

WOMEN IN ACADEMIC SCIENCE IN THE UNITED STATES: Analyzing Issues, Problems, and Solutions

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**Presented at:
Forum on Women in Science
Japan Society for the Promotion of Science**

**Washington, D. C.
11 June 2009**

I. Academic Women in Science: Analyzing and diagnosing the issues, problems, and solutions

A. → Why this matters:

1. Human resources in science
2. Social equity in science

B. → And what this means for:

1. Development of students' potential
 - Undergraduate students
 - Graduate students
2. System of belief that “careers be open to talent”

II. Academic Women in Science: Participation, status, and rank

A. Doctoral degrees Awarded to Women, Over Time

Table 1. Percentage of Doctoral Degrees Awarded to Women, by Decade and Broad Field

<u>Field</u>	<u>Time Period</u>				
	<u>1960-69</u>	<u>1970-79</u>	<u>1980-89</u>	<u>1990-99</u>	<u>2000-04</u>
Engineering	0.4	1.4	5.9	11.2	16.9
Earth/Atmospheric	1.6	6.3	16.3	22.9	31.9
Physical Sciences	4.8	7.7	15.1	21.5	25.8
Math/Computer Science	5.9	10.1	14.8	19.3	23.5
Biology/Agriculture	11.4	18.2	29.1	38.1	43.6
Social Sciences	20.4	32.1	49.4	63.4	67.1

Source:

Commission on Professionals in Science and Technology (CPST). *Professional Women and Minorities: A total human resource data compendium*. 16th ed., 2006, Table 3-26.

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II. Academic Women in Science: Participation, status, and rank

B. Percentage of Faculty Who are Women, by Rank and Field

Table 2. Doctoral Scientists and Engineers Employed in 4-year Colleges and Universities: Percentage Who are Women, by Rank and Field, 2003

<u>Field</u>	<u>Rank</u>			
	<u>Full Prof.</u>	<u>Asso. Prof.</u>	<u>Asst. Prof.</u>	<u>Instructor/ Lecturer</u>
Engineering	3.8	11.9	16.0	30.5
Physical Sciences	6.8	19.2	24.5	27.6
Mathematics/Statistics	9.2	15.9	29.2	41.8
Computer/Info Sciences	12.3	19.9	23.3	25.3
Life Sciences	19.0	29.4	38.4	60.5
Social Sciences	21.4	35.5	48.4	38.4

Source:

Commission on Professionals in Science and Technology (CPST). *Professional Women and Minorities: A total human resource data compendium*. 16th ed., 2006, Table 4-50.

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III. Nature of the Issues/Problems

Focal Questions:

1. What may account for women's status in academic careers?

→ Perspectives

- a. Role of individual characteristics in explaining career attainments
- b. Role of social-organizational features of education and the workplaces

2. What are the implications for "solutions" for status and advancement of women in academic science?

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IV. Nature of Problem: Perspectives on Individual Characteristics

- Ability
- Intelligence
- Doctoral Origins
- Financial Support Received for Graduate Education
- Marriage/parenthood

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V. Nature of the Problem: Perspectives on Social and Organizational Features

→ Why Important:

Science and engineering are fundamentally social and organizational enterprises (Fox, 1991, 2001, 2008).

A. Graduate Education—characteristics and practices of:

1. Departments
2. Research groups
3. Advisement

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V. Nature of the Problem: Perspectives on Social and Organizational Features

B. Social and Organizational Characteristics of the Academic Workplace

1. Data

Data from Survey of Tenured and Tenure-Track Faculty in Computer Science, Engineering, and Sciences (physical, atmospheric, biological/life, math, and psychology) within 9 Research Institutions, collected 2002-2004.

- Stratified random sample of men
- Population of women (except sampling in biology and psychology)
- Response rate: 66.2%
- Respondents (N=764): 427 men; 337 women

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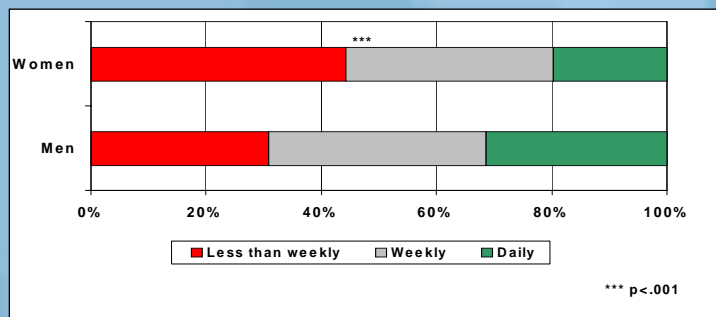
V. Nature of the Problem: Perspectives on Social and Organizational Features

2. Three Telling Areas – Reflecting Social-organizational Features of Academic Work

a. Frequency of Speaking about Research

→ Why Important: Connection between speaking about research and performance in science.

Figure 1. Frequency of Speaking about Research with Faculty in Home Unit, by Gender



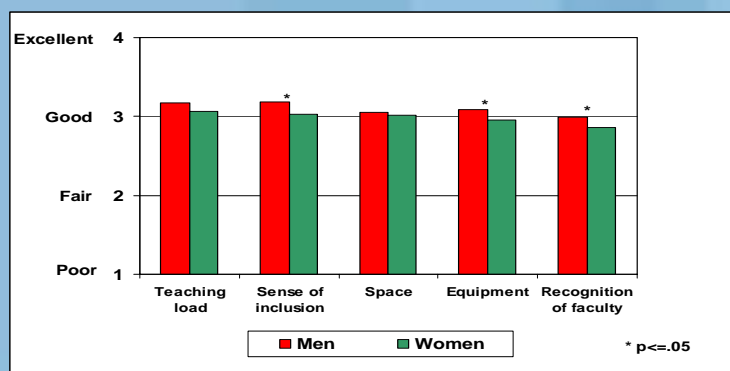
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V. Nature of the Problem: Perspectives on Social and Organizational Features

b. Ratings of Aspects of Position/Unit

→ Why Important: Issues of human and material resources.

Figure 2. Rating of Aspects of Position/Unit, by Gender



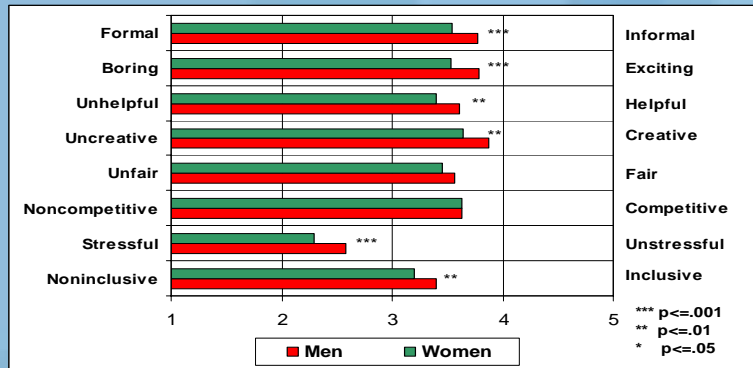
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V. Nature of the Problem: Perspectives on Social and Organizational Features

c. Characterizations of home unit

→ **Why important:** Dimensions of departmental climate as “experienced” and reported by faculty.

Figure 3. Characterizations of Home Department, by Gender



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VI. Implications, Conclusions, and Solutions – toward the advancement of women faculty in science and engineering

A. Implications

1. Individual characteristics are pertinent – but by themselves are limited in accounting for rank and status.
2. Challenges and opportunities lie in understanding the social and organizational environments of education and the academic workplace.

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VI. Implications, Conclusions, and Solutions – toward the advancement of women faculty in science and engineering

B. Solutions for equity – in settings, structures, and compositions of the places in which people are educated, and work (Fox, 2001, 2006, 2008).

In three areas depicted:

- Departmental leadership that supports patterns of communication and exchange (frequency of speaking about research)
 - Equity in the distribution of resources, recognition, and rewards (aspects of positions)
 - Attention to the experience of departmental climates (characterizations of home units)
- **Just as organizations are structured, so they can be re-structured.**