

# The Case for Retention: Women in the STEM Workforce

## MENTORING AS A TOOL FOR CAREER DEVELOPMENT AND RETENTION

Barbara Bogue, The AWE Project  
Department of Engineering Science & Mechanics, Penn State

# Building Science, Engineering and Technology Leadership Workshop

- Intentional approach to mentoring as an **integral part of career development**

## PAESMEM Award Activity

### Co-Chairs:

Barbara Bogue, Penn State

Daryl Chubin, AAAS

Yolanda Comedy, Consultant

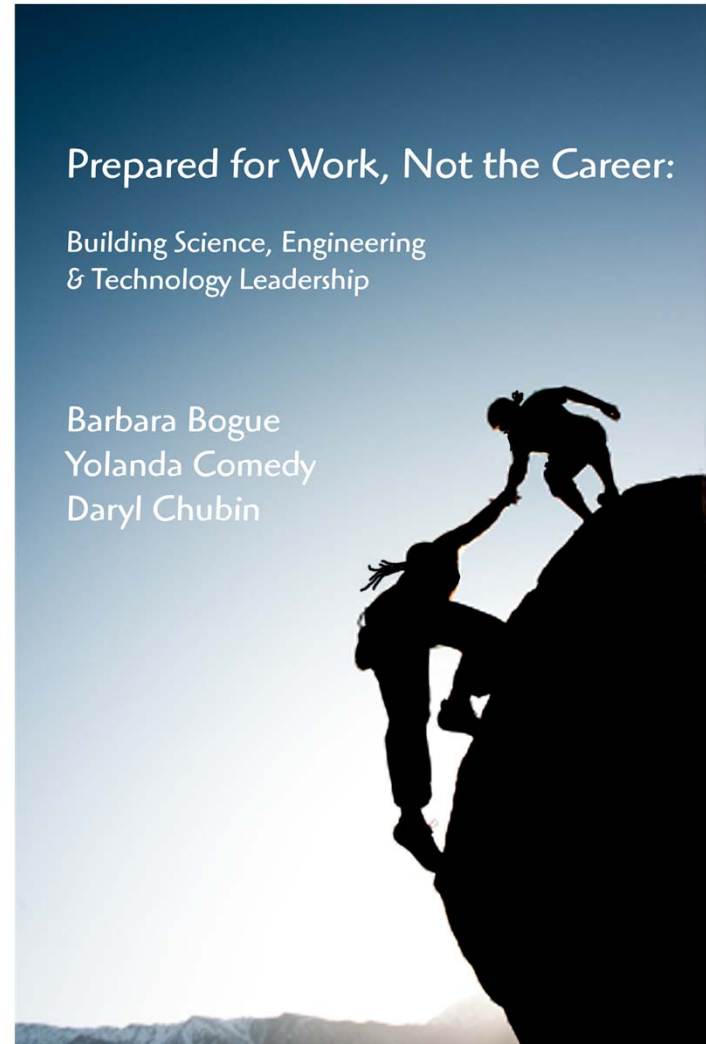
Organizers & Hosts: Penn State &  
AAAS

NSF HRD 0328144

Prepared for Work, Not the Career:

Building Science, Engineering  
& Technology Leadership

Barbara Bogue  
Yolanda Comedy  
Daryl Chubin



# Unique aspects

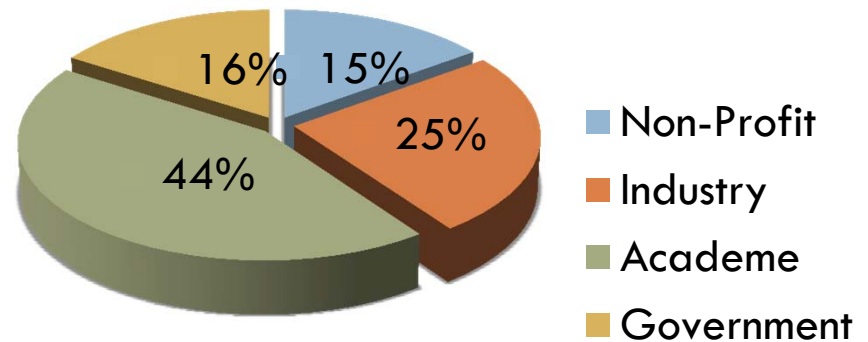


- Access the **experience of proven mentors** to:
  - Identify effective practices
  - Compare with formal mentoring research.
- Create idea exchange **beyond typical working spheres**: industry, academe, government, non-profit
  - Networking platform for professionals across sectors
- Integrate mentoring into **overall career progression**
  - For individuals
  - Organizationally

# Who participated?

- 60 women from industry, academia, government & non profits
  - 46% were women of color
  - Waitlist of 100+
- 14 high level individuals acknowledged as **effective mentors**
  - Also diverse

Participation by Sector



# A word on terminology

- What do we call the people being mentored?
  - ▣ Question basic to mentoring as a tool of development and empowerment
  - ▣ Existing terms encourage non-dynamic, hierarchical approach to mentoring
    - Someone is acted upon rather than developing to act
- Model: Mentor & Telemachus
  - Empowerment in addition to teaching & counseling

The advance scout who returns to tell others on the journey where they will find 'boulders, thickets, edible berries, fordable streams.'

More terminology:

Retention???

---

Or development?

□ *Retention* of people

□ Non-dynamic: Preservation, maintenance, running in place

OR

□ *Development* of people

□ Dynamic: Growth, progress, expansion

# Role of Mentoring in Career Development



- Dynamic process of personal and career development
  - ▣ Benefits individuals, mentors and organizations
  - ▣ Creates platform for career progression and achievement in organization
  - ▣ Can also identify dissonance between individual goals and organizational goals

# Findings: Participants

- Very talented and successful in positions

Women come into the workplace as well-prepared professionals, but once there they confront the realities of career advancement, balancing personal and work life, gaining recognition for achievements and other professional challenges for which they have been little prepared.

- Conundrum:

- Many are clearly disempowered
- Feel must be independent/Not ask for help
- “Heads Down” work approach evident



# Findings: Issues for mid-level women

- Lack of **meta vision** of career and organization
  - ▣ Need for clear career strategies
  - ▣ Need for clear organizational perspective
  - ▣ Need to understand steps to move upward on career path
- **Narrow** view of mentoring
  - ▣ See mentoring as one-way street
  - ▣ Failure to recognize mutability of mentoring
- Failure of **formal mentoring** programs
  - ▣ Lack of mentors who “look like me”
    - Double impact for Women of Color
  - ▣ Poor match with mentors
  - ▣ Disconnect between personal/professional goals and the advice of mentors
  - ▣ Confounding of supervisor/advisor function with mentoring

# Issues for mentors

## Individual

- Expects “magic bullet” rather than mutual effort
- Communicates poorly
  - ▣ Lack of follow up
  - ▣ Won't listen
  - ▣ Inability or unwillingness to perceive themselves as others do
- Demonstrates low commitment to organization
  - ▣ Fails to inspire trust
  - ▣ Low promise of success in organization

## Organization

- Provides only half-hearted, short-term measures
  - ▣ Lack of commitment from the top
  - ▣ Lack of recognition for those who mentor
  - ▣ Not tied to empirical measures

# Effective Practices: Individuals

- Have clear, **articulated** objective for mentoring relationship
- Seek **multiple** mentors
  - ▣ Informal and formal
  - ▣ Board of directors
- Undertake **continuous career planning**
- Understand organization
  - ▣ Structure: Learn **organizational culture**; Work within to meet personal goals
  - ▣ Constraints: **Choose battles**—make allies, not adversaries
- Have **reasonable expectations** of mentors
  - ▣ Resource, not crutch
  - ▣ Don't confuse advising or supervising with mentoring

# Challenges for organizations

Challenges	Practical Solutions
Diminishing number of senior mentors	Provide peer, distributed or team mentoring
Not enough diversity in available mentors	Cross race/ethnicity/gender mentoring Integrate social networking, relational and developmental aspects into mentoring Essential key components*: <ul style="list-style-type: none"><li>✓ Training</li><li>✓ Management</li><li>✓ Formal Review</li></ul>

\*Important components for mentoring programs in general.

# Challenges for organizations

Challenges	Practical Solutions
<p>Disproportionate “Failure to Thrive” among individuals not traditionally represented in culture</p>	<p>Provide <b>Organizational</b> Mentoring:</p> <ul style="list-style-type: none"><li>✓ Recognize <b>informal information/support networks</b> among majority; make transparent</li><li>✓ Change <b>practices that handicap</b>:<ul style="list-style-type: none"><li>➤ Fair start up packages, negotiations</li><li>➤ Recognition &amp; reward before poachers</li></ul></li><li>✓ Provide information <b>key to success</b><ul style="list-style-type: none"><li>➤ Workshops for associate professor women explaining steps to full; facilitating career planning and progression</li></ul></li></ul>

# Resources

- Prepared for Work, Not the Career: Building Science, Engineering and Technology Leadership ([stores.lulu.com/sevo](https://stores.lulu.com/sevo))
- Catalyst.org
  - Unwritten Rules: What You Don't Know Can Hurt Your Career (2008)
    - Laura Sabattini and Sarah Dinolfo
  - User's Guide: Discussing Unwritten Rules With Your Supervisors, Employees, and Teams (2008)
    - Laura Sabattini and Michael Chamberlain
  - Making Mentoring Work (2010)
    - Sarah Dinolfo and Laura Sabattini
- WepanKnowledgeCenter.org
  - WEPAN Knowledge Center Agenda Paper: Putting Policy into Practice to Diversify Faculty
- CRA-W.org
  - Committee on the Status of Women in Computing workshops, distributed mentoring program



Thank you!

## Contact Info:

**Barbara Bogue** [bbogue@psu.edu](mailto:bbogue@psu.edu)

PI, PAESMEM Award

Director, The AWE Project

Associate Professor of Engineering Science and Mechanics and

Women in Engineering, Penn State

212 Earth and Engineering Science Building

University Park, PA 16802

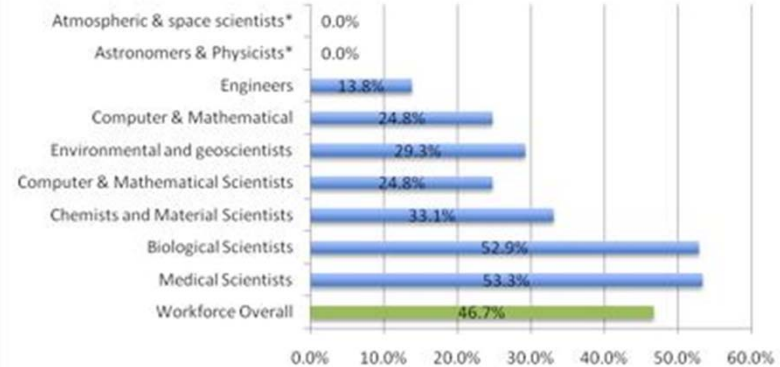
# 2009 statistical snapshot

## Women in Managerial & Professional Positions



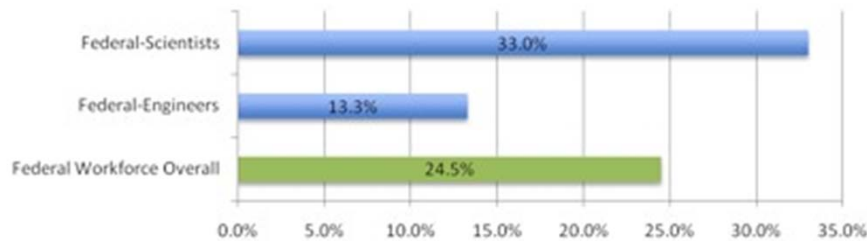
Source: Bureau of Labor Statistics (2009) Women in the Labor Force: A Databook, 2009 Edition. Table 11. Employed persons by detailed occupation and sex, 2008 annual averages. \* Represents less than 1%.

## Women in the SET Workforce



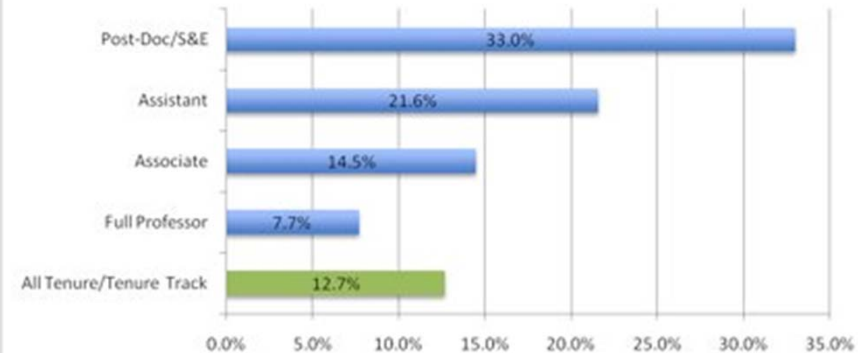
Source: Bureau of Labor Statistics (2009) Women in the Labor Force: A Databook, 2009 Edition. Table 11. Employed persons by detailed occupation and sex, 2008 annual averages. \* Represents less than 1%.

## Women in SET Federal Positions



Source: Proudfoot, S. for NSF, Federal Employment of Scientists and Engineers. (2009) (2005 Data)

## Women in Engineering Faculty Positions



Sources: Faculty- Gibbons, MT (2009) for ASEE. Engineering by the numbers. (Fall 2009 data). Post-doctoral fellows-National Science Foundation (2006). Survey of Graduate Students and Postdoctorates. (2006) (Fall 2006 data).



WOMEN FACULTY IN THREE DISCIPLINES,  
 AS A PERCENTAGE OF EACH RANK  
 IN "TOP 50" DEPARTMENTS

Discipline	% Assistant	% Associate	% Full	% All
Chemistry (2003)	21.5	20.5	7.6	12.1
Chemical Engineering (2002)	21.4	19.2	4.4	10.5
Computer Science (2002)	2.8	3.8	4	10.6
Mathematics (2002)	19.6	13.2	4.6	8.3
Mechanical Engineering (2002)	2.5	2.3	1.1	6.7

Source: Nelson, 2007