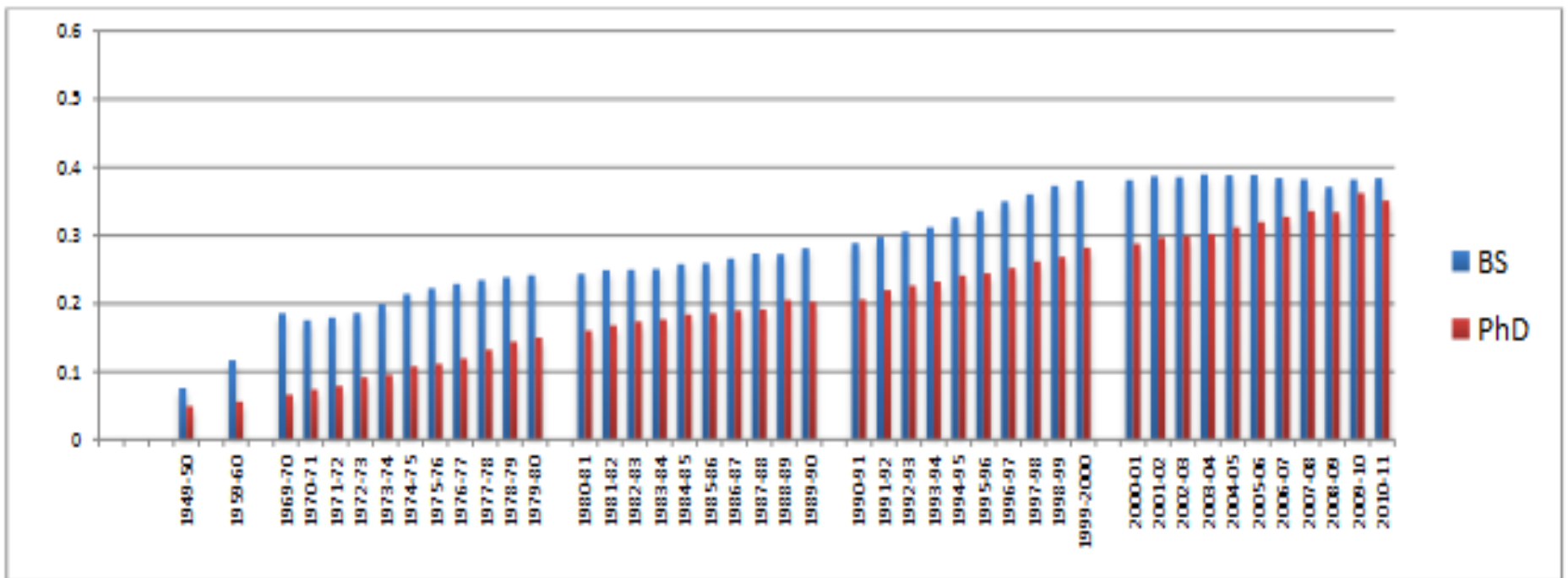
- Question: How do taken-for-granted beliefs in STEM reproduce inequality?
 - Focus: Professional Cultures in STEM

A Starting Place

- Not primarily a “bad apples” problem
- Subtle beliefs and practices matter
- Won’t necessarily improve with time
- Small disadvantages accumulate over time

A Starting Place

Figure 3: Representation of Women among S&E Bachelor's and PhD Earners, 1949-2011 (Excluding SocSci and Psych)**



- Source: Erin Cech, Laura Pecenco, and Mary Blair-Loy 2013. "Science and Technology Professions: The Status of Women and Men." Center for Research on Gender in the Professions, UC San Diego. <http://crgp.ucsd.edu>.

A Starting Place

- No longer primarily a “bad apples” problem
- Subtle beliefs and practices matter
- Won’t necessarily improve with time
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Culture Matters

- Professional cultures of STEM disciplines can help reproduce inequalities
- 3 specific cultural ideologies:
 - Schemas of scientific excellence
 - Depoliticization
 - Meritocracy
- How to undermine these ideologies

What are Professional Cultures?

- Professional cultures = rich and historically-rooted **meaning systems** built into and around professions' tasks and knowledge.
 - Give professional work meaning
 - Unite profession members
- Biases can be built into these cultures.



Three Specific Ideologies

Professional Cultures of STEM

**Schemas of
Scientific
Excellence**

Depoliticization

**Meritocratic
Ideology**

Schemas of Scientific Excellence

- Characteristics & skills assumed to be markers of professional competence
 - **Cultural yardsticks** for measuring “excellence”
 - Influence hiring, promotion, and funding decisions
- Not necessarily the characteristics *actually* required for success
- Can be *gendered, racialized, and heteronormative*

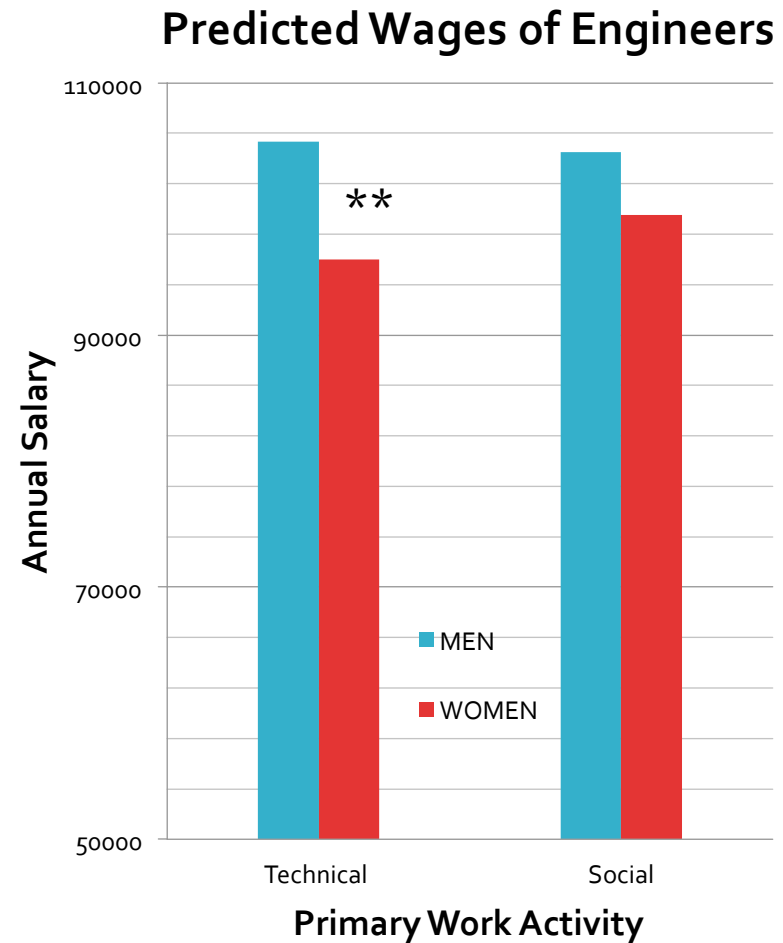


-Cech & Blair-Loy in progress, Cech 2013

Schemas of Scientific Excellence

- E.g., the *Technical/Social Dualism*
 - The ideological separation between “technically-focused” and “socially-focused” activities (Faulkner 2000)
 - “Technical” is more highly-valued than the “social”

- Gender stereotypes mapped on to this dualism:



Source: (Cech 2013, *Social Forces*)

Schemas of Scientific Excellence

Percent of STEM Faculty who Agree that “Caring about Promoting Diversity” is characteristic of:

Embargoed

(Blair-Loy, Ferrante, Cech & Rogers, in progress)

Schemas of Scientific Excellence

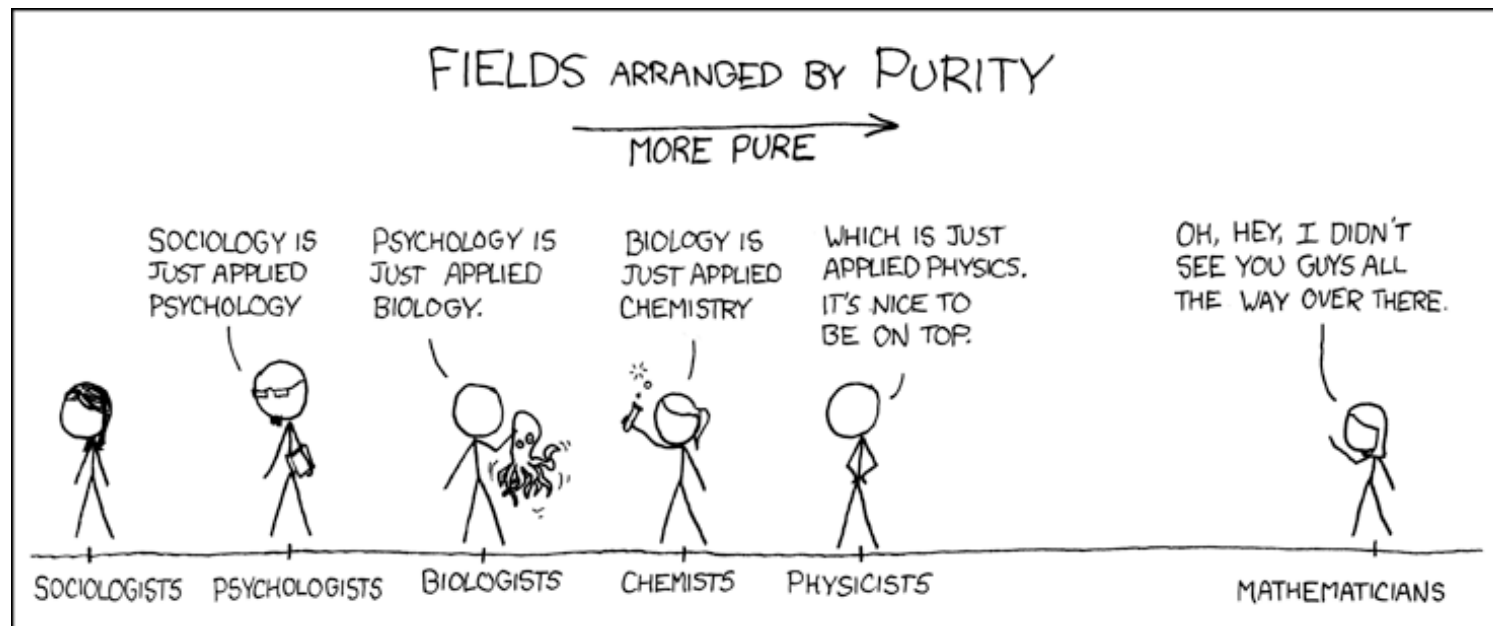
Also shape what **research areas** are considered most “prestigious” and “valuable:”

Embargoed

Schemas of Scientific Excellence

Reflection Question: How is excellence judged in your department? How might social stereotypes get folded into these beliefs about excellence?

Depoliticization



comic: <http://xkcd.com/435/>

Depoliticization

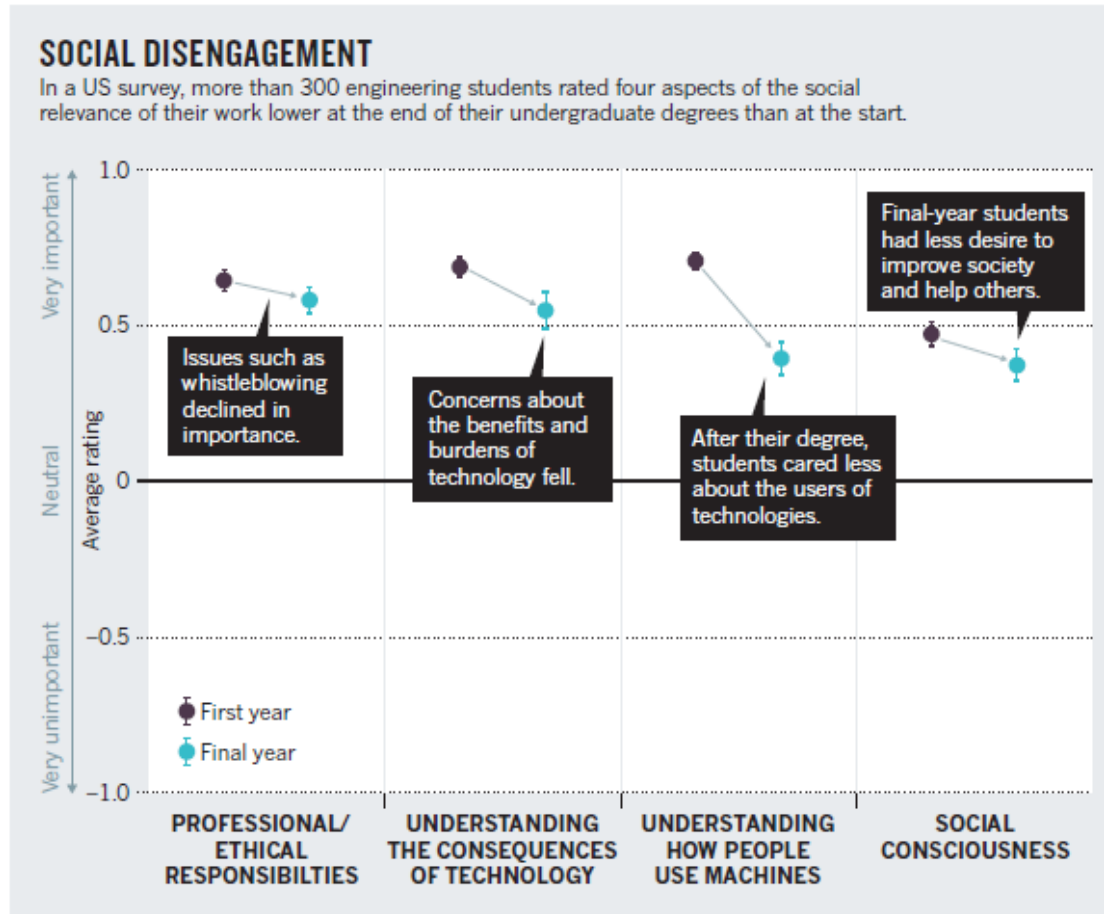
- Depoliticization: the belief that science is a “pure” space that *can* and *should* be stripped of political and cultural concerns.
- ...But what to **study**, how to **define problems**, what to **fund** are *cultural & political* decisions

-Cech 2013, 2013b; Cech & Sherick 2015; Knorr-Cetina 1999; Latour & Woolgar 1986

Depoliticization

- Depoliticization can *shut down* conversations about diversity and equality within STEM

- Impacts Students:



Cech 2014. "Comment: Embed Social Awareness in Science Curricula" *Nature*, vol. 50(7484):477-8.

Depoliticization

- Depoliticization reinforces existing power structures within STEM:

In my department, [the issue of sexual identity] is sort of invisible. I think most of them are straight dudes who don't really think about the existence of people who are not like them. I think they have so much privilege that they can't understand what it's like for people who don't have that privilege. (Lesbian computer science graduate student)

(--Cech and Waidzuans 2011, p. 11).

Depoliticization

Reflection Question: How might depoliticization silence conversations about diversity and inequality in your department?

Meritocratic Ideology

- The belief that success is the result of individual talent, training, and motivation
- Frames inequalities in STEM as the fault of women and minorities, not the social system.

Cech & Blair-Loy 2010, Cech, Blair-Loy and Rogers in progress, Klugel and Smith 1989, McCall 2012



Meritocratic Ideology

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Meritocratic Ideology

Reflection Question: Who still needs to be convinced that unequal processes actually exist in STEM?

In sum...

- These 3 ideologies are part of the professional cultures of STEM
 - Difficult to *see*, hard to *change*
- Professional cultures can reproduce inequalities within STEM
- Do we contribute to these cultural processes?

What can be done?

- Not about “fixing” women or minorities to be more like white men
- **Schemas of Scientific Excellence:** Be wary of discussions about “fit”
- **Depoliticization:** Legitimize topics of diversity and equality
- **Meritocratic Ideology:** First step—explain that there *is* a problem

"Persistence of Male Power & Prestige in the Professions" Report

Center for Research on Gender in the Professions

March 2013



The Persistence of Male Power and Prestige in the Professions: Report on the Professions of Law, Medicine, and Science & Engineering*

Our new case studies of three prestigious professions show that, among those at the pinnacle of power, women still lag behind men.

Gender inequality maintains a tenacious grip on the American workplace. Post-recession, men continue to be more likely than women to retain the lion's share of power. This holds true even within the professions requiring the most education, where some might imagine the potential for parity would be greatest. This social scientific report and set of three case studies* from the Center for Research on Gender in the Professions show that, among those at the pinnacle of power, women still lag behind men. Recent claims by journalists and pundits have exaggerated the strides women have made in recent years.¹ In contrast, this report documents the spectrum of power in the service economy. Women are common in the lower-paying service occupations, while men continue to dominate the professions. There are many interlocking reasons for these patterns and no simple solution to this problem. We conclude with practical steps that could help move our country toward a more positive future.

The Decline of Men? Not So Fast!

Books by journalists Hanna Resin (*The End of Men*) and Lisa Mundy (*The Richer Sex*) have been especially emphatic in the decline of men story.

CENTER FOR RESEARCH ON GENDER IN THE PROFESSIONS Science and Engineering Professions: The Status of Women and Men*

EDUCATION:

At each increasing level of advanced training, the proportion of female science and engineering (S&E) degree recipients declines (Figure 1). Moreover, the decades long trend of women's increasing representation among S&E BS and PhD degree holders has stalled in recent years (Figure 3).

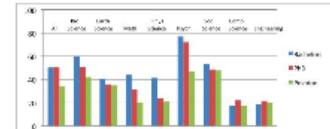


Figure 1: Percent Women among People with Bachelors, PhDs and Postdocs in Science and Engineering Fields¹

SCIENCE & ENGINEERING CAREERS:

Women are increasingly under-represented at each stage of the career ladder in both industry and academia:

Glass ceilings for women in industry:

Women are under-represented in science and engineering management positions, compared with their overall representation in these industries:

- In 2008, women researchers and engineers employed in business or industry held 70% of all management and 75% of non-S&E top-line management positions, compared with their 71% representation in S&E business and industry overall.²
- Women held only 63% of engineering management and 20% of computer and information systems management positions.³

Among S&E doctorate holders in academia (science & engineering, excluding social science and psychology):

- Women obtained 44% of S&E doctorates in 2002 and 33% of postdoc positions.⁴
- Women made up a higher percentage of people employed in temporary positions than of those in tenure-track positions in 2009: Women held 56% of S&E adjunct faculty positions, but only 28% of tenure-track and 10% of full professor positions.⁵
- Women are only 19% of faculty in all S&E fields (and only 9% of all engineering faculty).⁶

Although social science has more women than S&E, female representation declines at each successively higher academic level:

- Women obtained 67% of social science and 72% of psychology doctorates in 2006 but only held 47% of tenure-track and 14% of psychology postdoc positions.⁷
- Women were over-represented among people in temporary academic positions in 2009: Women held 62% of social science and psychology adjunct faculty positions, but only 32% of tenure-track and 30% of full professor positions.⁸

GENDER PAY GAP:

Women in S&E fields earn average yearly salaries of \$21,865, while men receive \$26,714.⁹ Overall, women working full-time in S&E professions earn 85% on average what their male counterparts do.¹⁰ This is similar to or higher than among lawyers (80%), physicians and surgeons (79%), and among working men and women overall (83.4%).¹¹ But the momentum of movement toward income equality gained in the 1970s and 1980s has largely stagnated since the mid-1990s.¹²

SCIENCE & ENGINEERING COMPARED TO OTHER OCCUPATIONS:

- In 2009, women continued to constitute the vast majority of those employed in traditionally female occupations.
- More than three-quarters of registered nurses, therapists, and non-postsecondary teachers were women.¹³
- Women were about half of people employed in all occupations and half of postsecondary teachers, one-third of lawyers and judges, and 32% of physicians.¹⁴
- In science and engineering occupations, in comparison, women were 49% of biological and life scientists, 25% of mathematical and computer scientists, and only 13% of engineers.¹⁵

CRGP.ucsd.edu/STEMresearch

Schemas of Scientific Excellence:: How is excellence judged in your department? How might social stereotypes get folded into these beliefs about excellence?

Depoliticization: How might depoliticization silence conversations about diversity and inequality in your department?

Meritocratic Ideology: Who still needs to be convinced that unequal processes actually exist in STEM?

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Thank you