



# League for Innovation STEMTech Conference

## Opportunities for Women in STEM at Community Colleges



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Kansas City, MO  
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## National Alliance for Partnerships in Equity

- “ NAPE is a consortium of state and local education and workforce development agencies, businesses, and national organizations committed to the advancement of equity and diversity in classrooms and workplaces
- “ Mission to expand career options and the economic potential of America's workforce by collaborating with stakeholders to build the capacity of teachers, administrators, parents, and employers.



## NAPE's Lines of Business

Technical  
Assistance

Public Policy  
(Advocacy)

Research  
& Evaluation

Professional  
Development



Special  
Populations

Nontraditional  
Career  
Preparation

STEM Equity  
Pipeline

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## Professional Development for Educators: STEM (including CTE) Access, Equity, Diversity

### STEM Equity Pipeline™

#### STEM Equity Training for Inst. Change

Working with institutional leaders (administrators, dept heads, etc.) to improve enrollment, retention & completion of girls & under-represented populations in STEM courses

#### STEM Equity Teacher Training

Training teachers to use pedagogy that improves enrollment, retention & completion of girls & under-represented populations in STEM courses

#### STEM Equity Counselor Training

Coaching counselors to encourage girls and under-represented populations in STEM careers

#### Tools & Resources

Tools to support teachers' & counselors' learning and assist their students, e.g., camps, partner orgs, books



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## STEM Equity Pipeline Goals

- “ Build the capacity of the formal education community to provide high quality professional development on equity in STEM education
- “ Institutionalize the implemented strategies by connecting the outcomes to existing accountability systems
- “ Broaden the commitment to equity in STEM education



## Program Improvement Process for Equity in STEM (PIPESTEM™)

- “ Institutional capacity building model
- “ Unified program of change
- “ Informed by the research
- “ Employ evidence-based exemplars
- “ Increase participation, achievement, persistence and graduation





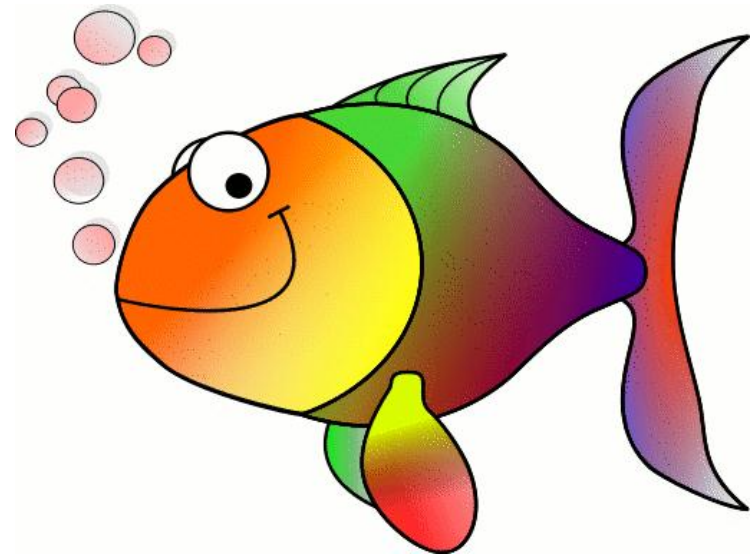
N A P E E

# Capacity Building

Give me a fish  
and I eat for a  
day.

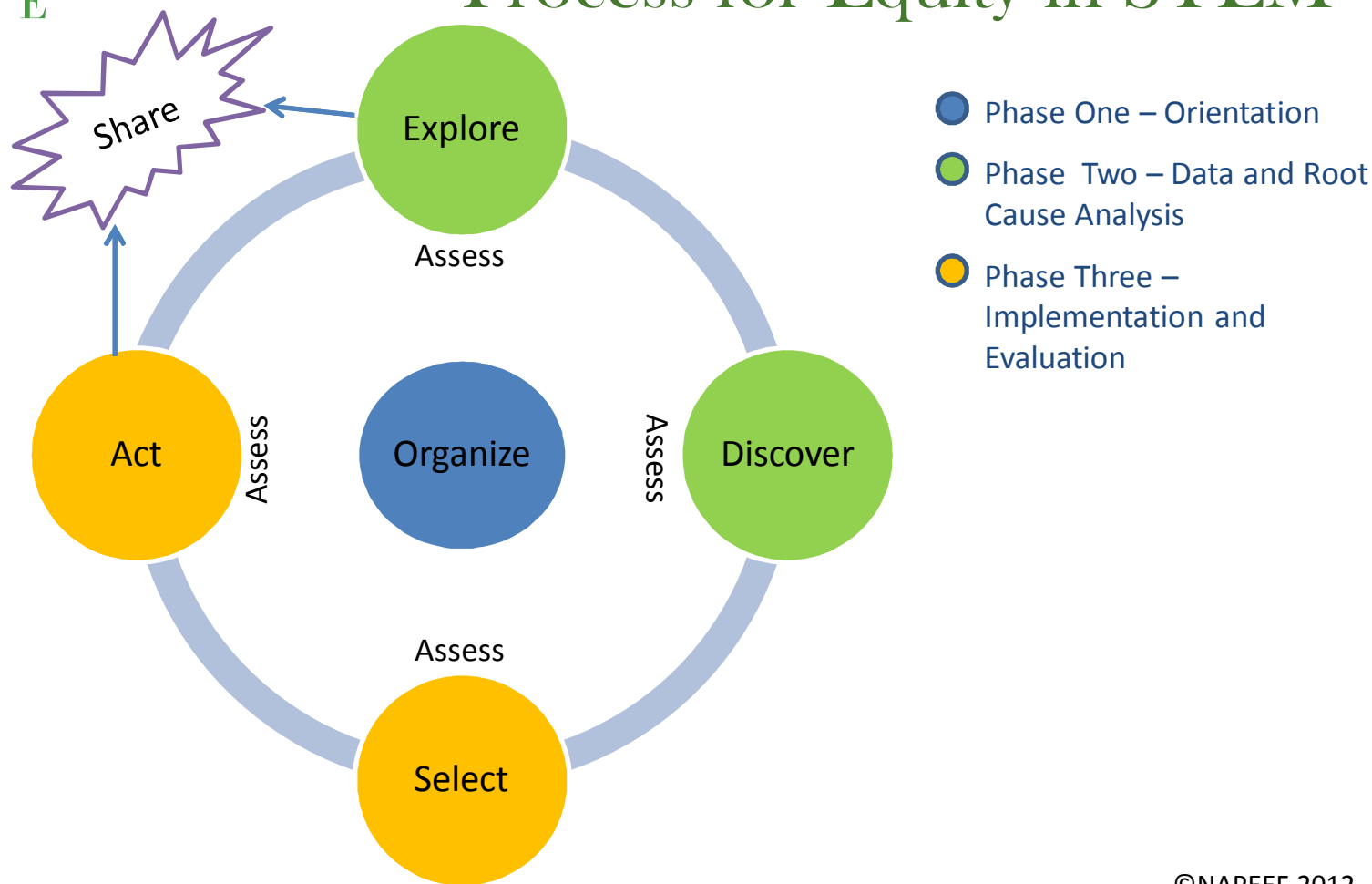
Teach me to fish  
and I eat for a  
lifetime.

Chinese Proverb





# PIPE-STEM: Program Improvement Process for Equity in STEM







# STEM Equity Pipeline 1.0

## Participating States

### 2008-2012

“ California

“ Georgia

“ Idaho

“ Illinois

“ Iowa

“ Minnesota

“ Missouri

“ New Hampshire

“ Ohio

“ Oklahoma

“ Texas

“ Wisconsin



# STEM Equity Pipeline 2.0

## Participating States

### 2012-17

- “ Colorado
- “ District of Columbia
- “ Idaho
- “ Kentucky
- “ Louisiana
- “ New Jersey
- “ Vermont
- “ Mississippi
- “ Plus three additional states



# Micromessaging to Reach and Teach Every Student™

## Goal

” To increase the academic performance and retention through program completion of significantly more racially and ethnically diverse female students in STEM programs of study by providing a professional growth opportunity for community college faculty and secondary teachers that will improve classroom pedagogy and instruction



# Micromessaging to Reach and Teach Every Student™

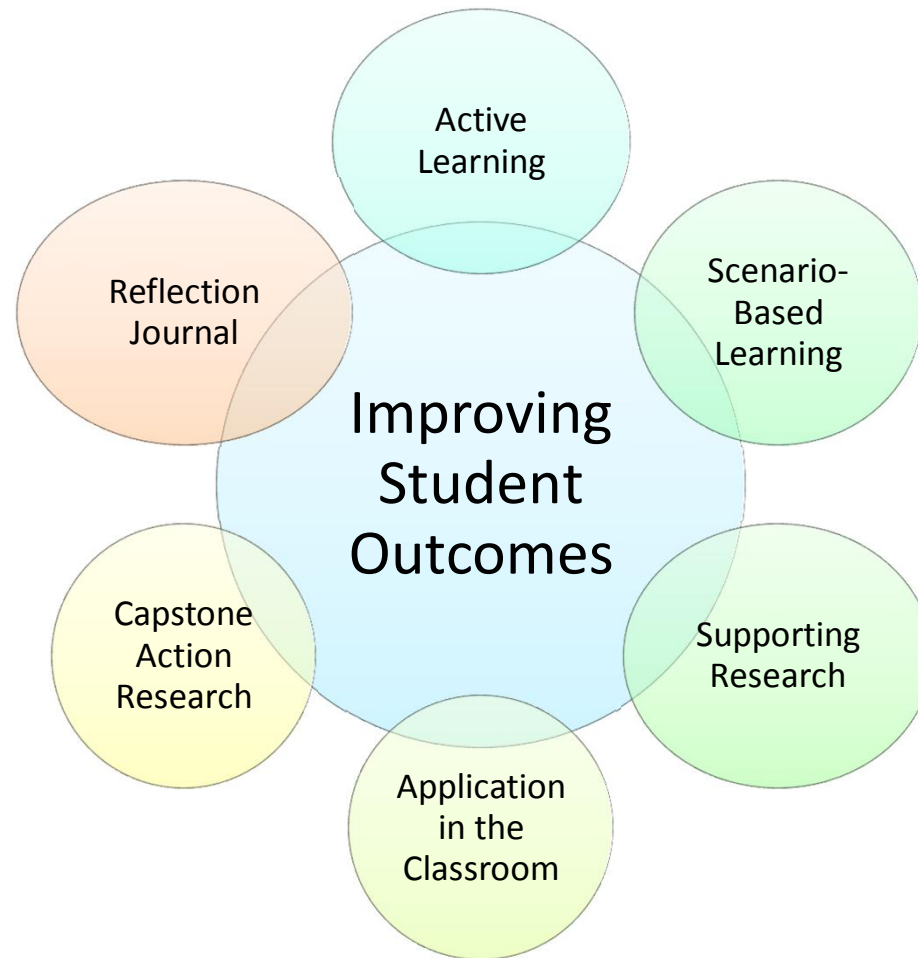
## Instructional Units

- ” Setting the Stage . Women in STEM
- ” The Influence of Micromessages
- ” Neuroscience Link to Learning
- ” Social Theories of Achievement
- ” Influence of Culture
- ” Career Development
- ” The Equitable Classroom



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# Making It Happen



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# Micromessaging to Reach and Teach Every Student™

## Pilot Testing

- “ Maryland – phased in over three years across the state to both secondary and post-secondary.*
- “ Texas – Dallas, Plano, and Richardson (2012) and expanding to Fort Worth Independent School Districts this fall.*



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## STEM Careers Counselor Training

- “ Goal: to support career counselors efforts to highlight STEM careers in a context that appeals to a diversity of students, their cultures, and their values.
- “ Currently a high quality workshop focusing on engineering.
- “ 2012 . 2013 building an intensive equity professional development program for secondary and college career counselors.





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**STEM Equity Pipeline**

**IMPACT**



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# Levels of Impact

## Where

- National
- State
- Local

## What

- Policy
- Investment
- Practice

## Who

- Administrators
- Teachers/Faculty
- Counselors





## State Investments in Community Colleges

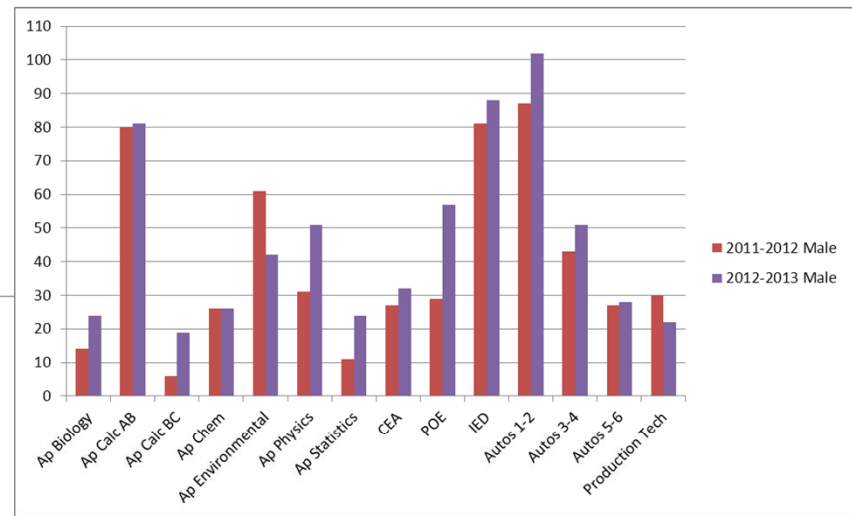
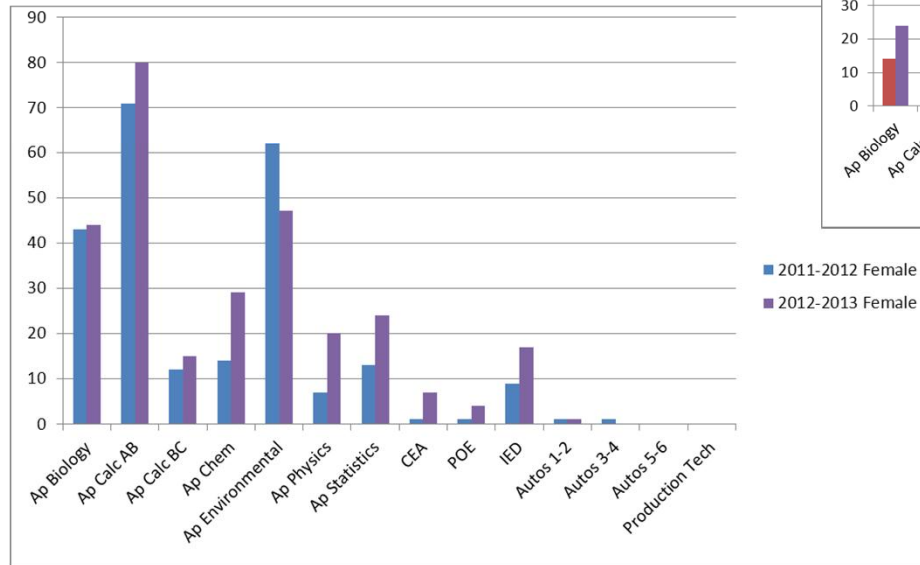
- “ Wisconsin Dept. of Public Instruction- \$60,000 in grants for three pilot sites
- “ Iowa Dept. of Education - \$150,000 in grants for 15 Community Colleges to receive PIPESTEM training
- “ Ohio Department of Education - \$78,000 grant to expand pilot sites from four to twelve in two years
- “ Texas Higher Education Coordinating Board - \$135,000 over three years for statewide technical assistance and PIPESTEM pilot sites



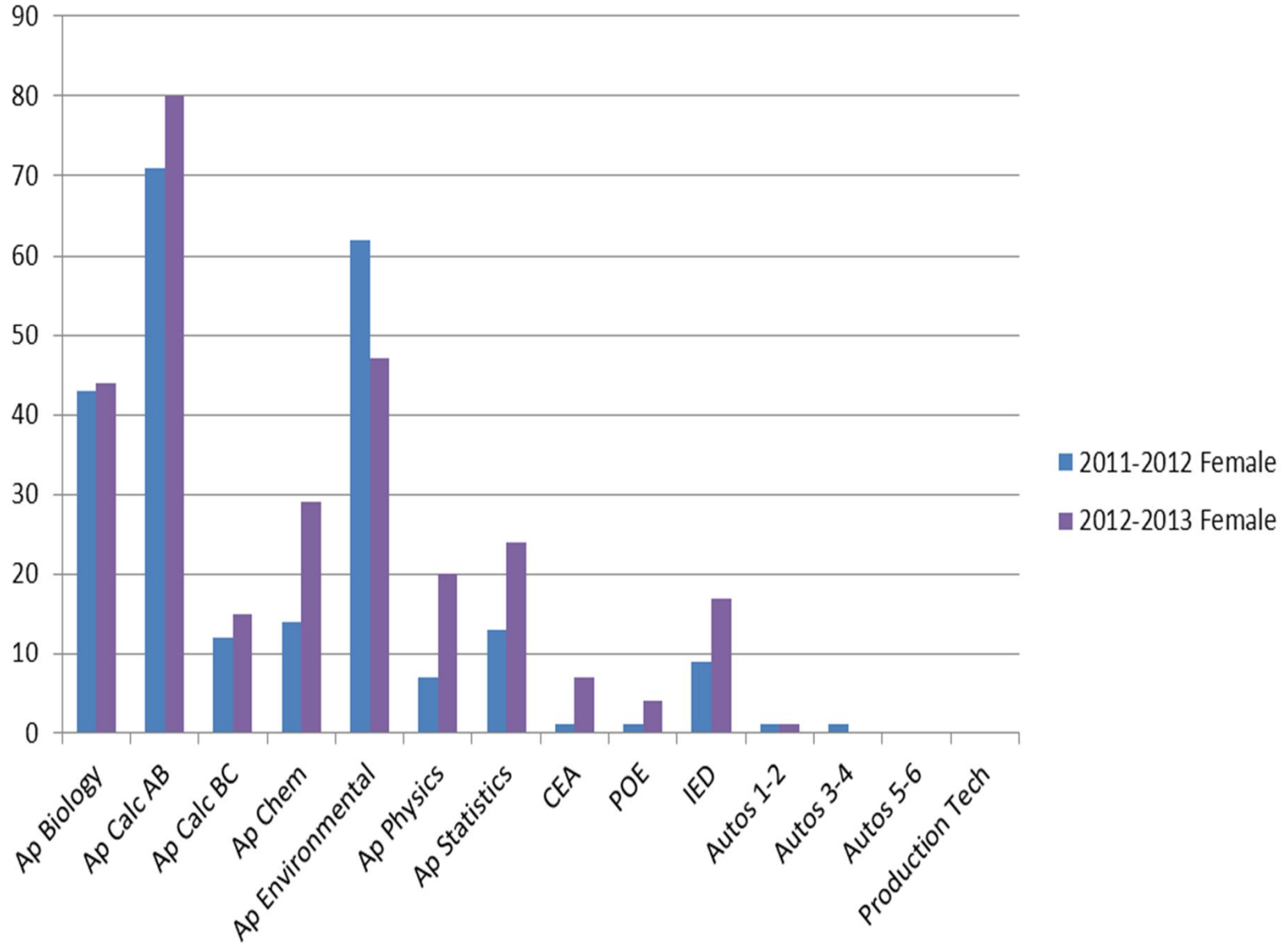
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# Summative Measurement

## Increased Enrollment Females



## Males





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## Significant results to note

High School female enrollment increases-

- " AP Physics: 18% -> 28%
- " AP Chemistry: 35% -> 53%
- " IED: 10% -> 16%
- " CEA: 4% -> 18%
- " POE: 3% -> 7%





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## Increased Achievement

- “ Micromessaging curriculum implemented with physics teachers student passage rates on the AP physics exam increased
- . 4 times more female students
  - . 4 times more African Americans students
  - . 6 times more Hispanic students





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## High School - Community College Collaboration

Community college invited middle school girls enrolled in the PLTW Gateway program to the campus where they were introduced to various engineering career fields through speakers and projects.

- “ 40% said they would like to pursue a STEM career, with 11% specifically stating Engineering
- “ 83% of the girls said that they would like to take an engineering class in high school.
- “ The next fall, 7 ninth grade girls enrolled in the PLTW introduction to engineering course (previously there was only one ninth grade girl enrolled) and 18 ninth grade girls enrolled in beginning drafting.



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## Community College Results

“ After hiring a female teachers aide in the auto technology program enrollment of women increased from 4-15 in one semester





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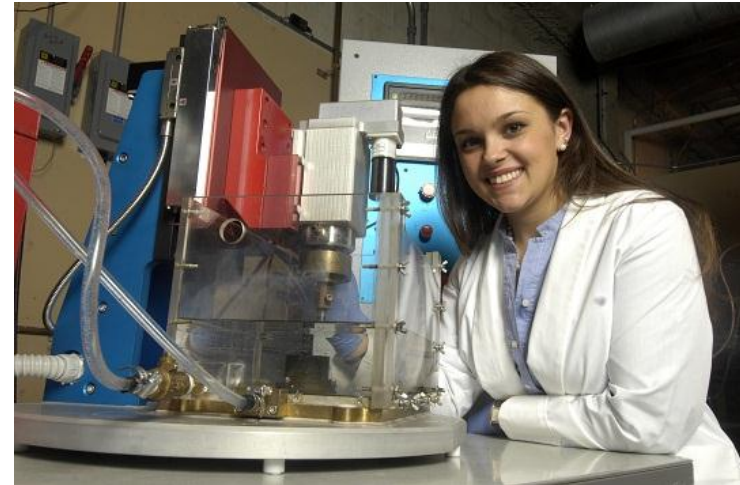
After conducting targeted recruitment events the aviation maintenance program had 7 women enroll after never having women in the program



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## More Community College Results

“ Nuclear engineering program graduated its first class in 2012 including 6 (25%) women and 7 (30%) women are enrolled this Fall



“ After implementing a capstone project faculty are reporting increased achievement (grades) and retention of female students . data to be collected in January 2013.



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# Questions

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