BUILDING DIVERSITY

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“In a world where advanced knowledge is widespread and low-cost labor is readily available, U.S. advantages in the marketplace and in science and technology have begun to erode.”

- In the report, “Rising Above the Gathering Storm: Energizing and Employing America for a Brighter Economic Future” published in 2007 by the Committee on Science, Engineering, and Public Policy

**WE NEED MORE STEM PROFESSIONALS IN THE US**

We need more students in the STEM fields
Why increase # of underrepresented students entering STEM professions?

- Equity
  - STEM jobs, higher paying
  - Right thing to do

- Multiple perspectives improve scientific research & innovation
  - Why engineers work in teams in the first place!

- Increase overall #s of STEM professionals
MY EXPERIENCE IN STEM

- NYC Public Schools
  - Prep for Prep

- Milton Academy - Private Boarding School

- Pomona College
  - Center for Talented Youth
    - summer program where I taught math courses

- Mathematical and Theoretical Biology Institute (MTBI) - REU summer program
  - Presentation by Colette Patt (UC Berkeley)
    - Statistics & financial support available for STEM degrees
In the style of Colette Patt

HOW UNDERREPRESENTED MINORITIES ARE PERFORMING IN STEM/ S&E
At the undergraduate level, women make up the majority of college students, but are still underwhelmingly represented in the sciences.

At the graduate level, women earn 39% of master’s degrees in mathematics, and 21% of doctorates.

At the professional level, women make up only 23% of employed doctorates in the sciences.

- Women represent 15% of the faculty in the STEM fields at the top 50 research institutions.

From the Dept of Education Statistics website
S&E ->
- Agricultural sciences
- Biological sciences
- Computer sciences
- Earth, atmospheric, and ocean sciences
  - Atmospheric sciences
  - Earth sciences
  - Ocean sciences
  - Other
- Mathematics and Statistics
- Physical sciences
  - Astronomy
  - Chemistry
  - Physics
  - Other
- Psychology
- Social sciences
  - Anthropology
  - Area and Ethnic studies
  - Economics
  - History of science
  - Linguistics
  - Political science and public administration
  - Sociology
  - Other
- Engineering
  - Aerospace engineering
  - Chemical engineering
  - Civil engineering
  - Electrical engineering
  - Industrial engineering
  - Materials engineering
  - Mechanical engineering
  - Other
Women, Minorities, and Persons with Disabilities in Science and Engineering, May 2008, National Science Foundation
S & E Associate's Degrees by Race/ Ethnicity
2007

Women, Minorities, and Persons with Disabilities in Science and Engineering, May 2008, National Science Foundation
Women, Minorities, and Persons with Disabilities in Science and Engineering, May 2008, National Science Foundation
Master's Degrees by Race/ Ethnicity 2007

Women, Minorities, and Persons with Disabilities in Science and Engineering, May 2008, National Science Foundation
S&E Doctoral Degrees by Race/Ethnicity and Gender

Women, Minorities, and Persons with Disabilities in Science and Engineering, May 2008, National Science Foundation
Men seek associates and doctoral degrees at a higher rate than women do
Women seek bachelor’s and master’s degrees at a higher rate than men do
Underrepresented minorities are sorely underrepresented in all post-secondary degree fields
- And especially in the STEM fields
My Experience in STEM

- **Pomona College (cont’d)**
  - EDGE - summer research/bridge program

- **University of Iowa**
  - Community support
    - AGEP
  - Financial support
    - GAANN
    - Sloan

- **Arizona State University**
  - Home division on West campus
  - Continue to be a part of MTBI family
Mentoring was an important factor in my success:

- “It takes a village”
- “Each one reach one”

- My mentors encouraged me to continue in mathematics at critical junctures
  - Selection of summer activities
  - Recommendations
  - Advice when I did not get into grad school initially
  - Career choices
Mentoring is a critical factor in:

- Increasing the participation of URMs
- Undergraduates choosing to pursue graduate degrees in STEM
- Helping to retain URM students in STEM doctoral programs
- The promotion and advancement of employees in academia, government, and industry
It is our DUTY to go out and seek mentors for ourselves

It is our DUTY to go out and mentor someone else
Increase in STEM PhDs awarded to underrepresented students (2001-2008) vs all US citizens and permanent residents.

While the number in total STEM PhDs increased by 22.3%, STEM PhDs awarded to URMs rose by 33.9%

Natural sciences and Engineering, 31% overall vs 50% increase in URM PhDs
We need to create supportive learning environments for women and underrepresented groups.

- The Association for Women in Mathematics (AWM) - sponsors a myriad of projects to help women succeed in math.
- Smith College - Center for Women in Math.
- EDGE - Enriching Diversity in Graduate Education, summer REU.
- MentorNet - an online mentoring community for women in science.
- Expanding Your Horizons Conference - based out of Mills College, but take place at various locations nationally.
- Sonia Kovalevsky High School Mathematics Days - sponsored by the Association for Women in Mathematics, but take place at various locations nationally.
We need to create supportive learning environments for women and underrepresented groups.

- **National Association of Mathematicians (NAM)** - sponsors a myriad of projects to support mathematicians of all ethnicities, but specifically focuses on African-American Mathematicians.
  - **MAD** - Mathematicians of the African Diaspora
  - **CAARMS** - summer undergraduate research conference
- **SACNAS** - Society for the Advancement of Chicano and Native Americans in the Sciences
- **Alliances for Broadening Participation in STEM (ABP)**
  - **LSAMP** - Louis Stokes Alliance for Minority Participation
  - **LSAMP-BD** - Bridge to the Doctorate
  - **AGEP** - Alliance for Graduate Education.
- **EDGE** - Enriching Diversity in Graduate Education, summer REU.
- **Infinite Possibilities Conference (IPC)** - biennial conference for women of color in the mathematical sciences
- **Math Circles** - strategically placed in underrepresented communities.
- Create programs focused on Community College students
- **Synergy** - Networking and Institutional Collaboration
How to create a supportive learning environment for yourself.

- Attend conferences
  - network
- Find a mentor/Be a mentor
  - Mentornet
  - AWM Mentor Network
- Join a study group at your home institution
- Join a national or regional scientific association
- Believe in yourself
- Persevere

- You can do it, because you are AMAZING!
“Now is the time to use every tool available to make sure America reaps the benefits of the best possible workforce of scientists and engineers, equal opportunity in math and science will benefit not just the women who enter the professions, but all Americans through our technological leadership and our national security.”

-Senator Ron Wyden (OR)