DOCTORAL-LEVEL WOMEN FACULTY IN ACADEMIC SCIENCE AND ENGINEERING: Challenges and Opportunities

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I. Doctoral-level Women Faculty in Science and Engineering: participation, status, rank

→ Why this matters:

1. Human resources in science/engineering
   - Size, creativity, and diversity of workforce
   - Development of students' potential

2. Social equity in science

II. Participation, status, and rank: Opportunity and challenge

A. Doctoral Degrees in Science/Engineering Awarded to Women, Over Time

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

	Time Period				
Field	**1960-69**	**1970-79**	**1980-89**	**1990-99**	**2000-04**
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.

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

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

	Rank			
Field	Full Prof.	Asso. Prof.	Asst. Prof.	Instructor/ Lecturer
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.

III. Nature of the Problem/Challenge

A. Social-organizational features of work

→ **Why important:**

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

B. Data

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

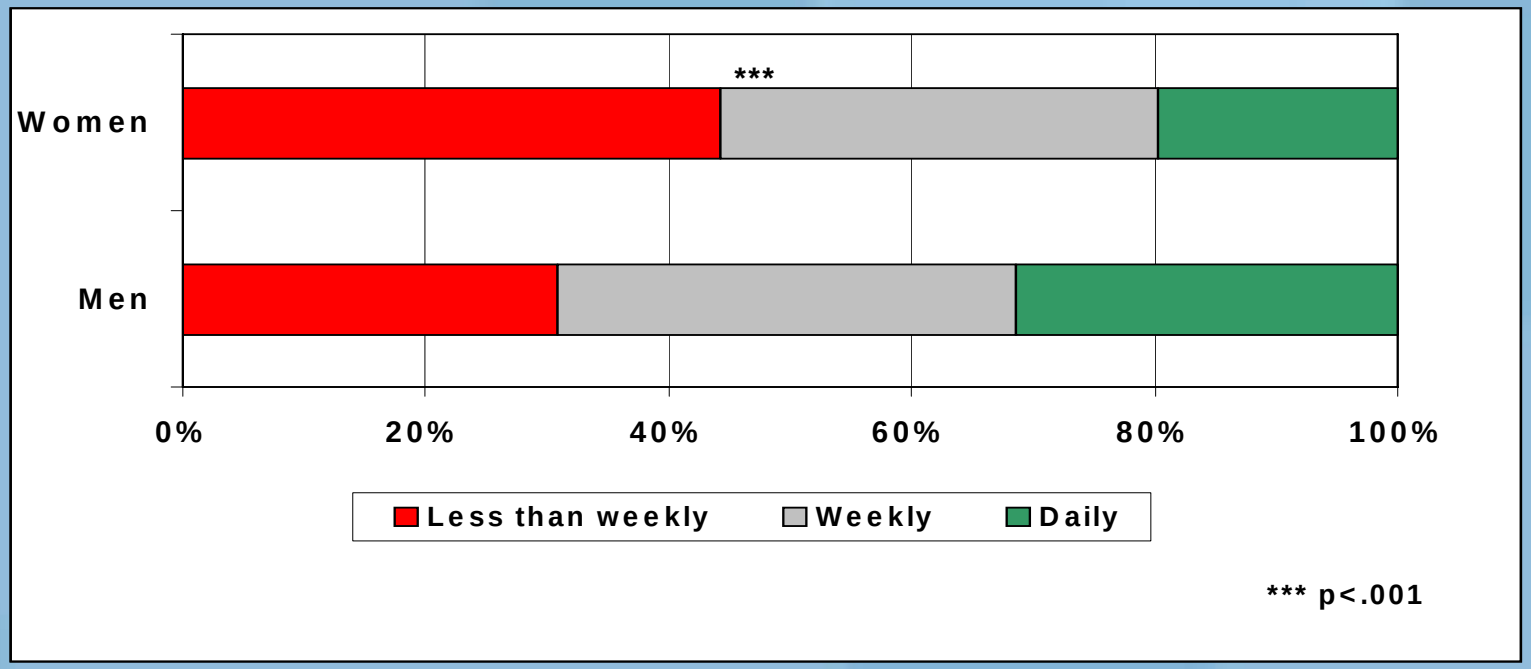
-Stratified random sample of men
-Population of women (except sampling in biology and psychology)
-Response rate: 66.2%
-Respondents (N=764): 427 men; 337 women

C. Four Telling Areas – reflecting social-organizational features of work

1. Frequency of Speaking about Research

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

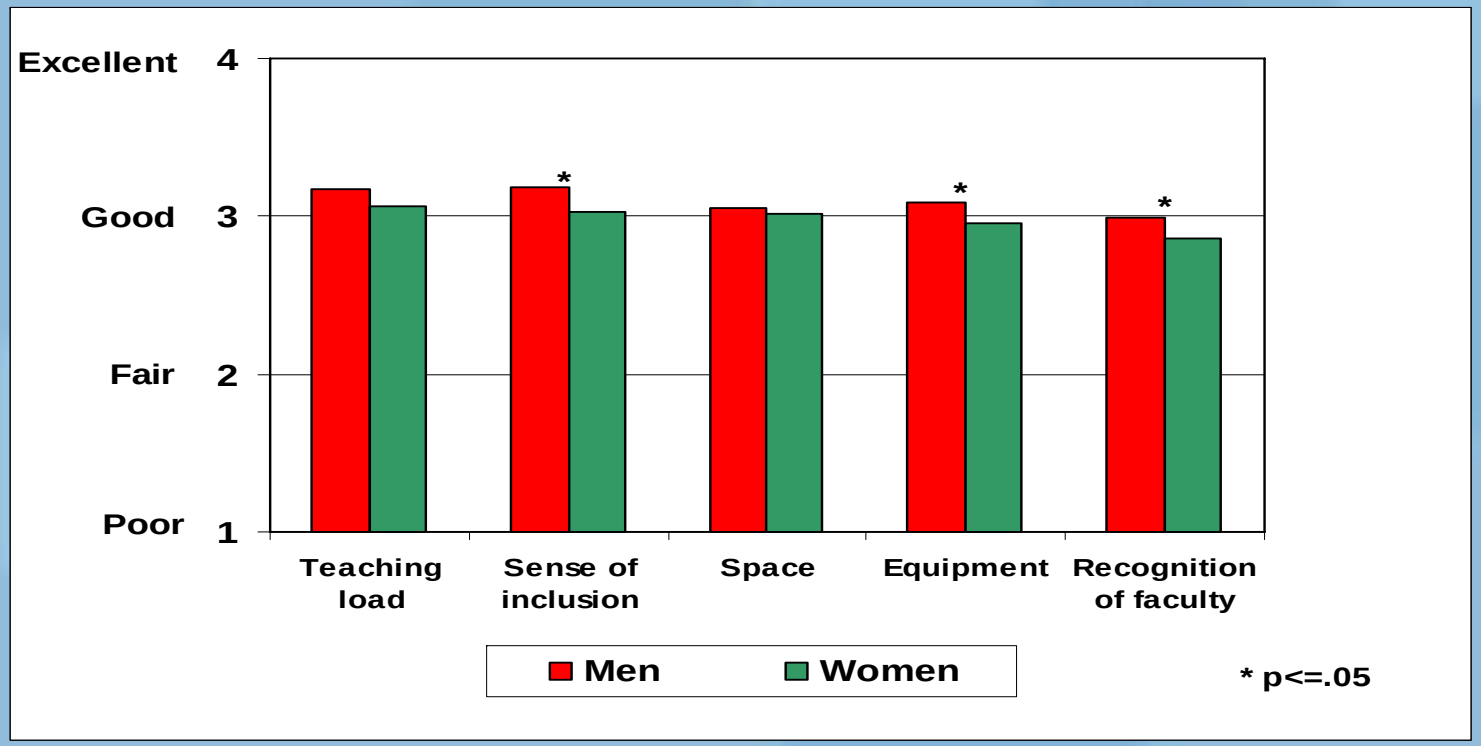
Figure 1. Frequency of Speaking about Research with Faculty in Home Unit, by Gender



2. Ratings of Aspects of Position/Unit

→ **Why Important:** Issues of human and material resources.

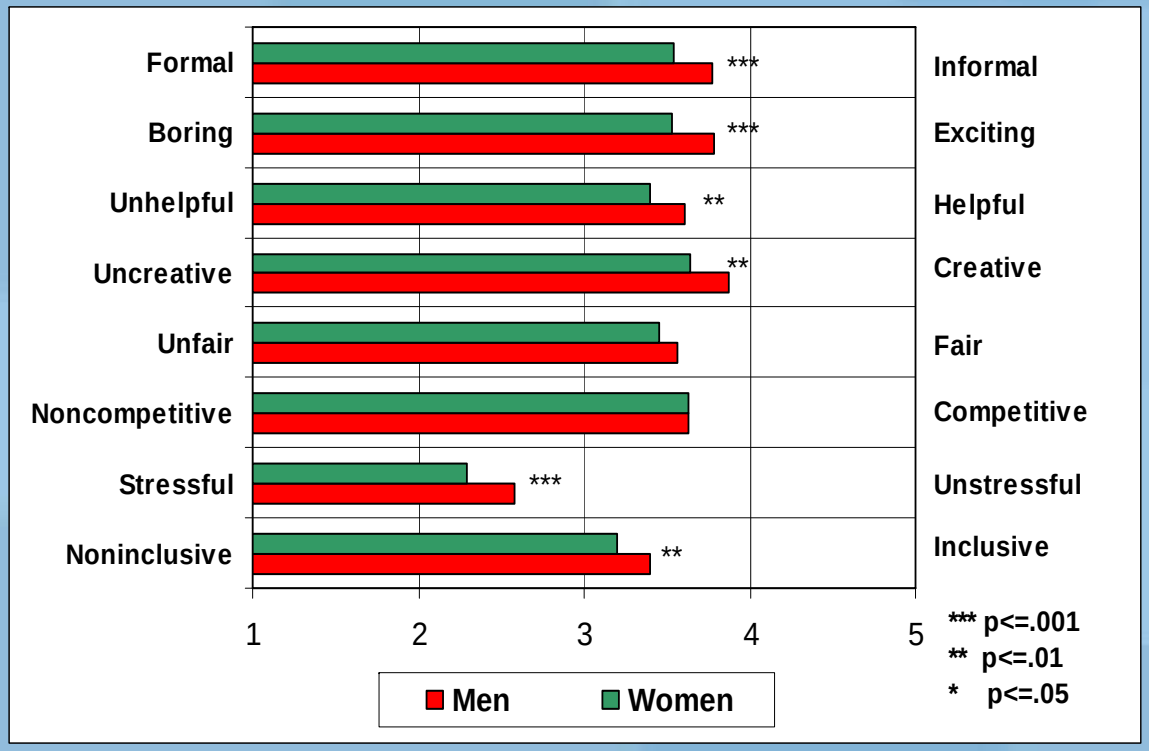
Figure 2. Rating of Aspects of Position/Unit, by Gender



3. Characterizations of home unit

→ **Why Important:** Dimensions of departmental climate as "experienced" and reported by faculty.

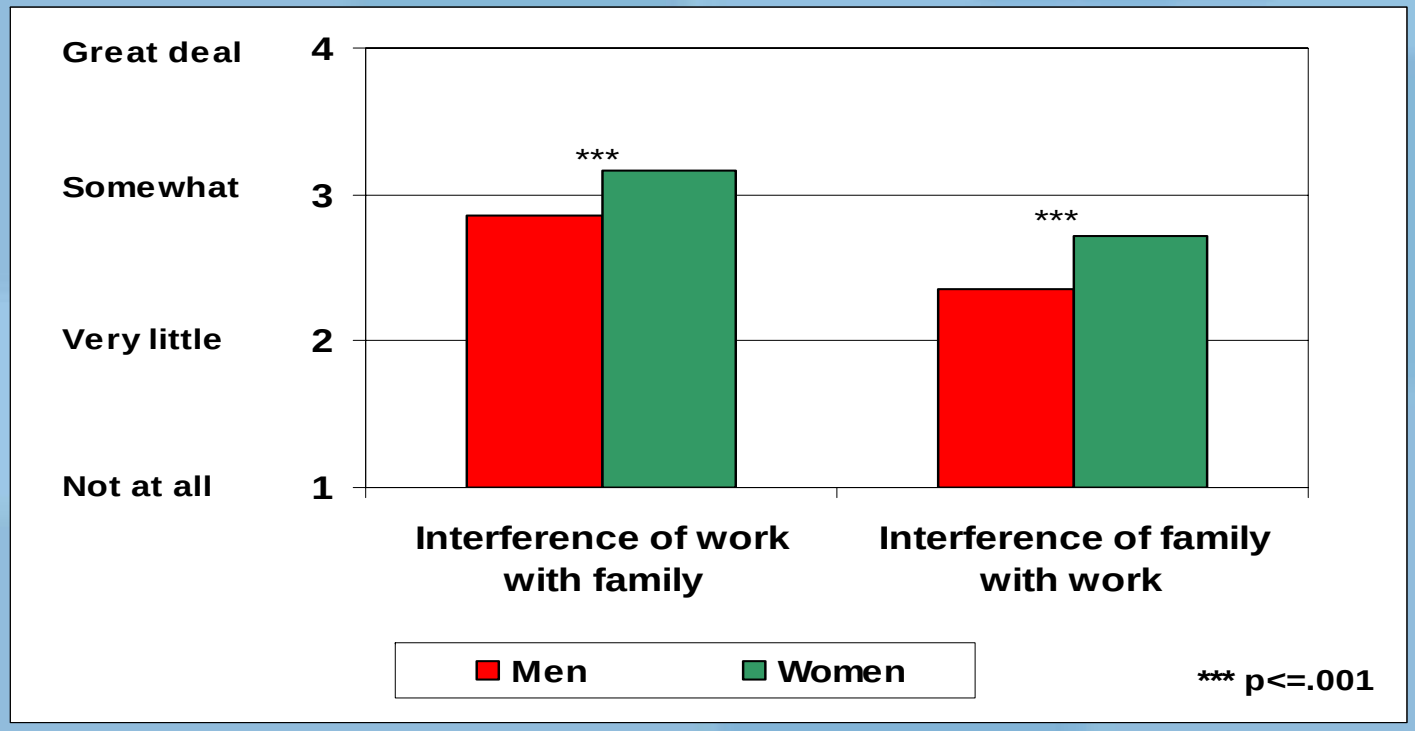
Figure 3. Characterizations of Home Department, by Gender



4. Work-Family Interference

→ **Why Important:** Family and work are "greedy"–and often competing–institutions.

Figure 4. Reported Extent of Interference-Work and Family Responsibilities, by Gender



IV. Solutions – toward sustained participation and status of women faculty in science and engineering

- The challenge and opportunity include understanding and addressing organizational practices and policies –for examples:

  - patterns of communication and exchange
  - resources and rewards
  - departmental climates
  - work-family policies and practices.

- Solutions for equity lie in the settings, structures, and compositions of the places in which people work (and have been educated) (Fox, 2001, 2006, 2008).

→ Just as organizations are structured, so they can be re-structured.