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Leaning in, but Getting Pushed Back (and Out)

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# Agenda

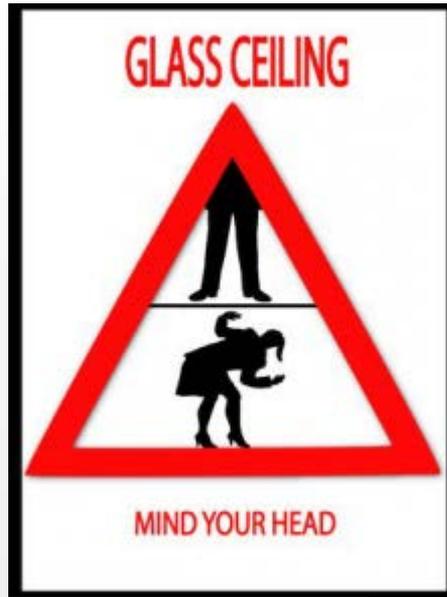
- Status of women engineers nationally
- “Stemming the tide”
  - Rationale
  - Key findings
- Differences between women engineers who stay and leave
- Best practices from the study
- Summary and recommendations

# Women in Engineering: National Investment

- Concern about underrepresentation for 3 decades
- Many efforts at Undergraduate, then K-12 levels to address STEM Education
- \$ 3.4 billion in federal funds for STEM Education in FY 2010
- 31% for underrepresented minorities, 13 million for women explicitly

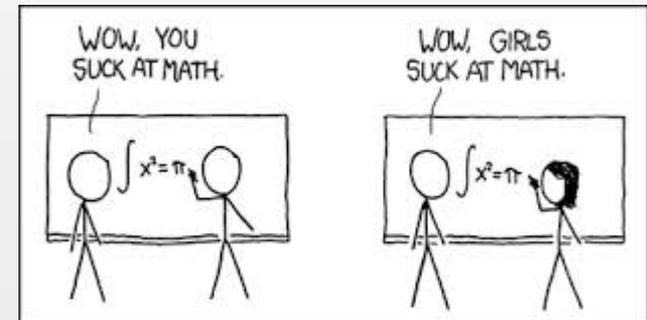
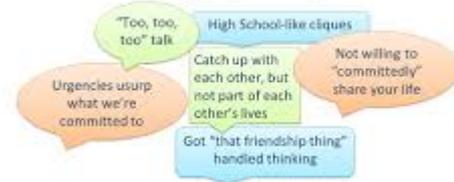
# Women in Engineering: National Profile

- Women comprised more than 20% of engineering school graduates for past two decades (18% in 2012).
- 11% of practicing engineers are women
- Varies by discipline area
- EE and Electronics Engineering the lowest (9%),
- Chemical the highest (22%) (Biomed majors are highest-50%)



### Is Fear Standing in the Way?

What stops you from reaching out?

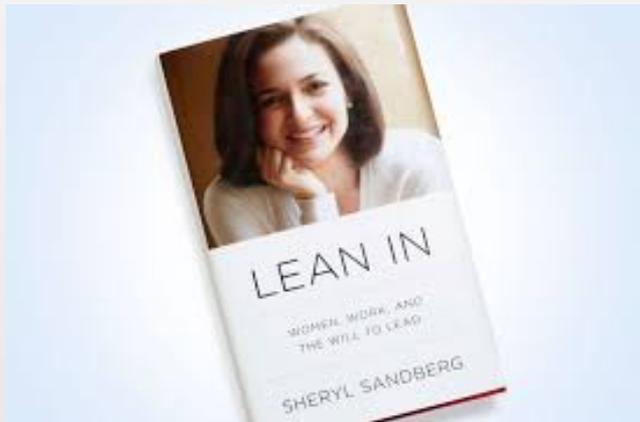


Brett Ryder



“hold ourselves back in ways both big and small, by lacking self-confidence, by not raising our hands, and by pulling back when we should be leaning in. We internalize the negative messages we get throughout our lives—the messages that say it’s wrong to be outspoken, aggressive, more powerful than men.”

— Sheryl Sandberg, *Lean In: Women, Work, and the Will to Lead*



# Women in Engineering: Current Status

- Engineering profession has the highest turnover compared to other skilled professions: accounting, law, medicine, and higher education.
- Return on Investment (ROI) on STEM careers is not optimally realized
- Loss of women engineers=loss to organizations, loss to society, loss to the U.S.'s competitive edge, loss to individual

# Women = Dispensable Talent?

“The stock market would not allow the waste of capital in the way we tolerate the waste of female talent and ability.”

- Lord Myners, in his keynote speech at the Report of the Gender & Productivity Summit, 11 Downing Street, October 2004

# Project on Women Engineers' Retention (POWER): Study Site and Method

- 3-year, NSF-funded longitudinal study
- Formally partnered with top 30 universities with the highest number of women engineering graduates (list from ASEE, 2008).
- Reached out to female engineering alumnae through email and postcards
- Women from an additional 200 colleges participated in the survey after hearing of this study through colleagues

# Study Site and Method

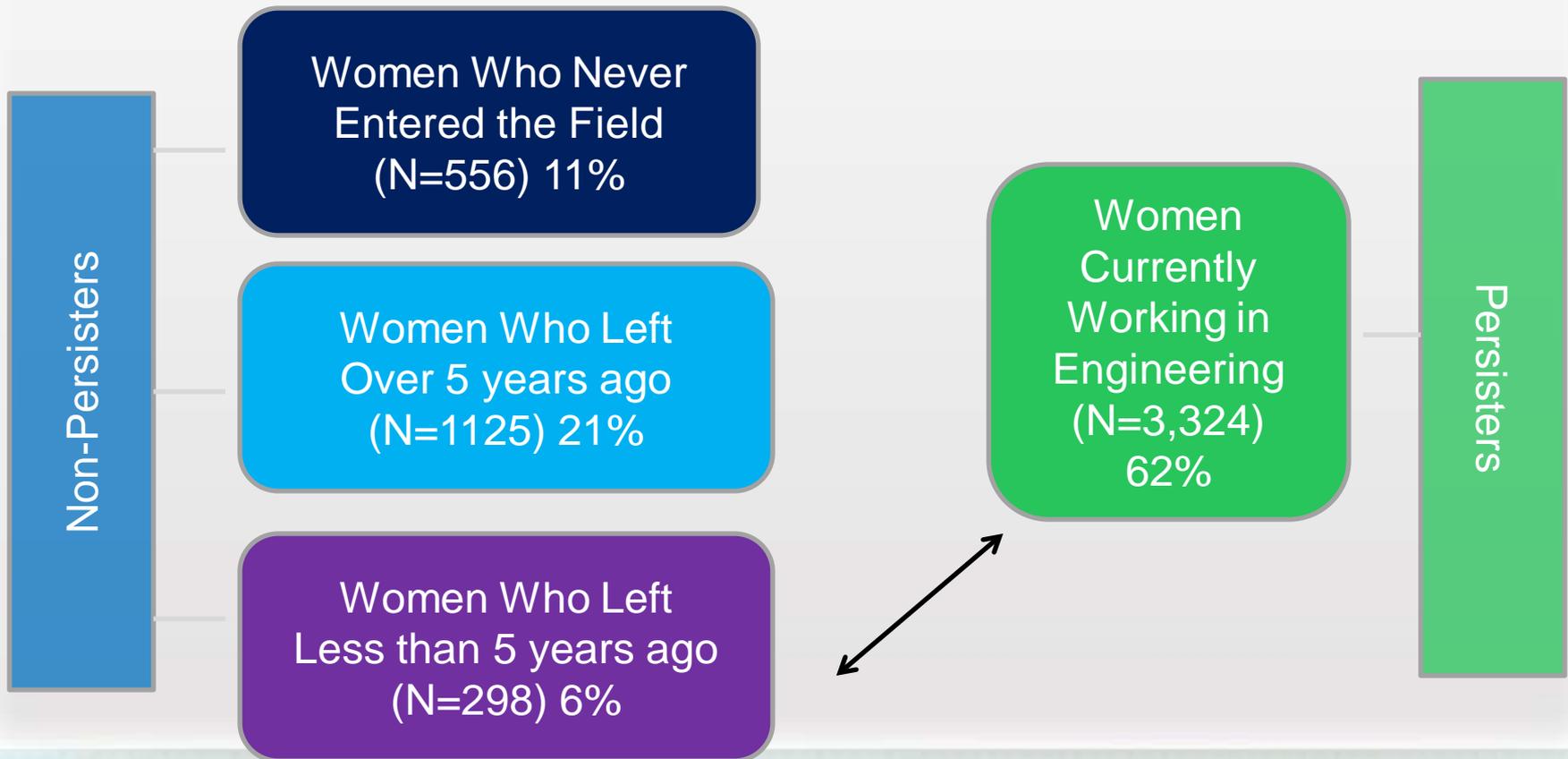
- As of August 2012, over 5,700 women responded to the survey; (Response rate ~ 31%) (5303 useable responses)
- Engineering alumnae targeted across different life and career stages (graduates spanned over six decades: 1947-2010)
- Thousands of women added comments at the end of survey
- *Who's an engineer?* Women asked to self-identify whether they were currently working in engineering

# Partner Schools

California Polytechnic State University, SLO	Southern Illinois University
California State Polytechnic University, Pomona	Stanford University
California State University, Northridge	University of California, San Diego
Cornell University	University of Florida
Georgia Institute of Technology	University of Illinois
Iowa State University	University of Maryland
Marquette University	University of Michigan
Michigan State University	University of Missouri-Kansas City
Massachusetts Institute of Technology	University of New Mexico
North Carolina State University	University of Texas, El Paso
Ohio State University	University of Washington
Penn State University	University of Wisconsin-Madison
Purdue University	University of Wisconsin-Milwaukee
Rutgers University	University of Wisconsin-Platteville
San Jose State University	Virginia Tech

# Participants: Four Groups

Three most cited majors: Industrial Engineering, Chemical Engineering, and Mechanical Engineering

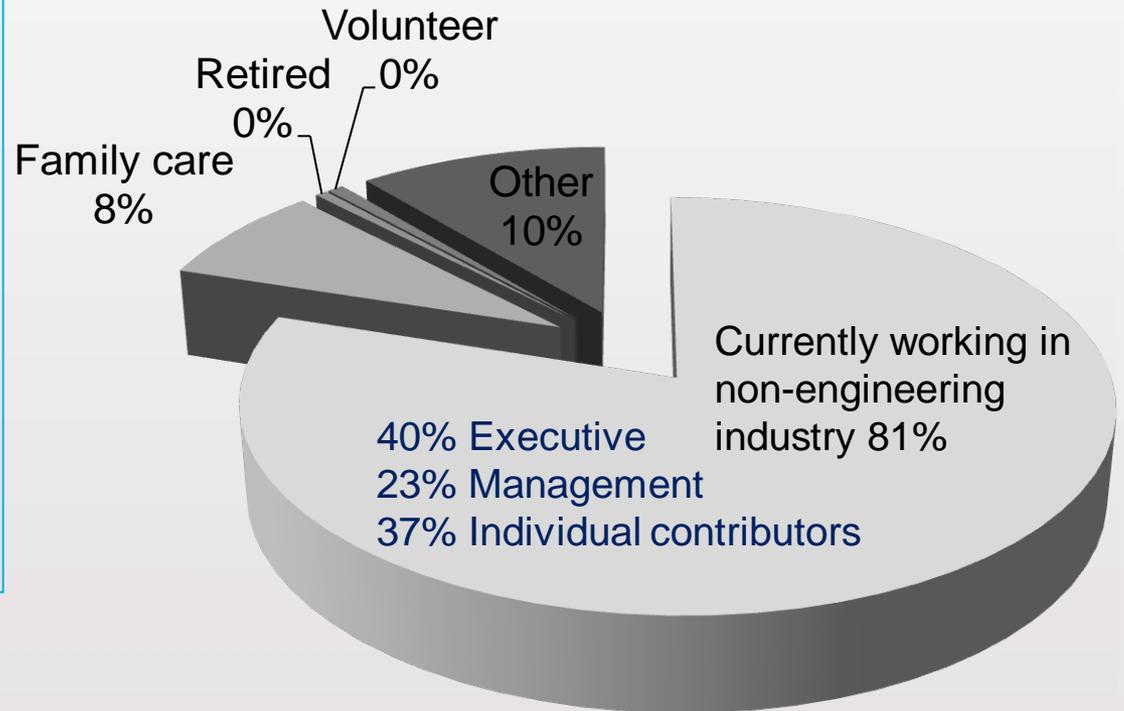


# Some never entered the field:

## Why Didn't They Enter?

- Not interested in engineering (24%)
- Wanted to start their own business (18%)
- Didn't like the engineering culture (17%)
- Planned to go into another field (15%)
- Low salary (7%)

## Where Are They Now?



# In their own words...

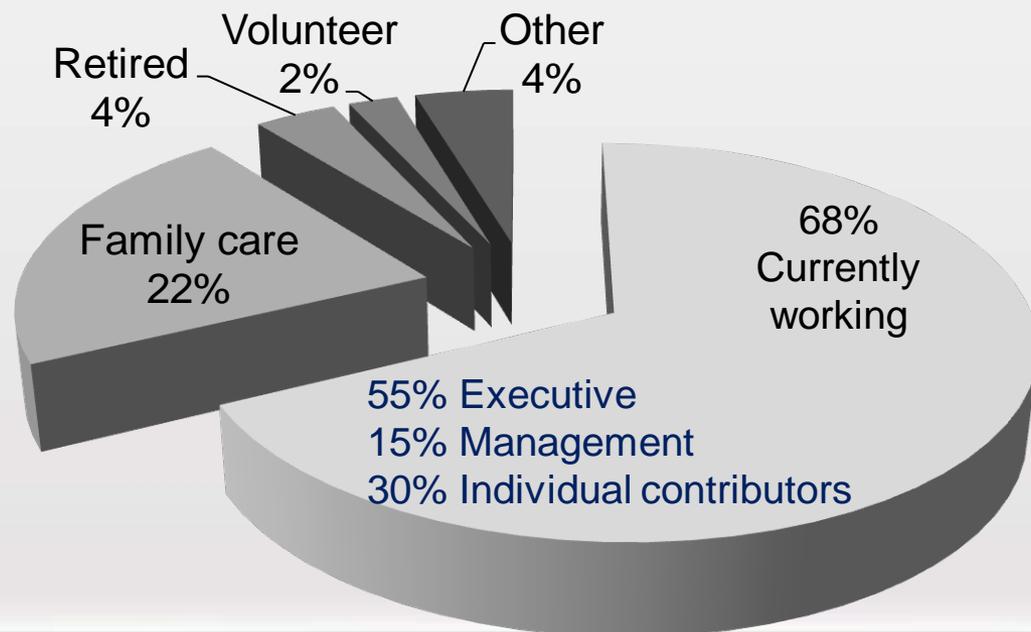
- “At the time I graduated no one was hiring except for the computer consulting companies that also paid very well compared to engineering and valued our problem-solving skills. By the time I worked ... for 5 years, I had surpassed my father’s salary who had worked in engineering for over 40 years.”
  - Caucasian Aerospace Engineering Graduate
- “I interviewed with a company where there were no women, no minorities and one in the young adult age group”
  - African American Chemical Engineering Graduate
- “My first-class engineering education allowed me to pursue extraordinary opportunities as a strategy consultant.”
  - Caucasian/Latina Chemical Engineering Graduate

# Paths for those who left more than five years ago:

- Why Did They Leave?

- To fulfill care-giving responsibilities (17%).
- Not offered opportunities for advancement (12%).
- Lost interest in engineering (12%)

## Where Are They Now?



# In their own words...

- “ To advance, it seems as though you must be willing and able to work 50+ hours/week and often be on-call 24/7.”
  - Caucasian Chemical Engineering Graduate
- “There isn’t a strong network of females in engineering. You either need to learn to be “one of the guys” or blaze the trail yourself, which is very difficult. I deviated from engineering... but work now in construction, where I am the only female executive officer.”
  - Caucasian Agricultural Engineering Graduate
- “[There is] no opportunity for advancement in a male-dominated field—the culture of engineering is male-centric with high expectations for travel and little personal time.”
  - Caucasian Chemical Engineering Graduate

## Women who left less than 5 years ago

- Paths taken by women who worked in engineering fields and then left less than five years ago: smallest of 4 groups
- Two-thirds left pursue *better opportunities* in other fields and organizations
- A third left to stay home with the children (*because companies weren't flexible enough to accommodate work-life concerns*)
- Currently:
  - 54% in Executive roles, 22% in Project Management and/or Management roles, 24% in Individual Contributor roles
- Average compensation: \$51,000-\$100,000

# In their own words...

- “Women leave engineering due to a lack of job satisfaction, lack of reliable female role models, inflexible work schedules, workplace discrimination, white mid-western men syndrome, and glass ceiling issues.”
  - [Latina Civil Engineering Graduate](#)
- “Most of management is a male-dominated culture (male conversation topics, long hours, demanding lifestyle, career-focused expectations).... Women usually choose to leave without fighting the uphill battle to make improvements. It is a self-sustaining cycle!”
  - [Asian-American Operations Research and Engineering Graduate](#)
- “...what ultimately led me to B-school and a non-engineering job was the lack of a viable career path (i.e. advancement) within the engineering organizations where I worked. In addition to that, most engineering organizations have promotion/leadership funnels that are very, very narrow.”
  - [African-American Mechanical Engineering Graduate](#)

# Current Engineers

- On average worked 43.5 hrs/week, tenure at organization- 8 years, and reported earning salaries ranging from \$76,000 to \$125,000.
- About half of them were “individual contributors,” one-third were in project management positions, 15% were in executive roles.
- For those in management positions, a majority of engineers supervised between 1 to 5 individuals.
- Most worked in groups that were predominantly male with a smaller number (18%) reporting working in gender balanced groups.

# Why Do Women Stay in Engineering?

- They are satisfied with their jobs and careers
- They have supportive bosses and co-workers
- Their organizations “get it”- how do they show it?
  - They recognize women’s contributions and care about their well-being
  - They invest in their training & professional development
  - They provide clear, transparent paths for advancement
  - They have supportive work-life policies and a work culture that supports work-life balance for all

# Are Current Women Engineers a **Flight Risk**?

- Yes, they are. And here's why:
- Women who thought about leaving their organizations experienced :
  - excessive workload without enough resources, conflicting work demands, and unclear expectations about work goals and standards
  - a career plateau with few advancement opportunities
  - low satisfaction with their jobs and careers
  - a variety of climate related barriers

# Workplace Climate that Hinders Persistence: Undermining & Incivility at Work

- Undermining behaviors targeted at women by their managers and co-workers:
  - Being belittled, insulted, talked about behind their back
  - Being pulled back when trying to succeed at work
- Working in companies where women are treated in a condescending, patronizing manner by senior managers and co-workers

# Workplace Climate that Hinders Persistence: No Support for Managing Multiple Life Roles

- Companies that did not offer flexible work-life policies
- Companies with poor work-life cultures stressed:
  - Face-time;
  - Taking work home on weekends and evenings;
  - Working more than 50+ hours/week to get ahead;
  - Regularly putting work before family
- Companies need *both* - supportive climate and work-life policies - to attract and retain employees

# Do Persisters and Non-Persisters Differ?

- Random sample of 250 persisters compared to 264 non persisters
- Persisters:
  - 82% White, 9% Asian, 4% Latina and 2 % African American,
  - 67% married/partnered,
  - Mean age 36
  - Median earning of \$75,000-\$ 99,000

# Nonpersisters

- Non Persisters:
  - 79% White, 8% Asian, 3% Latina and 3 % African American,
  - 65% married/partnered,
  - Mean age 35
  - Median earning of \$75,000-\$ 99,000

# MANOVAs: 5 types of differences

- 1. Self efficacy/Outcome Expectations
- 2. Vocational Interests
- 3. Organizational Barriers
- 4. Organizational Barriers
- 5. Engineering Turnover cognitions and attitudes

## Results

- No differences in self-efficacy, outcome expectations, interests or barriers
- Significant MANOVA for organizational support  $Wilks' \lambda = .958$ ,  $F(7, 503) = 3.175$ ,  $p = .003$ , partial  $\eta^2 = .042$ .
  - Work-family manager support and training and development

## Results

- Significant MANOVA for withdrawal cognitions: *Wilks'  $\lambda$*  = .754, *F* (3, 510) = 55.36, *p* < .001, partial  $\eta^2$  = .246.
- Engineering Turnover Intentions, Professional Commitment and Professional Satisfaction

# Are There Differences by Industry?

- No reported differences by industry in terms of perceptions of supportive and non-supportive work environments.
- Key\* (SIC) industries examined were:
  - Aerospace (N=340)
  - Transportation & utilities (N=253)
  - Construction (N=174)
  - Computer services/software (N=140)
  - Biotech (N=100)
  - Excluded: Education, Consulting, and Govt.

# Leaning In But Getting Pushed Back (and Out)

- What Pushes Women Engineers Back from Success?
  - role-related pressures
  - hostile climate
  - job dissatisfaction
  - inadequate training and development opportunities, and
  - lack of advancement opportunities.
- Women engineers are not being pushed out by lack of self-confidence. No differences in women engineers' self-confidence regardless of whether they stayed or left.
- Race matters: women of color reported less supportive work environments.

# What Can Organizations Do to Retain Women Engineers?

## Step 1: Recognize the problem

- Recognize that --
  - this is not a woman's issue
  - it is not about women wanting to spend time with their children or taking time for care-giving
  - the reasons why women stay are very similar to why they leave--
    - **Advancement opportunities**
    - **Climate issues**

# How to Retain Women Engineers

Step 2: **Change starts from the top,**

but leaders all the way down to the front-line supervisor must model the change.

- Create a culture that --
  - has zero-tolerance for incivility and undermining
  - recognizes employees' contributions and cares about their well-being
  - respects employees' work-life obligations and responsibilities

# How to Retain Women Engineers

## Step 3: **Implement system-wide changes;**

reinforce the change with metrics and accountability

- Create systems and policies that --
  - Invest in skills-based training and overall professional development
  - Provide transparent paths with clear, fair criteria for mobility and advancement
  - Provide opportunities for formal and informal mentoring; other networking opportunities
  - Offer a variety of options to manage multiple life responsibilities, without any career penalties

# How to Retain Women Engineers

## Step 4: Implement role-level changes

- Communicate clear work goals and relevance of tasks to the corporate objectives
- Clarify what needs to be done, how, and when it needs to be done
- Eliminate, when possible, conflicting demands, expectations, and role disruptions
- Infuse new resources or reallocate existing ones to streamline work procedures

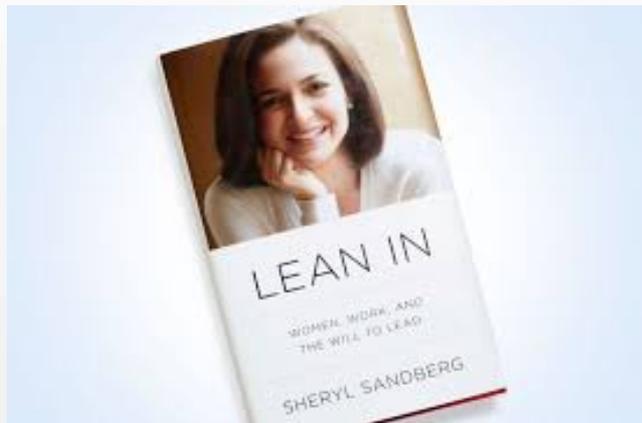
# Summary and Final Thoughts

- All evidence points to one fact:

**Women's departure from engineering is not a "woman's issue" after all.**

- Climate issues and lack of advancement opportunities lie at the heart of women opting out and/or not leaning in.
- Our results also show that women engineers who contemplate leaving their organizations also think about leaving the profession:

**attrition from organization=attrition from profession**



“Today, despite all of the gains we have made, neither men nor women have real choice. Until women have supportive employers and colleagues as well as partners who share family responsibilities, they don't have real choice. And until men are fully respected for contributing inside the home, they don't have real choice either.”

— Sheryl Sandberg, *Lean In: Women, Work, and the Will to Lead*

# Next Steps...

- Currently 2<sup>nd</sup> phase of longitudinal Study for Women
- Funding from NSF for 2 studies:
  - Recruit Male Alumni from partner universities
  - Recruit working engineers (Male and Female) to study engagement: Why do engineers stay in their organizations and the field?

# Questions?



AMERICAN PSYCHOLOGICAL ASSOCIATION



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