

Life in a Fish Bowl: A Conversation on Inclusive Efforts in Engineering Education (Revisited)

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Trondheim, Norway, NTNU**

William A. Wulf, President of the National Academy of Engineering, called for diversity in engineering in broad terms:

“When I speak of diversity, I mean the kind of inclusion you probably thought of instantly, that is, appropriate representation of women and underrepresented minorities. But my idea of diversity also includes the notion of individual diversity, that is, the breadth of experience of a single individual.”

Cognitive Diversity

Page, 2007



- Diverse perspectives: people have different ways of representing situations and problems; they see or envision the set of possibilities confronting them differently.
- Diverse interpretations: people put things into different categories and classifications. To some people, I might be someone who works at the University of Cincinnati. To others, I might be Mom. To others, I might be a researcher on engineering education. All are true. They are different interpretations of the world.
- Diverse heuristics: People have different ways of generating solutions to problems. Some people like to talk through their thinking about problems; others prefer to write out his solutions first and then talk
- Diverse predictive models: Some people analyze the situation. Others may look for the story.

One morning, two fish are swimming in a pond. They happen along a frog swimming in the opposite direction. The frog says, “Good morning fish. How’s the water?” The fish have no idea how to respond. They are completely baffled.

They have no idea what “water” is.

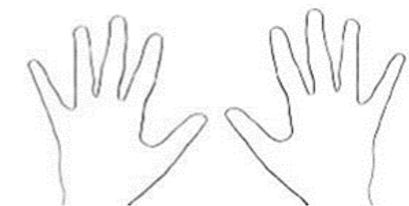


What does your bowl look like?



What are the important attributes of your bowl?

- Individual exercise
- Identify the mission and vision of your entity
- Why they are important...
- Your neighbor must be able to report out for you
- Using your left hand only!!!





Thoughts on the Experience

- **Handedness is not chosen or bestowed. (unearned privilege)**
- **Right handedness is considered normal, while left handedness has historically been perceived as deviant, dangerous, and sinister. (concept of domination)**
- **The society may view left-handed people as awkward or strange, and left-handed people often believe this about themselves (internalized oppression).**
- **Left-handed people frequently change their behaviors to fit into a right-handed world (assimilation and code shifting).**
- **Right-handed people are unconscious of the benefits they receive (the privilege of ignorance).**
- **Right-handed people cannot avoid the benefits they receive, even when they are conscious of the benefits (institutionalized and systemic nature of privilege).**

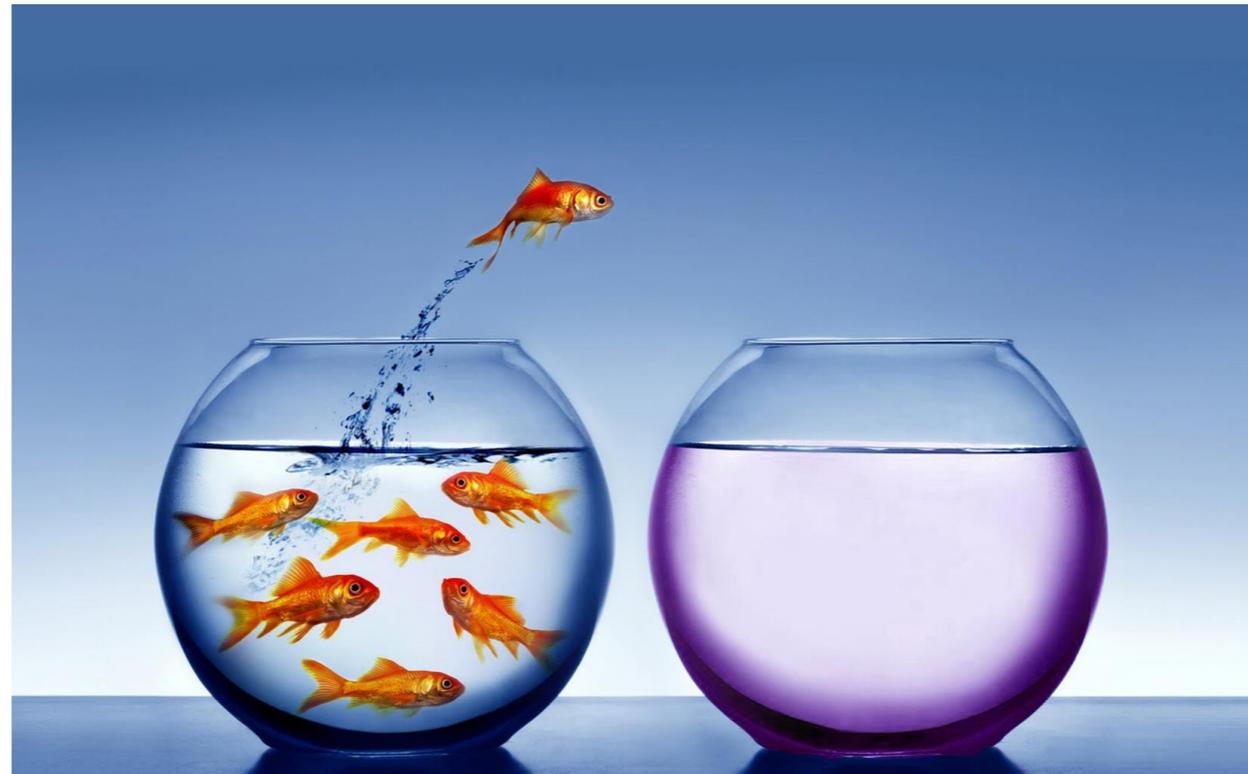
What happens to salt water fish placed in
a fresh water pond...



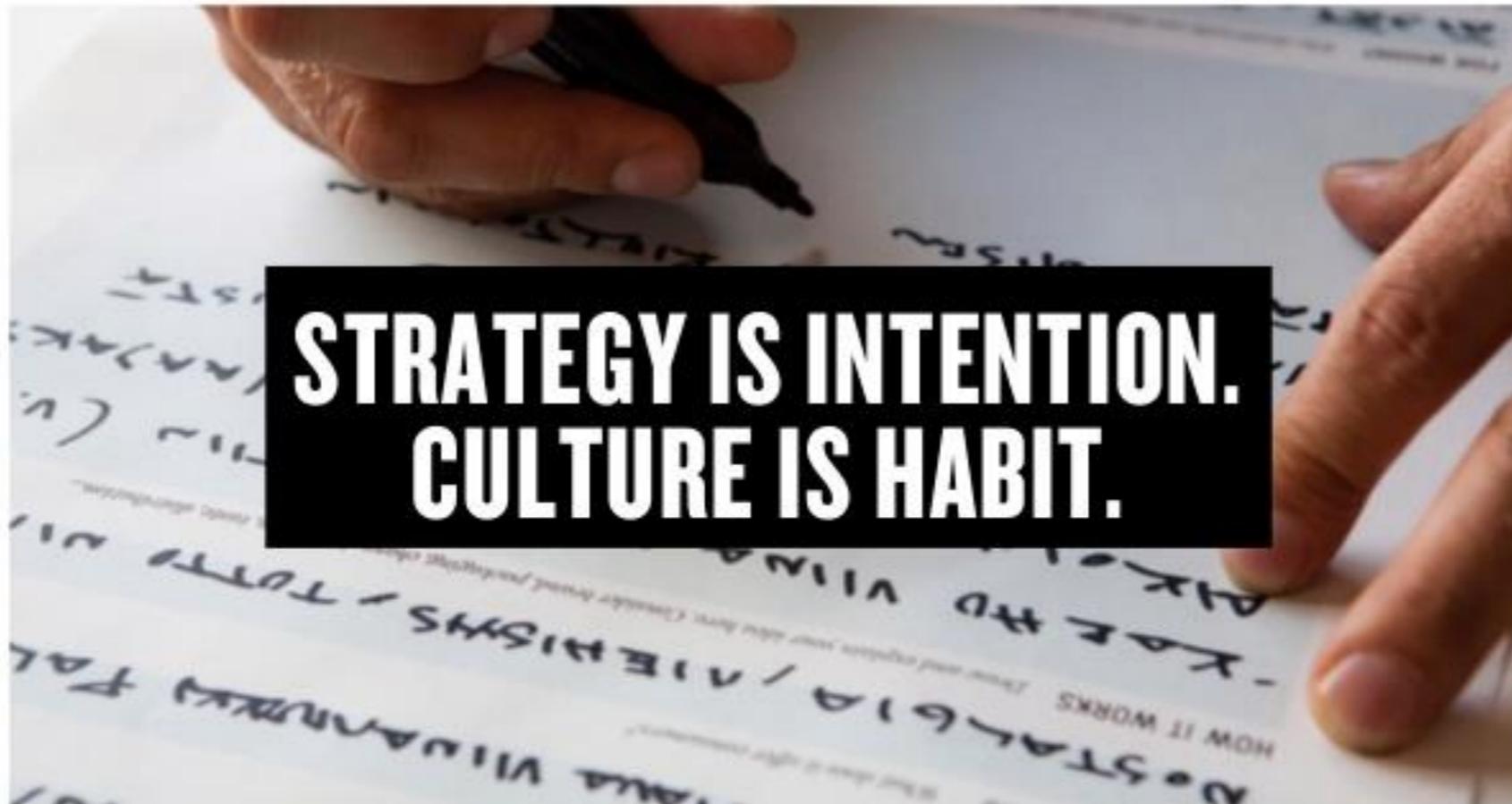
Creating a “brackish” environment



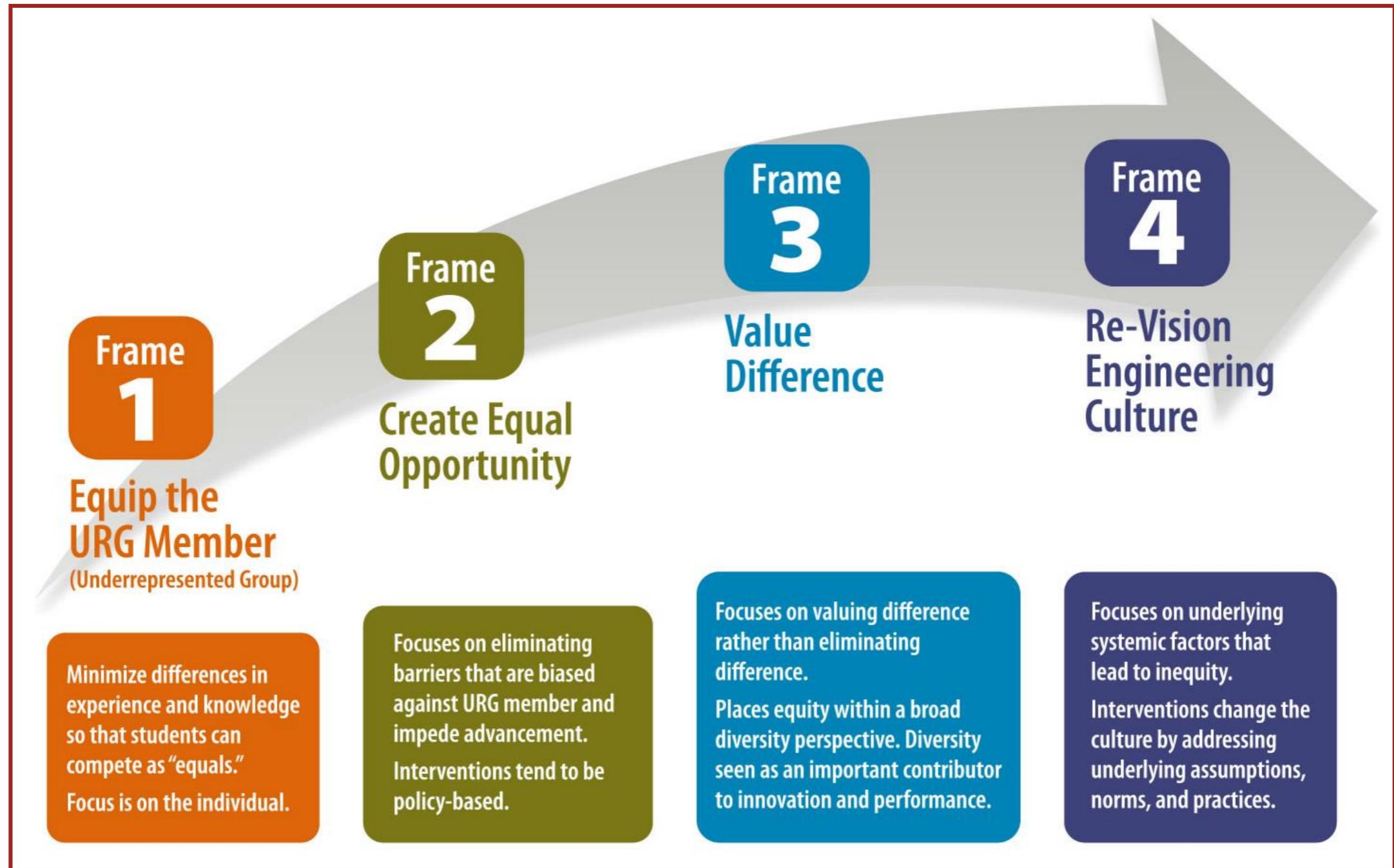
Often the only way we can see the
“water” (i.e., our culture) is to step
outside of it.



Culture eats strategy for breakfast. - Peter Drucker



Change Model: Four Frames for Creating Inclusive Cultures



Source: Simmons Center for Gender in Organizations

Adapted to engineering in Holloway, 2014

Equip the Women/Prepare Women for Success

- Operates from “women as deficient” model.
- Pros – Minimize differences in experience, and academic and business socialization so women and men can compete as equals through training and skill building.
- Cons – Differences are not good. Equip can be seen or feel like being “fixed”. The same rules of the game remain in place and gender inequity remain and change is very slow.

Go Beyond “Add Women and Stir”: Improve Gender Equity in Your Organization. 2013. Patricia Deyton, Beth Holloway, Isaura Gaeta.

Create Equal Opportunity/Level the Playing Field/Heed Policy and Law

- Operates from perspective that differences are tolerated and we can make accommodations for it.
- Pros - Remove structural barriers and processes that are biased against women and impede advancement. Can increase recruitment and retention, reduce tokenism, and are critical for gender equity.
- Cons – Resentment of policies can exist and can at times be in essence a band-aid. Does not necessarily change organizational culture.

Go Beyond “Add Women and Stir”: Improve Gender Equity in Your Organization. 2013. Patricia Deyton, Beth Holloway, Isaura Gaeta.

Value Differences/Value Diversity

- Values the differences between masculine and feminine traits.
- Pros - Shift the focus from eliminating difference to valuing difference and attempts to promote socialized differences as being beneficial. Is leading to the topic of intersectionality – beyond gender. Can lead to change in cultural norms.
- Cons – Tends to universalize women’s experiences and strengths, and reinforces the very stereotypes that have exacerbated exclusion.

Go Beyond “Add Women and Stir”: Improve Gender Equity in Your Organization. 2013. Patricia Deyton, Beth Holloway, Isaura Gaeta.

Change or Re-vision the Culture

- Addresses underlying systemic factors that perpetuate inequity and operates from the perspective that the organization is gendered itself.
- The organization is a collection of values, beliefs and assumptions of those in the culture and will necessarily predict those who will be successful in the culture. Hardest of all.
- Means you recognize the culture – the water! Set up our environments with the belief that all will be successful, then we will facilitate and promote universal success.



In the spirit of the four frames, the following shorthand is offered as guides to the literature:

- **Equip** the student
 - Classroom Pedagogies
 - Research Experiences
- **Enforce** policy and law
 - Look Critically at Policy and Practice
- **Embrace** difference
 - Curriculum Re-design
 - Rethinking Faculty Hiring and Leadership
- **Evolve** the organizational culture
 - Not just Implicit Bias and Stereotype Threat
 - Whole campus change – Meyerhoff Fellows Program (UMBC)
 - Men as Advocates

How do we get there – what is a potential pathway, roadmap, or viaduct?

What are actionable plans for our institutions, programs, departments, classrooms?



**“Diversity is being invited to
the party...”**



**...inclusion is being asked to
dance”**



**“Diversity is being invited to
the party;
inclusion is being asked to
dance”**



**Who will be dancing at
your party?**

Often the only way we can see the
“water” (i.e., our culture) is to step
outside of it.



**Recall our first exercise? It started in
the classroom with First-year
Engineering Students!**

By-stander Training

- Becoming very common on campuses
- Find out your vocabulary
- Use it

Google Article

The image is a screenshot of a USA Today news article. The article title is "Google's 'bias-busting' workshops target hidden prejudices" by Jessica Guynn, dated May 12, 2015. The article text discusses Google's efforts to address unconscious bias through workshops. A large red watermark "Project Implicit Founded 1998" is overlaid diagonally across the article content. The USA Today logo and navigation menu are visible at the top of the page.

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Google's 'bias-busting' workshops target hidden prejudices

By Jessica Guynn, USATODAY 2:35 p.m. EDT May 12, 2015

SAN FRANCISCO — Google is the first to call out unconscious bias for contributing to the systemic lack of diversity in the technology industry.

Now the Internet giant is rolling out "bias-busting" workshops, hands-on sessions that coach Google employees on how to address hidden prejudices.

Nearly 2,000 have taken the workshops, which offer practical tips to small groups of employees, says Brian Voth, director of people analytics at Google.

Google is one of a growing number of companies educating employees on the hidden biases that people harbor in hopes of creating a corporate culture that is more welcoming to different people and ideas.

Project Implicit Founded 1998

TOP VIDEOS

What does language say?

- Pronouns
- Names
- Titles



What else?



Male Advocates and Allies

- This interactive workshop encourages and equips men to serve as effective allies for gender equity in STEM settings. Participants will have opportunities to learn, ask questions, and practice skills through scenario-based exercises. The Men Allies for Gender Equity workshop utilizes a men-only format, which helps promote candid discussions and safe conversation spaces for the target male audience.
- This workshop will
 - highlight data on the recruitment, retention, and advancement of women as well as the importance of institutional climate;
 - provide an overview of recent literature that helps explain why and how gender inequity occurs; and
 - introduce and develop concepts, vocabulary, actions and practical skills to promote gender equity.



Interviewing Deans, Department Heads, etc.



Example Questions for Meetings with Head and Dean Candidates in Engineering to Discuss Recruitment, Retention and Climate for Women in Engineering.

Encourage candidate to give specific examples of what they have done to inform themselves, to address problems, and to be supportive of diversity initiatives especially as they relate to women. Have they been proactive? Will they do something in the future? Do they have the courage to address poor behavior and inequities? Are they capable or recognizing problems? Do they have the courage to implement diversity initiatives? Are they capable of creating a welcoming environment? Overall which would you pick: Is this person going to make the School/College a better place for women students, staff and faculty?

(1) NO WAY (2) PROBABLY NOT (3) MAYBE (4) DEFINITELY YES

Kick Off Question (2 mins)

1. Identify the women that you interact with at work and describe their jobs. [How many are junior faculty, how many are senior faculty. Are junior faculty getting promoted? Retention? What about the demographics of the upper administration in your college and your university. Numbers of female vs. males students.]

Issues and Awareness (8 mins)

2. Describe what you think the **climate is like for women and minorities in your school** (faculty, staff, graduate students, undergraduate students). [Could mention the role of “micro-aggressions” in affecting the climate for women. See if they understand “death by 1000 cuts” and the lack of “micro-positives” to offset the effect of the “micro-negatives”.]
3. What do you think are the top **three issues that women faculty in engineering have to deal with**, that are different to issues faced by their male colleagues?
4. What do you perceive are the **biggest problems impeding progress** towards the goal of having an engineering faculty and student population that is as diverse as the general population?
5. What have **you done to inform yourself** of the potential impact of your own and other people’s biases (intentional and/or unintentional) on the information you are using to make decisions? [E.g., Gender bias in teaching evaluations which adversely affects women’s evaluations. Similarly in evaluations of qualifications of people pre-interviews and paper reviews.]
6. How do you think that **your own experiences impact** the way that you work with and evaluate your female colleagues?

Recruitment and Retention (8 mins)

7. What are the strategies at your current institution for **hiring and recruiting** people from under-represented groups and have the strategies been successful (why or why not)? [Criteria being used for student admissions, are they good indicators of future

Dean's Diversity Pledge

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January 3, 2017

Engineering is empowering society in unprecedented ways. It is at the core of all innovation, resulting in tremendous societal and economic benefits; it is the most important discipline to address current and emerging challenges in the US and on a global scale; and it provides new, imaginative ways to enrich life. A fundamental requirement for growth of this enabling power, however, is for the engineering community to attract and engage people from all segments of our society. The evolving demographic landscape of the US, the need for constant economic competitiveness and the upholding of our core values to ensure equal opportunity and access to all who seek it, all point to the importance of actively embracing diversity and inclusiveness in all our endeavors. Diversity and inclusiveness are essential for the development of creative solutions to the world's challenges and to enrich life.

While gains have been made in the participation of women, African-Americans, Hispanics, and Native Americans in engineering in recent decades, significant progress is still needed to reach a level where the engineering community fully embraces all segments of our increasingly diverse and vibrant society. In particular, we must further promote the pursuit of engineering education to all those who have been historically under-represented within our discipline; provide an educational experience that is demonstrably equitable and inclusive; and actively work to improve the broader engineering culture to fully engage the diverse generations to come.

Dean's Diversity Pledge



DIVERSITY INITIATIVES ▾ INSTITUTIONS RESOURCES BLOG ABOUT CONTACT 🔍

**DIVERSITY PLANS ARTICULATE
visions of diversity
and inclusiveness**

DIVERSITY PLANS PATHWAYS PARTNERSHIPS FACULTY DIVERSITY



DIVERSITY INITIATIVES ▾ INSTITUTIONS RESOURCES BLOG ABOUT CONTACT 🔍

Diversity Initiatives

All Types ▾ All Institutions ▾ Search

Engineering Dean's Council of ASEE led by Greg Washington, Dean of the University of California – Irving (gregory.Washington@uci.edu)

- Currently working to propose a new model
- Not meant to be punitive
- What would be on your scorecard?

The University Experience; Retention to Degree - Reisberg

- Key Factors
 - Welcoming environment
 - Societally meaningful content and relevance
 - Engaging curriculum and classrooms
 - Contextual support
 - Role models
 - Out-of-classroom opportunities

Options for Action - Universities

- Identify “champions of diversity” on campus – especially male advocates.
- Raise awareness about the costs of gender inequality.
- Institute gender-inclusive policies.
- Require the Implicit Association Test (www.implicit.harvard.edu)

Options for Action – Schools/Colleges/Departments

- Conduct curriculum reviews.
- Consider inclusive pedagogies.
- Explore decentralized admissions.
- Encourage ABET on accreditation criteria to include diversity metrics – OR, put your own into your own self-study.
- Revisit gender bias through climate surveys disaggregated by engineering department.

Options for Action – Schools/Colleges/Departments

- Commit to hiring and promoting and advocating for diverse candidates.
- Adjust recruitment and hiring procedures to ensure diverse searches.
- Pair faculty mentors or advocates with new hires.
- Ensure undergraduate contact early and often with non-faculty engineering professionals, especially female role models.
- Encourage bringing engineering to life in the classroom.

Thank you for this opportunity to celebrate and revisit “Diversity in engineering education: an opportunity to face the new trends of engineering!”

Happy dancing!

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Resources

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Equity Framework Action Check-list

Frame 1: Equip the Underrepresented Group member



- Am I making an assumption that URG members need special assistance to be successful?
- Are there individuals in my classroom that need special assistance and am I aware of a variety of resources to help provide students an array of support, including URG member-specific support?
- Do I share opportunities for skill enhancement with all members of the class? Or only with URG members?
- Am I equally committed to the success of ALL students, not just the “best” students, and am I willing to do what it takes to provide opportunities for all to “thrive,” not just “survive.”



Equity Framework Action Check-list

Frame 2: Create Equal Opportunity



- Are there barriers, within the learning environment created, that may inadvertently impact some students more than others based on their URG member status?
- Are there specific policies or procedures I follow to ensure equity (e.g., selection process for teamwork,) am I aware of the implications of the selections strategies I am using, and do I have alternative strategies to mitigate unanticipated negative consequences?
- Are my classroom policies transparent and designed to ensure fairness?
- Are critical accommodations necessary for diverse learners?

Equity Framework Action Check-list Frame 3: Value Difference



- Do I provide reference to and/or showcase diverse engineers as a regular part of what I do in class, not simply as something “special.”
- Do I seek to value and acknowledge the contributions and engagement of all the students, not just individuals that look like me.
- Do I share diverse perspectives in problem solving engineering solutions?
- Do I model support for and understanding of different perspectives?
- Do I help students develop team-building and inclusive leadership skills?



Equity Framework Action Check-list Frame 4: Revision (Engineering) Culture



- Do I know about “social” aspects of (engineering) that influence equity, such as implicit bias, micro-inequities, self-efficacy, “fixed” and “growth” mindsets, the “masculinization” of (engineering)?
- Do I seek input from students regarding their experience of equity within the classroom?
- Do I talk with colleagues about what equity in engineering education and culture looks like?
- Do I introduce the societal relevance of the engineering concepts used in class? Do I talk about how these concepts would be used in real-world applications?

The Business Case

- Decades of research show that socially diverse groups (that is, those with a diversity of race, ethnicity, gender and sexual orientation) are more innovative than homogeneous groups.
- It is less obvious that social diversity should work in the same way—yet the science shows that it does.
- Simply interacting with individuals who are different forces group members to prepare better, to anticipate alternative viewpoints and to expect that reaching consensus will take effort.

The Business Case and the Research

- The more difficult the problem, the more diversity helps.
- Diversity enhances creativity. It encourages the search for novel information and perspectives, leading to better decision making and problem solving.
- One key to understanding the positive influence of diversity is the concept of informational diversity. When people are brought together to solve problems in groups, they bring different information, opinions and perspectives.
- When disagreement comes from a socially different person, we are prompted to work harder. Diversity jolts us into cognitive action in ways that homogeneity simply does not.
- People work harder in diverse environments both cognitively and socially. They might not like it, but the hard work can lead to better outcomes.