

Diversity and Inclusion in EE and the IEEE

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Chair: IEEE TAB Committee on Diversity and Inclusion

Chair: IEEE Board Ad-Hoc Committee on Diversity, Inclusion, and Ethics

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Women in EE

Are things better than when we were in college?

- **Students: % of women undergrads**
 - 12% EE, 17% CS, 19% engineering
 - Peak for CS: 36% in '84, decreasing since
 - MSEE: 20%, Ph.D in EE: 14%
- **Academia:**
 - 16% of EE/CS faculty are women
 - Less than 12% at Stanford, not unusual
- **Industry:**
 - 13% of the engineering workforce are women
 - 56% of women leave careers in tech. Leaky pipeline moving up company ladder
- **Patents:** Less than 3% of patent holders are women
- **Startups:** 8% of Bay Area Series A startups had women founders last year
 - In dozens of funding pitches for my 2 startups, only other women in the room were serving the coffee



Women's Experiences in Tech

In a recent IEEE survey, 4,579 women responded to questions on being a woman in tech. The detailed findings reveal discouraging experiences and perceptions within the industry.

Many women experienced the same negative incidents at alarmingly high rates...

73%
Have Experienced
Negative Outcomes
in Their Careers
Attributed to
Being a Woman

71%
said questions or
comments were
addressed to males when
questions should have
been addressed to her

58%
were asked
inappropriate
questions during
interviews

39%
were assigned
lower-level
tasks

37%
were excluded
from networking
opportunities

28%
have experienced unwanted
sexual advances

86% from
colleagues **58%** from
a superior **45%** from
a client



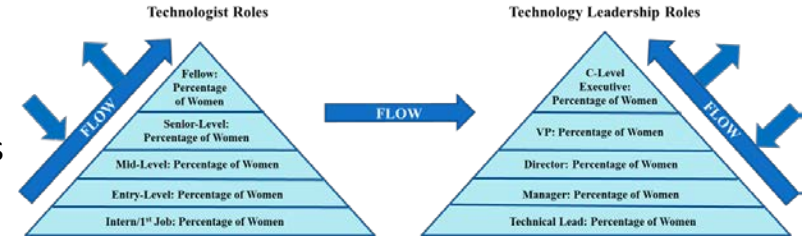
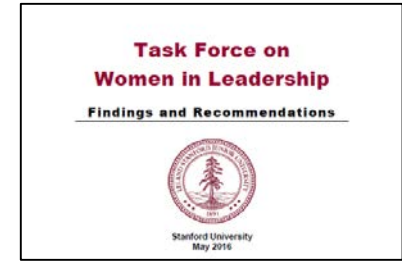


My Women in Tech Activism

Defining and Tracking Diversity Metrics Critical



- ▶ Stanford
 - Steering Committee: Faculty Women’s Forum
 - Provost Committee: Hiring, Promotions, and Appointments
 - Developed best practices to address causes that disadvantage diverse candidates
 - Task force on women and leadership
 - Proposed best practices to promote/support diverse leadership, including diversity metrics
- ▶ Women in Technology Leadership Roundtable (WITI)
 - Encouraged company members to “face the data”
 - Created a set of proposed diversity metrics for companies
- ▶ Institute of Electrical and Electronics Engineers (IEEE)
 - Awards Board document on Implicit Bias
 - Chair: TAB committee on diversity and inclusion
 - Chair: Board of Directors committee on diversity, inclusion, and ethics



The Institute of Electrical/Electronic Engineers



Largest professional organization in the world

- ▶ More than 422,000 members in more than 160 countries (more than 50% outside USA)
- ▶ More than 123,000 Student members
- ▶ 339 Sections in ten geographic Regions worldwide
- ▶ 39 Technical Societies and 7 technical councils representing a wide range of technical interests
- ▶ 4.5 million documents in the IEEE Xplore® Digital Library, with 8 million downloads/month
- ▶ Publishes approximately 200 transactions, journals, and magazines
- ▶ Sponsors more than 1,900 conferences in 103 countries
- ▶ Prestigious Honors and Awards (16 Medals, 32 Field Awards, Society Awards, Fellow, Dist. Lecturer)
- ▶ 1,250 active standards and more than 700 standards under development
- ▶ 2,116 Chapters that unite local members with similar technical interests
- ▶ 3,285 Student Branches at colleges and universities in over 100 countries
- ▶ 543 affinity groups including Young Professionals (YP) and Women in Engineering (WIE)

IEEE Technical Activities Board (TAB)

IEEE is the professional community for most EE academics and many EEs in industry

Why are diversity and inclusion important for the IEEE?

- ▶ Diverse organizations more creative, perform better, and have higher satisfaction
 - Diversity in IEEE encompasses gender, geography, work sector, race/ethnicity, and age
- ▶ Attracting, retaining, and engaging diverse members is essential for the IEEE to thrive
- ▶ The IEEE is losing women members (12% of EE ugrads/workforce, 16% of EE faculty)
 - % of IEEE women (self-report): All member grades (**12.1%**); Student members: (**30.3%**), Graduate Student Members (**8.8%**), Members (**8.7%**), Senior members (**7.8%**); Fellows: (**4.4%**)
- ▶ Lack of diversity/inclusion precludes providing the same benefits to all IEEE members
- ▶ IEEE can help guide the profession in attracting/retaining diverse members
 - Retention of women under 50%
- ▶ IEEE can make things better for the next generation of diverse technologists



How is the IEEE doing on diversity/inclusion?

- ▶ Poorly with respect to women members in many dimensions
 - IEEE award statistics for women abysmally low (in the low single-digit % in **nominations** and **winners**). This data is only available to Awards Board and Award Committee Chairs.
 - Lack of women representation in publications (as EiCs, within committees and editorial boards) as well as in papers published and citations
 - Low representation of women in conferences (GCs, TPC chairs, TPCs, plenary speakers)
 - Low number of women in S/C leadership positions and as Distinguished Lecturers
- ▶ Similar issues for members outside North America and in industry
- ▶ Goals on inclusion for Young Professionals in major committees not being met
- ▶ Process issues regarding leadership and committee selection, peer review, etc.
 - Processes not always transparent or inclusive, and are subject to implicit bias

TAB Ad-Hoc Committee: Women & URM (est. 2016)



VP TAB

- ▶ Recommendations (Nov. 2016 President's Forum)
 - Highest priority: form **TAB standing committee** on diversity/inclusion
 - Define and track **diversity metrics** (gender/region/work sector) across IEEE activities
 - Repository for **society best practices** around diversity
 - **Diversity training** for IEEE/society/committee leadership and staff
 - Create **implicit bias briefing** to raise awareness in IEEE and beyond
 - Make the “**face**” of IEEE and its marketing **more inclusive**
 - Create IEEE-wide **initiatives for URM**s
 - Support creation of a **climate survey** for all IEEE members
- ▶ TAB standing committee established in Nov. 2017
 - Scope: ensures TAB policies, procedures, and practices conducive to creating and maintaining a diverse and inclusive environment for all members.



Simultaneously



TAB Diversity/Inclusion Committee Accomplishments in 18-19

1. Bylaw changes recommending a diverse makeup of all IEEE TAB committees
2. Tracking and reporting of TAB committee and board diversity metrics
3. Diversity metrics pilot program: data from 20 Societies/Councils (46%)
4. TAB statement affirming IEEE Codes of Conduct and Ethics
 - Codes preclude discrimination, harassment, sexual harassment
 - Explicit affirmation of codes on member application/renewal
5. Conference Code of Conduct
6. TAB Diversity/Inclusion Website
7. IEEE Communications: Discussion on diversity metrics for Spectrum, Facebook, Instagram, etc.
8. NASEM report: Recommendations for professional societies to mitigate sexual harassment

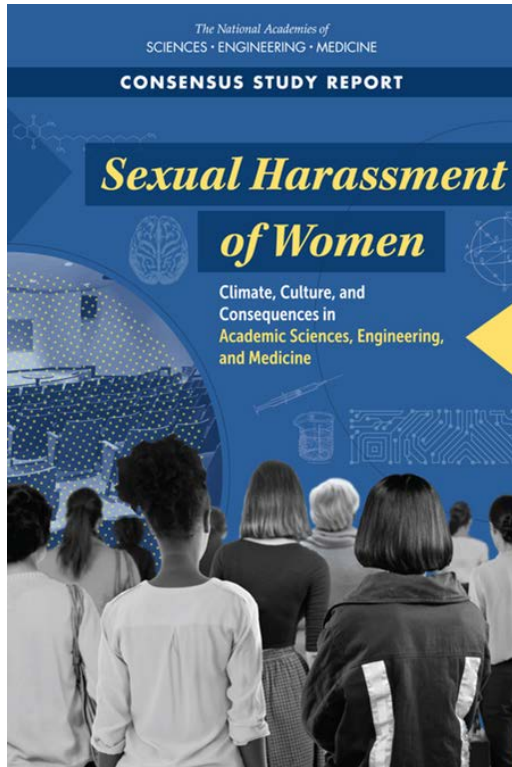


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Science Is Blind

November 2018 Spectrum: [Article on NASEM Report](#)



<http://sites.nationalacademies.org/SHSTUDY>

SEXUAL HARASSMENT IS A THREAT TO ENGINEERING

A National Academies report finds that it's not just individuals who suffer when gender-based abuse goes unaddressed

THE IEEE PRESIDENTS' STATEMENT

At IEEE, we are committed to maintaining a culture that is diverse, inclusive, and respectful. This includes efforts aimed at improving transparency and accountability, encouraging strong and diverse leadership, and inspiring all members of the engineering community to be responsible for reducing and preventing harassment.

JIM JEFFERIES
2018 IEEE
President and CEO

JOSÉ M.F. MOURA
2018 IEEE
President-Elect

KAREN BARTLESON
2018 IEEE
Past President

What Can Professional Organizations Do?

Recommendations from NASEM Report and Oct. 1 AAAS Convening of Society Leaders to discuss it

- ▶ Enact codes of conduct for membership and conferences that include language around sexual and gender harassment, with effective reporting mechanisms and consequences for violations
 - IEEE ahead of many professional societies in having codes of ethics/conduct
 - Not many members are aware of the codes or the implications for violating them
 - Ethics violation reporting and adjudication processes woefully inadequate, especially for sexual and gender harassment
 - Reporting rare and hard; **should not be up to most vulnerable members to fix this**
 - Potential for damaging retaliation against victim and his/her supporters
 - IEEE must implement conference code of conduct and processes to deal immediately and anonymously with complaints
- ▶ Need to create a culture and associated programs raising awareness and urging that all members work to prevent sexual/gender harassment
 - Awards and honors can consider ethics of nominees (AAAS revokes Fellow)
 - IEEE should create dialogs on this topic (statements, workshops, etc.)
 - Need transparency and accountability at all levels of leadership

2019 IEEE President



Andrea, come to the IEEE Board Retreat in Jan to talk about diversity/inclusion/ethics

Congratulations!

IEEE Board Ad-Hoc with 3 Subcommittees Proposed

- ▶ Subcommittee on diversity and inclusion
 - Develop and implement mechanisms to improve diversity and inclusion across all of the IEEE
- ▶ Subcommittee on ethics education
 - Streamline and merge all codes around ethics into 1 code with a few high-level principles to facilitate education of members and volunteers
 - Develop education, training, and outreach to raise awareness among members and volunteers about IEEE ethics and their responsibility to uphold them, report violations, and prevent retaliation
- ▶ Subcommittee on IEEE ethics processes
 - Develop a complete overhaul of IEEE ethics processes around reporting, mediation, adjudication, appeal, and sanctions incorporating best practices for confidential reporting, timelines, tracking, and transparency.
 - Consider implementing ombudsperson and whistleblower programs

Much work is needed to make the road ahead for the next generation of women in EE and STEM a bit easier



To make progress, need to collect statistics, raise awareness, track diversity/inclusion progress, & recruit advocates: *we need the guys*

These activities must take place professional organizations (particularly the IEEE), universities and companies