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# Addressing the Gender Gap in Emerging Technologies

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*Sandra McGarraugh, Director*

*The NET Project*

*Center for Women in Government & Civil Society,  
University at Albany*

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# Agenda

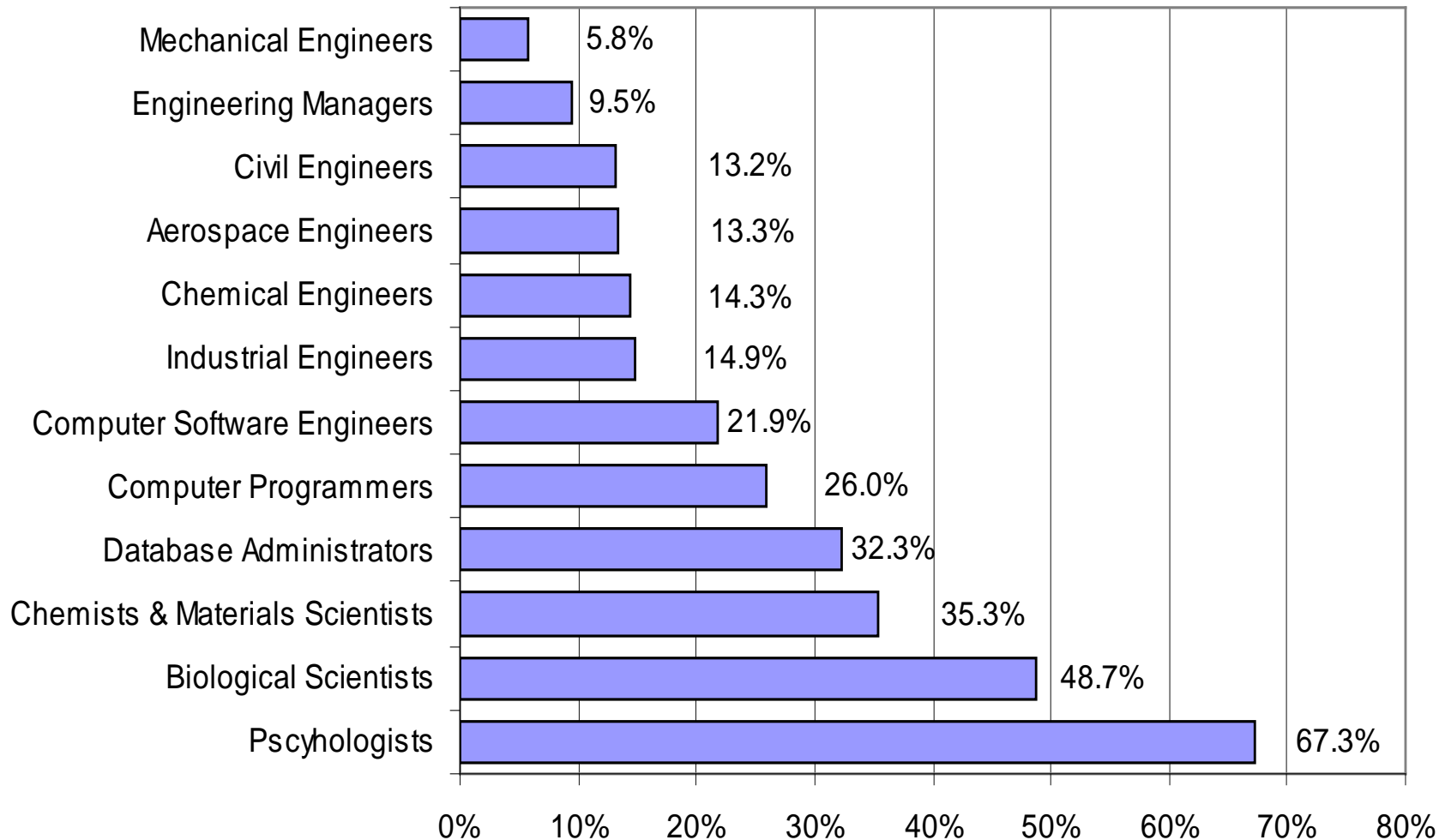
1. What is the gender gap?
  2. How does gender influence career choice?
  3. Does it matter? Why should we care?
  4. What can we do?
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# Gender gap in STEM

- Representation in workforce
  - Enrollments in education and training programs
  - Expressed interest in STEM careers
  - Self assessment of performance
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## Women as a Proportion of Selected STEM Occupations, 2005



Source: CPST, *Professional Women and Minorities*. Data derived from U.S. Census Bureau, *Current Population Survey*

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# Still Pink and Blue in 2005: Enrollments in CTE Courses

- In courses leading to traditional occupations for females:
  - 87% females
  - 13% males
- In courses leading to traditional occupations for males:
  - 15% females
  - 85% males

Source: National Women's Law Center, 2005

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# CTE Secondary Enrollments 2008

<u>Program</u>	<u>School</u>	<u>NT%</u>
Welding	Cap Reg	0/34
	WSWHE	1/59
HVAC/R	Cap Reg	0/23
	Questar III	1/34
Mfg Tech	Questar III	0/5
	WSWHE	0/21

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# Women and girls in IT

- In 2005 women were:
  - 29% of the US IT workforce
  - 11% of IT corporate officers
  - 24% of computer scientists
- In 2005 girls were:
  - 15% of AP computer scientist test-takers
  - 23% of ISEF in mathematics
  - 52% of ISEF in biochemistry
  - 15% of computer science degree awards

Source: [www.ncwit.org](http://www.ncwit.org)

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When the engineering team that created the original speech-recognition system – the genesis for our current-day voicemail – first tested its system with a woman, the system hung up on her. Why? Because there were no women on the engineering team, and the system wasn't designed to recognize female voice octaves.

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# How Do They Choose a Career?

- Cultural messages
    - Family
    - Community
    - Media
  - Experiences
    - Skills and interests
    - Education
  - Self-concept
  - Information and exposure
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# Who influences decisions?

- Parents and family
  - Peers – friendship groups and cultural
  - Teachers
  - Counselors
  - Community-ethnic and religious factors
  - Mentors and role models
  - The media
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# What are the messages?

- College
    - 4-year +
    - Professions
  - Financial success
  - Brain vs. brawn
  - Gender
  - Technology/STEM Crisis
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# Gender and career choice

- Gender role stereotypes
  - Traditional family role expectations
    - Father and worker
    - Mother and family and worker
  - Occupational segregation
    - Nurses, secretaries, teachers
    - Engineers, dentists, technicians
  - Influenced by history and technology
    - New tools first used by men, then women
    - War time shifted women into men's jobs
    - Shortages attract nontraditional workers
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# Women from 18 to 25: The “leaky pipeline”

## Variables of interest:

- Desire for family-flexible job
- Accept high time demands
- Intrinsic value for physical science

Stable group – 18%

Change group - 82%

- 55% to neutral
- 27% to “pink”

Source: Educational Research and Evaluation, 12;4, August 2006

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# “On Their Own” Career Guidance

Survey of HS students in 2002 found:

- 51% reported no help from school
- 10% credited teacher/counselor
- 78% cited parents as adult influence
- 68% plan four-year college
- 6% plan technical career

Source: Ferris State University 2002

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# Interest Over Opportunity

Technology remains a low priority

- “32% say computers offer the greatest career opportunities; 6% will prepare for a career in a computer field; none of these were female”
- Majority of parents unaware of benefits of vocational and technical programs at both high school and two-year college levels

Source: Ferris State University, 2002

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# Interest over Opportunity

## ■ Select for own career

- ❑ Computers 6.8%
- ❑ Medical 21%
- ❑ Teaching 9.4%
- ❑ Business 4.7%
- ❑ Engineering 3.2%
- ❑ Science 4.0%
- ❑ Automotive 2.7%

## ■ Good career opportunity

- ❑ Computers 47.6%
- ❑ Medical 51.1%
- ❑ Teaching 24.3%
- ❑ Business 16.8%
- ❑ Engineering 8.7%
- ❑ Science 6.9%
- ❑ Automotive 3.4%

Source: Ferris State University 2002

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# “Just a Feeling....”

## Primary reason for career choice

- ❑ Something I like 33%
  - ❑ Personal growth 22%
  - ❑ I am good at this 21%
  - ❑ Always been interested 13%
  - ❑ Good money 3.7%
  - ❑ Good field for job 2.5%
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# Critical points in education

- Middle school transition
    - Peer pressure
    - Course selection/"opt out" factor
    - Career exploration
  - High school
    - Family and culture
    - Career majors
    - Career planning
  - Freshman year of college
    - Academic expectations
    - Career preparation
    - Internships
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Does it matter?

Why should we care?

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# The Quiet Dilemma

- “One way to win” paradigm
- International shortage of technicians
- Underemployment of college graduates
- Reverse transfers

Source: Kenneth Gray, 2006

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# Job Skill Level Changes

Year	Skilled	Unskilled	Professional
1950	20%	60%	20%
1991	45%	35%	20%
2005	65%	15%	20%

Unskilled: High school or less with no technical training.

Skilled: Post-secondary training, but less than a baccalaureate degree. Includes associate degrees, vocational-technical schools, apprenticeship training, and military.

Professional: Baccalaureate degree or more.

Source: International Center for Leadership in Education, 2007

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# Advanced Manufacturing: Local Example

## Global Foundry

- Projected Employees: 1,460
  - 450 Operators
  - 445 Technicians
  - 390 Engineers
  - 120 Management
  - 60 Administrative
- Construction: 2,800

Source: NYSUT Technology Institute, 2/24/2009

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# SCCC: Selected enrollments 2008

<u>Program</u>	<u>NT</u>
Computer science	9/34
Computer networking	13/55
Aviation science	3/28
Electrical technology	2/14
Nanoscale Materials Tech	1/14

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# HVCC: Selected enrollments 2008

<u>Program</u>	<u>NT</u>
Photovoltaic installation	0/13
HVAC/R	1/100
Civil engineering tech	12/89
Electrical engineering tech	1/35
Semiconductor mfg tech	1/22
Manufacturing engineering tech	2/39
Construction tech	12/89

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How can we achieve the skill capacity needed for the region if we are recruiting talent from only 50% of the population?

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What can we do?

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# Why Not STEM?

- Lack of awareness and information about the full range of STEM opportunities
  - Student culture that includes gender stereotypes
  - Cultural pressure to enroll in courses that lead to traditional careers
  - Interest not aligned with capacity
  - Perceived family and work balance issues
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# Strategies for Career counselors

- Technical fluency
  - Realistic information
  - Gender stereotypes
  - Role models
  - Exploration activities
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# Recruitment Strategies

- Counselors **emphasize** NT course offerings
  - Involve local business partners
  - Career exploration “hands on” events
  - Role models and mentors
  - Recruitment materials; career information
  - Parent involvement
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# Career Exploration that Works

- Informal learning
    - Out of school community programs
    - Online games and networks
    - Field trips and workshops
    - Summer camps
  - Mentoring
    - Peer to peer
    - STEM related
    - Role models
    - Job shadowing and internships
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# Retention: Why NT Students Leave

- “Gendered classroom”
  - Isolation
  - Differential treatment
  - Lack of family/peer support
  - No clear career path
  - “Pioneer syndrome’
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# Retention: How to Help NT Students Succeed

- Classroom environment
  - Critical mass
  - Mentors and internships
  - Positive campus climate
  - Clear pathway to career goal
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## **The NET Project, University at Albany Resources**

1. Vanguard Award (December 18, 2009)
2. Nontraditional Career Posters
3. 21<sup>st</sup> Century Careers

■ [www.TheNetProject.org](http://www.TheNetProject.org)