

# **Commission on Professionals in Science and Technology**

## **Data Sources: Minorities and Non- Minorities in Academia**

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Program for Research on Gender in Science and Engineering

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# Acronyms

■ Science

■ Technology

■ Engineering

■ Mathematics

■ Under

■ Represented

■ Minorities

Includes: African Americans,  
American Indians, Alaska  
Natives, and Hispanics

# Research Questions

## Sloan Project

- 1. Is the representation of minorities (African Americans, Hispanics, Native Americans) in postdoctorate positions and/or assistant professor positions (depending upon discipline) in the natural sciences, mathematics and engineering lower, higher or about the same as their representation in the relevant pool, i.e. the recent Ph.D. recipients or postdoctorates?**
- 2. Are minority postdoctorates distributed similarly as all students across departments of varying quality, or are they concentrated in top, middle or lower ranked departments?**
- 3. Is the representation of minorities in faculty positions at various levels lower, higher or about the same as their representation in the relevant pools? The relevant pools for full Professors would be Associate Professors, for Associate Professors would be Assistant Professors, and for Assistant Professors would be either post-docs or recent Ph.D. recipients, depending on the field.**

# Research questions, cont'd.

- (4) Are minority faculty at each level distributed the same as all faculty across departments of varying quality or do they tend to be concentrated at the top or in the middle or at the lower ranked departments?
- *(5) Are the loss rates at critical transitions on the pathway to and within the faculty higher or lower or about the same for minority individuals as for all others? These critical transitions include from PhD to postdoc or faculty, from postdoc to faculty, from other employment sectors (i.e. industry) to faculty, and from Assistant to Associate to full Professor? And does it matter where the individual comes from – i.e. a preference for high ranking institutions that is different for minorities than for all? And does it matter where the individual works – i.e. at a high ranking institution or institutions of different types (see Q4) that is different for URM minorities than for non-Hispanic white faculty?*

## Sources of data: National Science Foundation

- Survey of Doctorate Recipients
- Survey of Earned Doctorates
- NCES IPEDS Completions Survey

# Sources of data: National Science Foundation

- Survey of Doctorate Recipients
  - NSF publication: *Science and Engineering Indicators* series.
  - Population: holders of U.S. science, health or engineering doctoral degrees who are in the United States
- Survey of Earned Doctorates
  - Annual NSF survey with >90% response rate
  - Population: recipients of doctoral degrees in all fields at U.S. colleges and universities

# Other Sources of Faculty Data

- Nelson Diversity Surveys
  - “Top 50” and “Tier 2” departments based on NSF expenditures data, FY2002
  - Engineering: electrical, mechanical, chemical and civil
  - Natural Sciences: astronomy (top 40), biology, chemistry, computer science, earth science, math and statistics, physics.
  - Social Sciences: economics, political science, psychology and sociology.
  - Reports by department head/chair or other person in department.
- National Center for Education Statistics: National Study of Postsecondary Faculty
  - Populations: all U.S. institutions of higher education and all faculty and instructional staff at those institutions
    - 1,080 institutions (86% response rate)
    - 35,000 faculty and instructional staff (76% response rate)

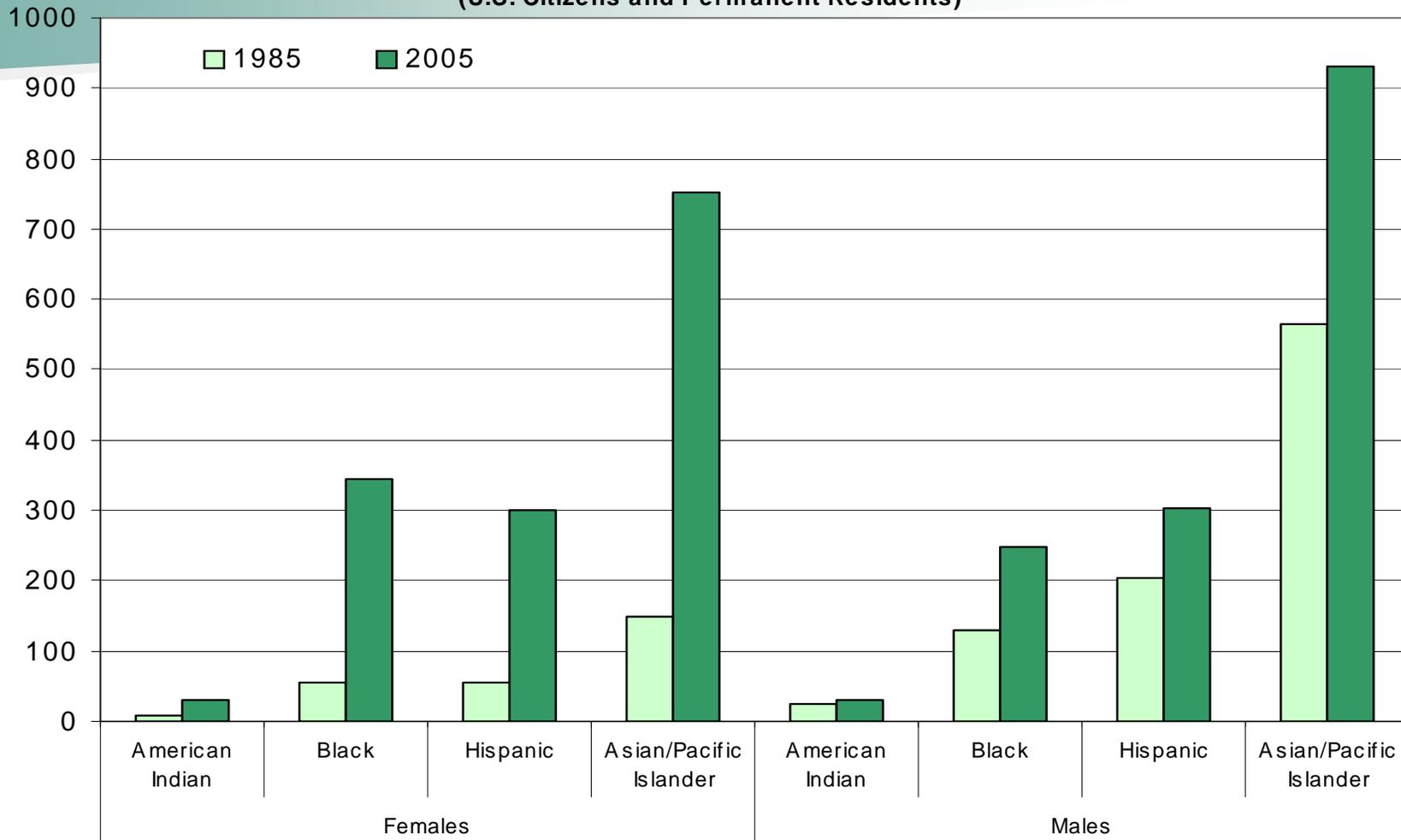
# NSoPF is a Larger Faculty Universe than NSF or Nelson

- 2-year and community colleges
- Non-U.S. doctoral degrees
- Degrees below the doctorate

# Disciplinary Society Surveys

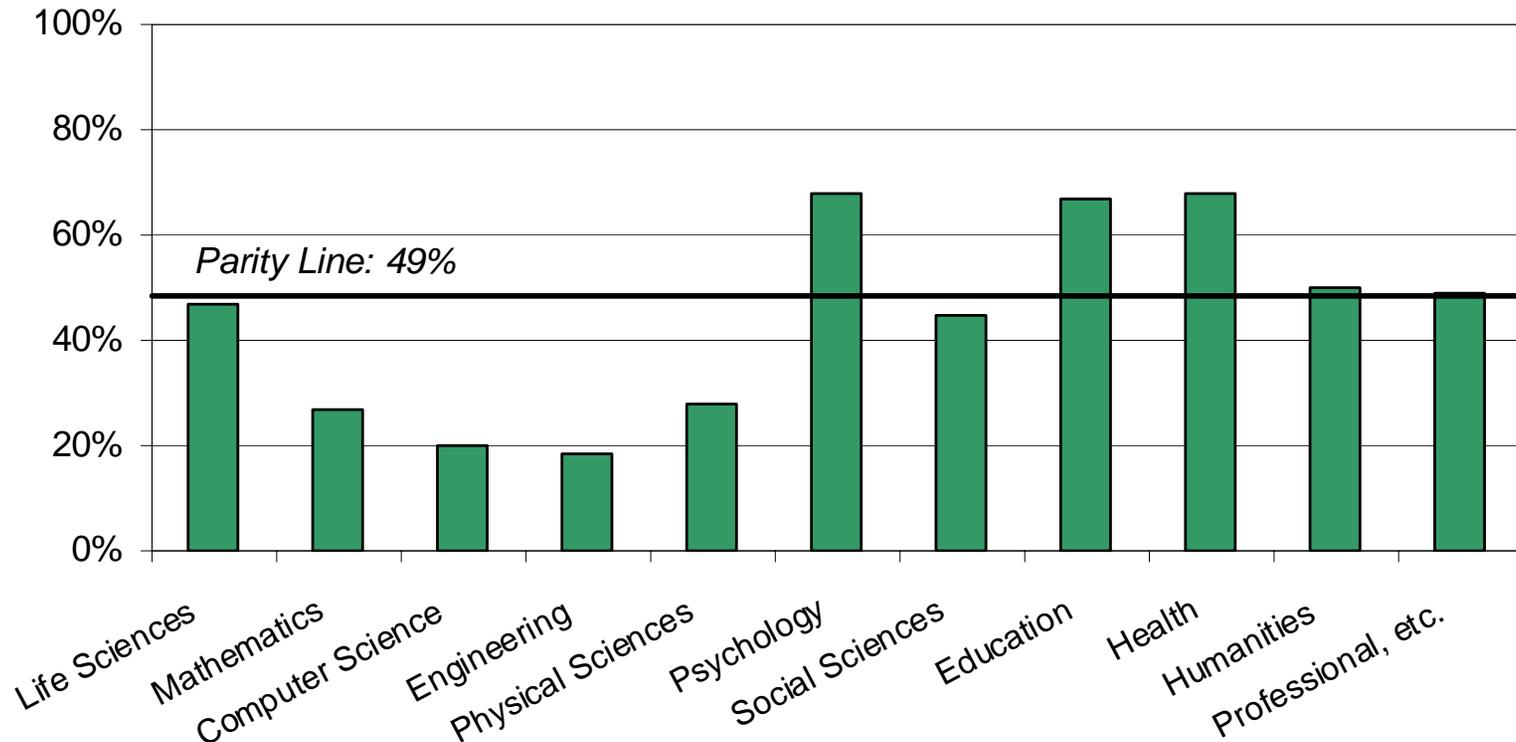
- Computing Research Association (Taulbee Survey)
  - Annual
  - Doctoral departments of computer science in the U.S. and Canada
- American Society for Engineering Education
  - Annual
  - All engineering departments
- AMS – in conjunction with several other mathematics societies
  - Survey of doctoral departments in math and statistics
  - Surveys of all mathematics departments
- American Institute of Physics
  - Every two years
  - Departments of physics and astronomy
  - 2004: collected data about faculty by ethnicity
  - 2006: collected data about faculty by gender
- American Chemical Society
  - Chem Census
  - Every 5 years

**Number of Natural Science and Engineering Doctorates  
Awarded by Gender and Ethnicity  
(U.S. Citizens and Permanent Residents)**



# Women's representation among doctoral recipients varies across fields

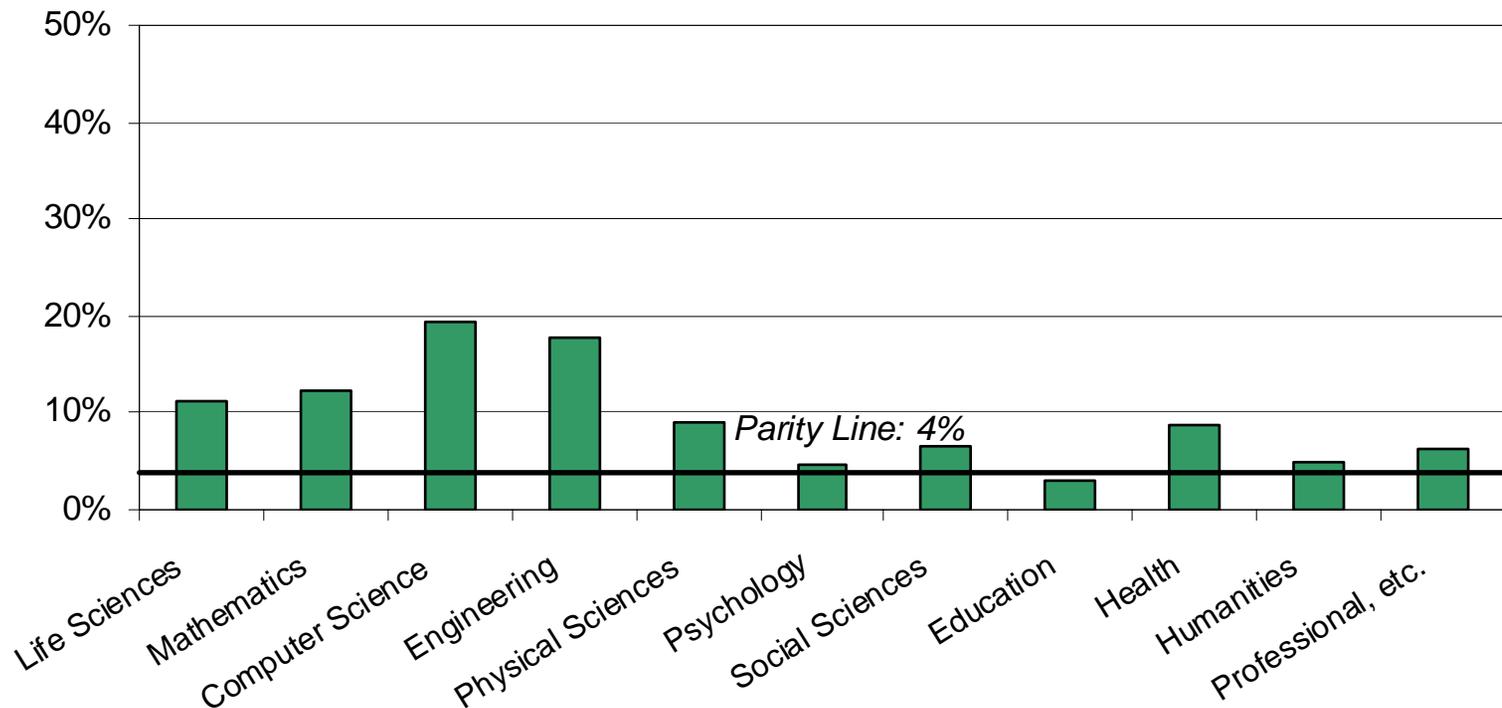
Percent Female Among Doctorate Recipients, 2005



Source: *NSF Science and Engineering Doctorate Awards: 2005*. "Professional, etc." includes professional, unknown, and other.

Asian/Pacific Islanders are under represented only in Education – at or above parity in all other doctoral fields.

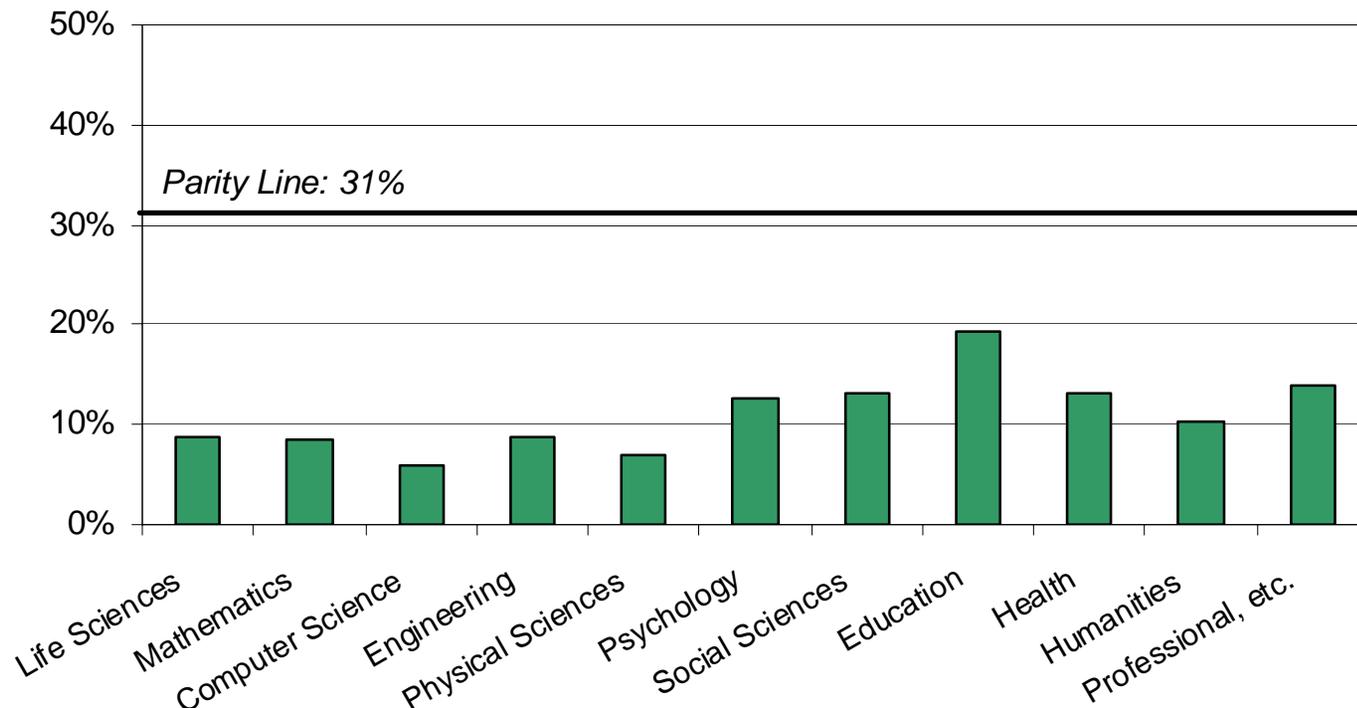
**Percent Asian/Pacific Islanders Among Doctorate Recipients,  
U.S. Citizens and Permanent Residents, 2005**



Source: NSF Science and Engineering Doctorate Awards: 2005. "Professional, etc." includes professional, unknown, and other.

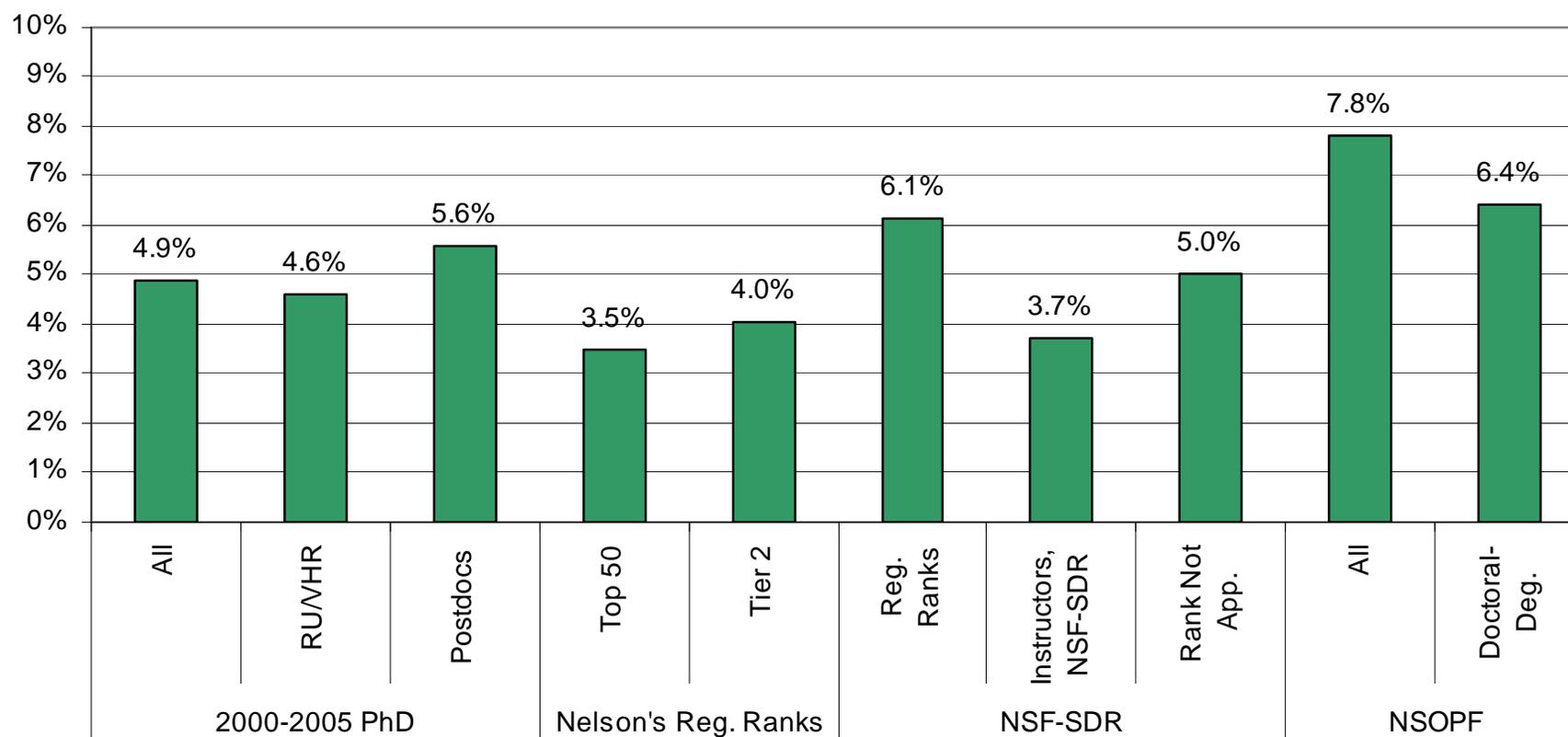
# African Americans, American Indians, and Latinos/as are highly underrepresented among doctorate recipients

**Percent URM Among Doctorate Recipients, U.S. Citizens and Permanent Residents, 2005**



Source: *NSF Science and Engineering Doctorate Awards: 2005*. "Professional, etc." includes professional, unknown, and other. URM includes African American, Hispanic, and American Indian.

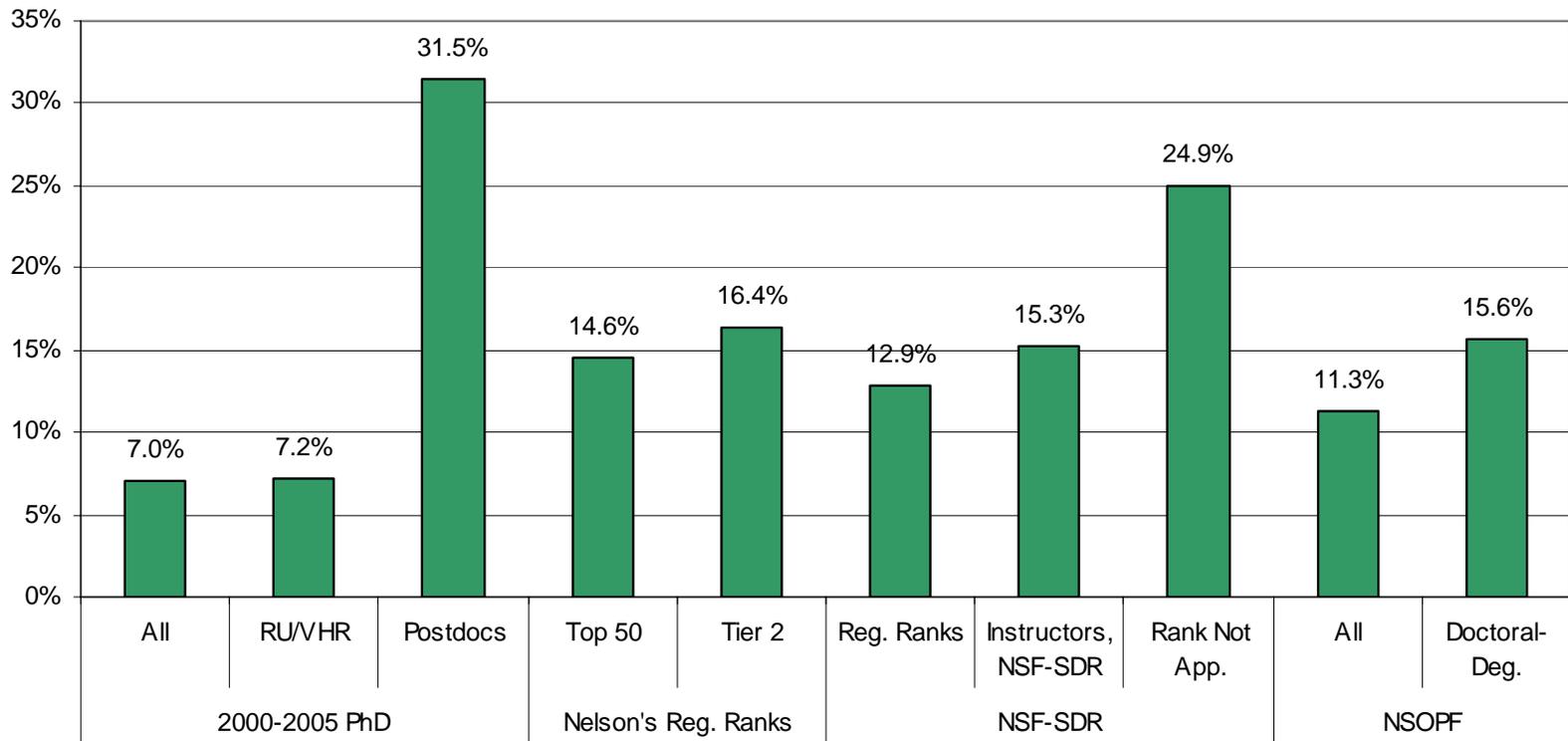
# Under Represented Minorities in Academic Positions



Sources: 2000-2005 PhD data from NORC analysis of SED data, RU/VHR refers to institutions classified by the Carnegie Foundation as Research Universities-Very High Research Activity under the 2006 guidelines; "Top 50" and "Tier 2" are from "Nelson Diversity Surveys" with "Top" departments defined by FY2002 research expenditures reported by NSF and data collected in 2005. "NSF-SDR" data are 2003 data from NSF's Science and Engineering Indicators, 2006 Table H-25. "Reg. Ranks" are faculty categorized as "Full," "Associate," or "Assistant" professor.



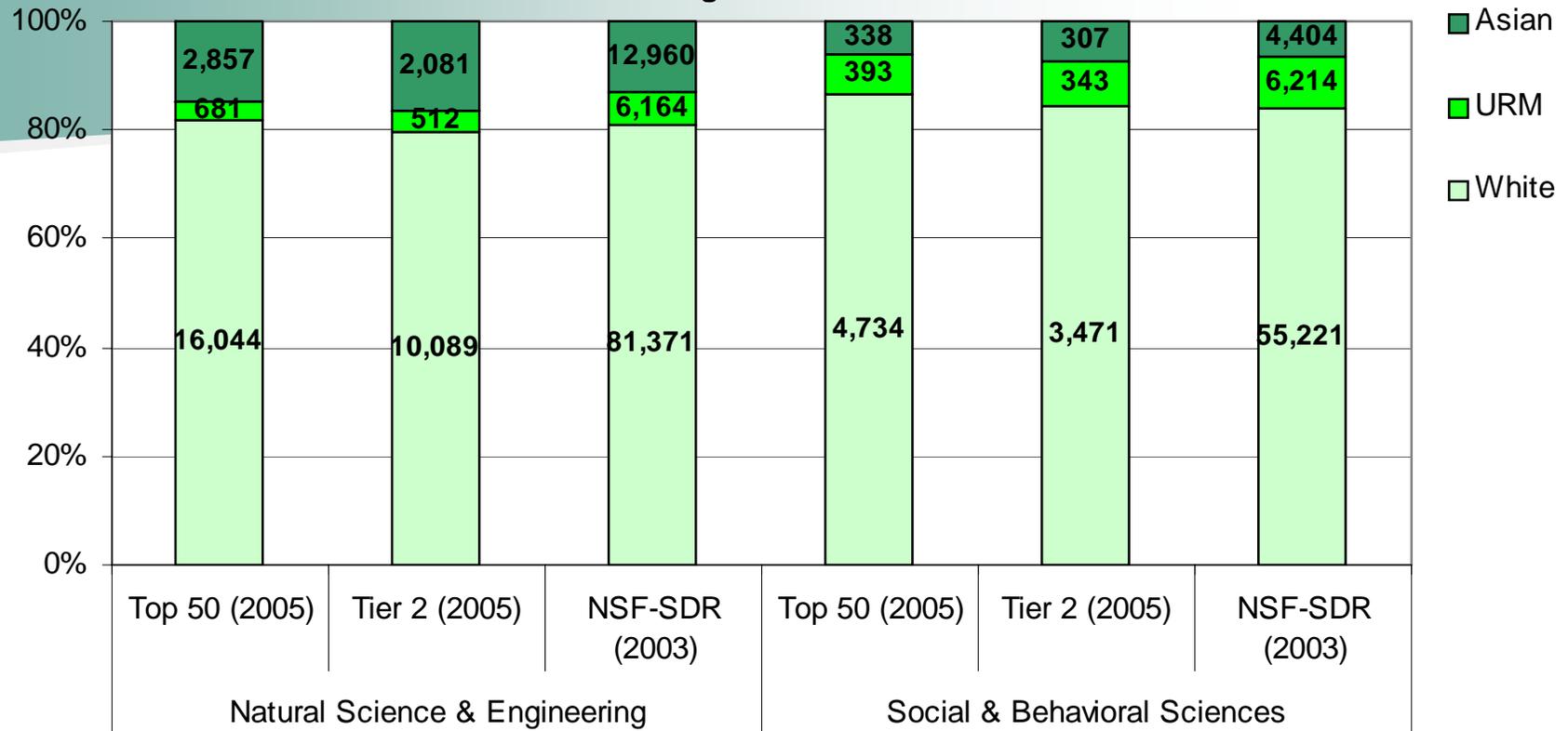
# Asians in Academic Positions



Sources: 2000-2005 PhD data from NORC analysis of SED data, RU/VHR refers to institutions classified by the Carnegie Foundation as Research Universities-Very High Research Activity under the 2006 guidelines; "Top 50" and "Tier 2" are from "Nelson Diversity Surveys" with "Top" departments defined by FY2002 research expenditures reported by NSF with data collected in 2005. "NSF-SDR" 2003 data are from NSF's Science and Engineering Indicators, 2006 Table H-25. "Reg. Ranks" are faculty categorized as "Full," "Associate," or "Assistant" professor. NSOPF are 2004 data.



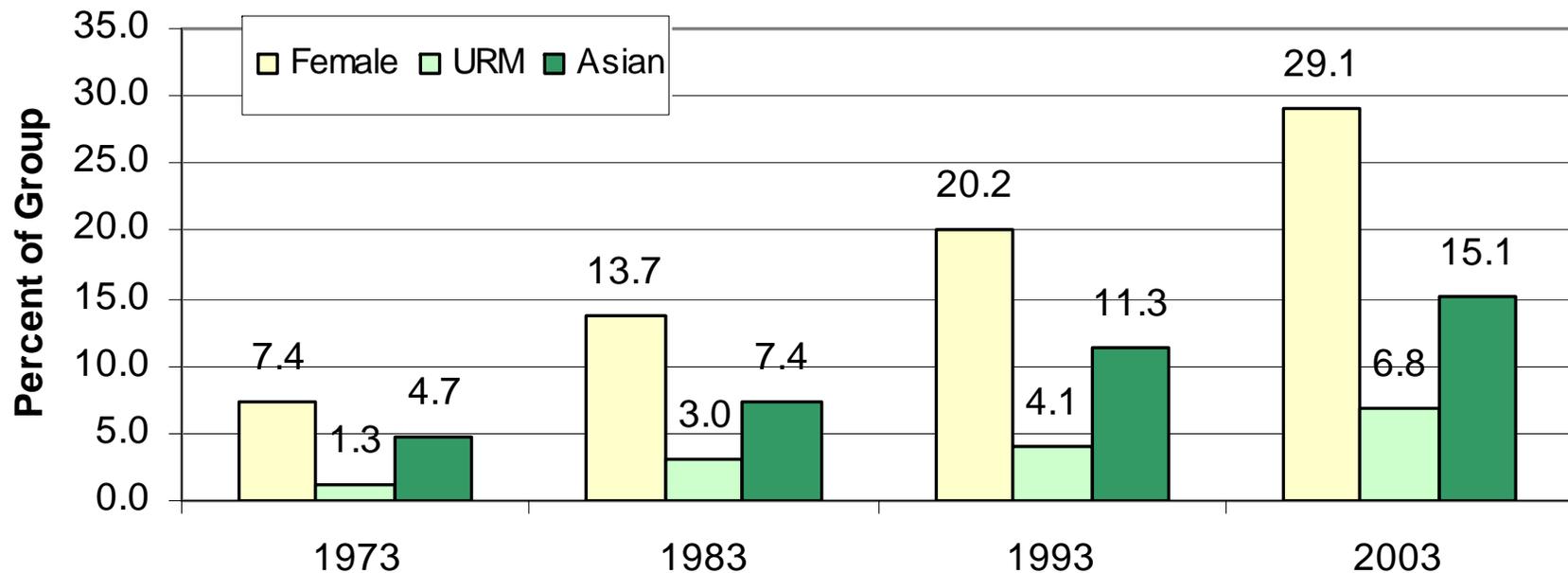
## Relative Representation of Faculty by Ethnicity 4-Year Colleges and Universities



Sources: "Top 50" and "Tier 2" are from "Nelson Diversity Surveys" with "Top" departments defined by FY2002 research expenditures reported by NSF. "NSF-SDR" data are from NSF's Science and Engineering Indicators, 2006 Table H-25. Only faculty categorized as "Full," "Associate," or "Assistant" professor are included.

# Representation of women, under represented minorities and Asian/Pacific Islanders has increased at Carnegie Research Universities

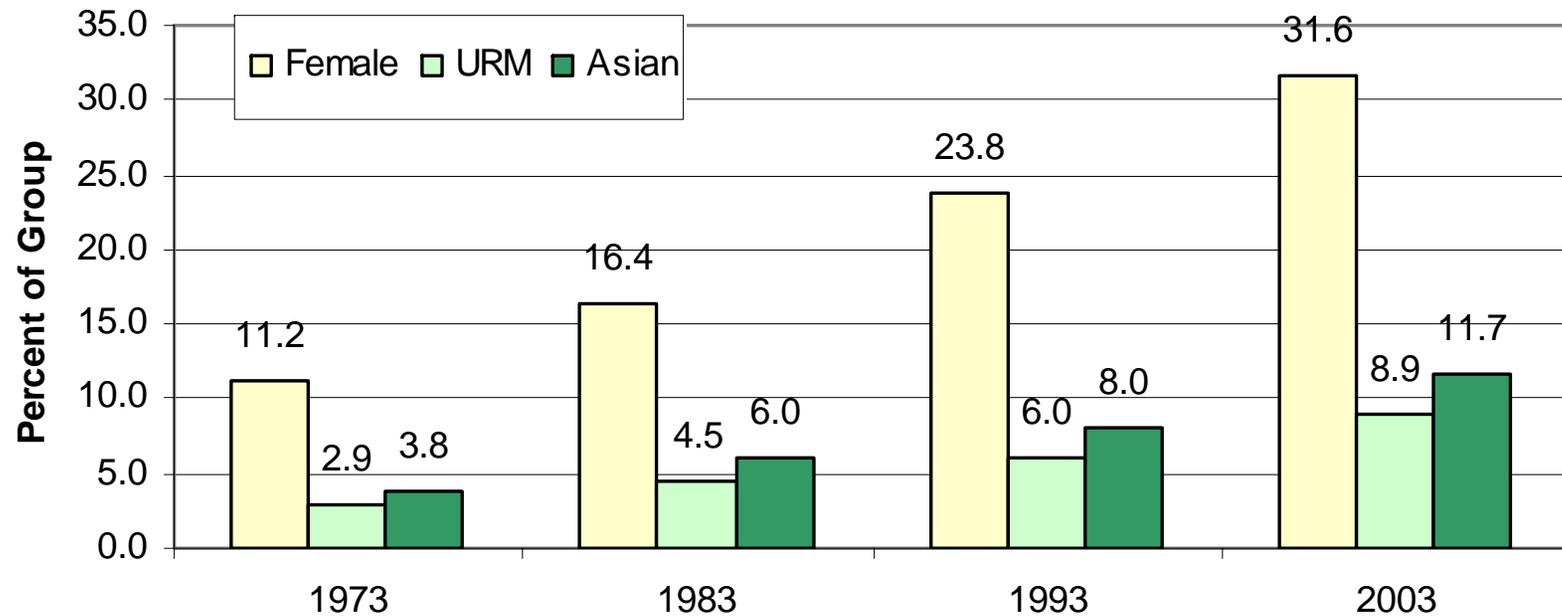
**Representation of Selected S&E Doctorate Degree Holders as Faculty at U.S. Research Universities**



Source: CPST analysis of National Science Foundation data reported in *Science and Engineering Indicators 2006*

# Representation of women, under represented minorities and Asian/Pacific Islanders has also increased at “other institutions”

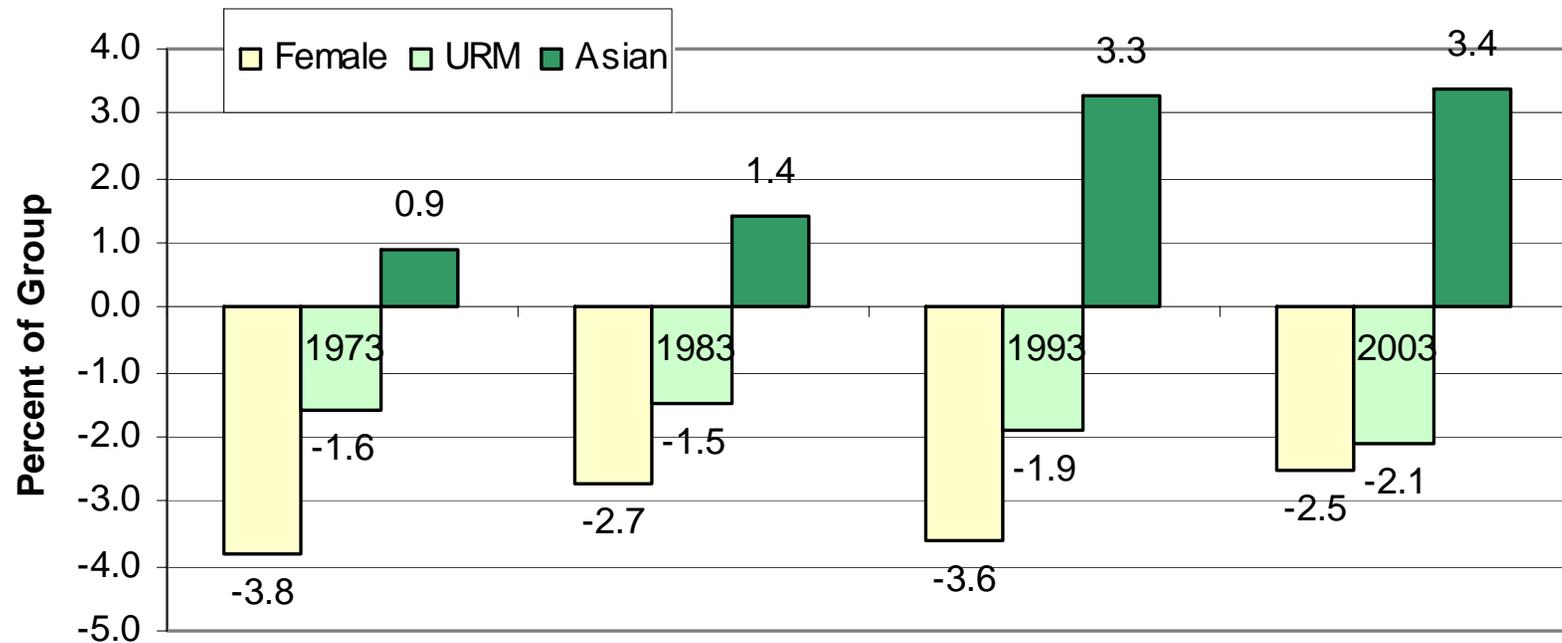
**Representation of Selected S&E Doctorate Degree Holders as Faculty at U.S. Academic Institutions, Non-Research**



Source: CPST analysis of National Science Foundation data reported in *Science and Engineering Indicators 2006*

Women and under represented minorities are more likely to be at “other” institutions while Asian/Pacific Islanders are more likely to be at research universities

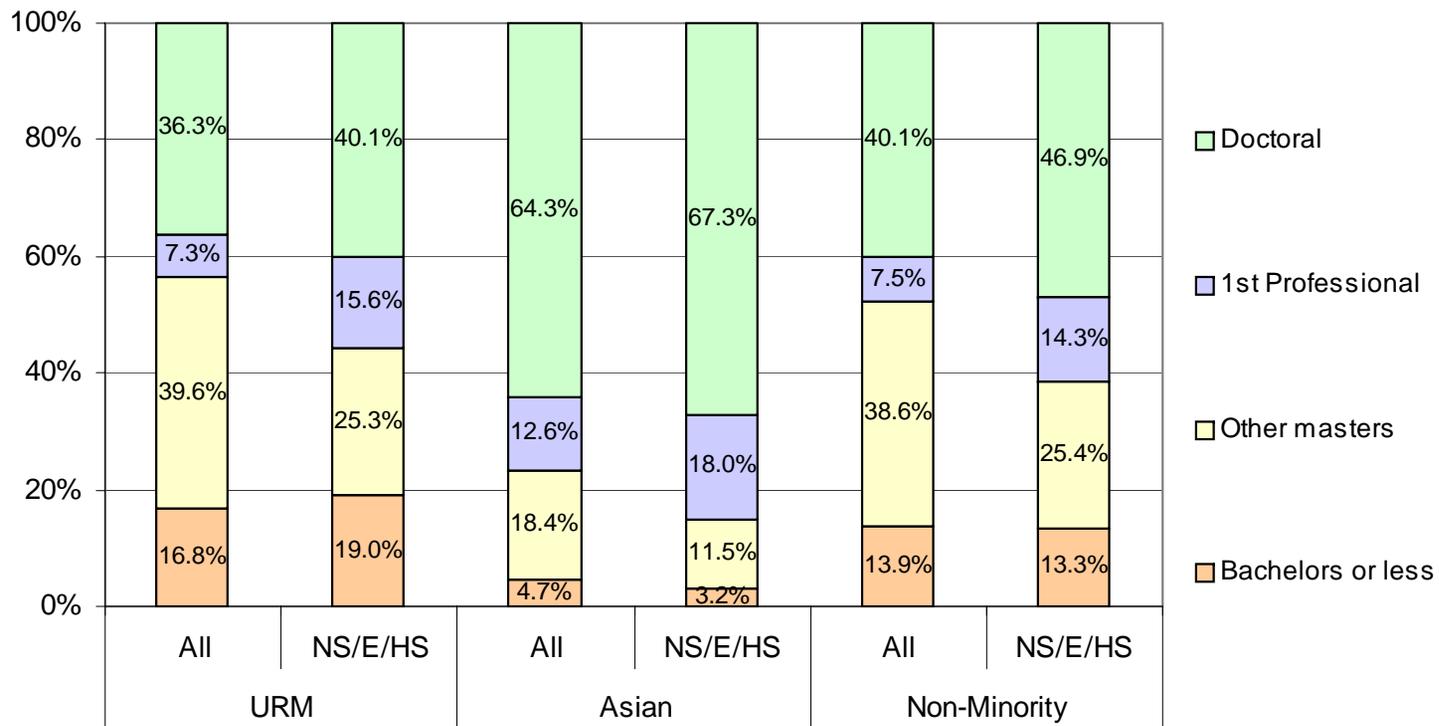
**Gap in Representation of Selected S&E Doctorate Degree Holders as Faculty at U.S. Research vs. Other Academic Institutions**



Source: CPST analysis of National Science Foundation data reported in *Science and Engineering Indicators 2006*

Natural science and engineering faculty are more likely to hold doctoral degrees. Asian faculty are most likely to hold doctoral degrees.

**Highest Degree of Faculty by Ethnicity and Field, NSoPF 2004  
Weighted Analysis**

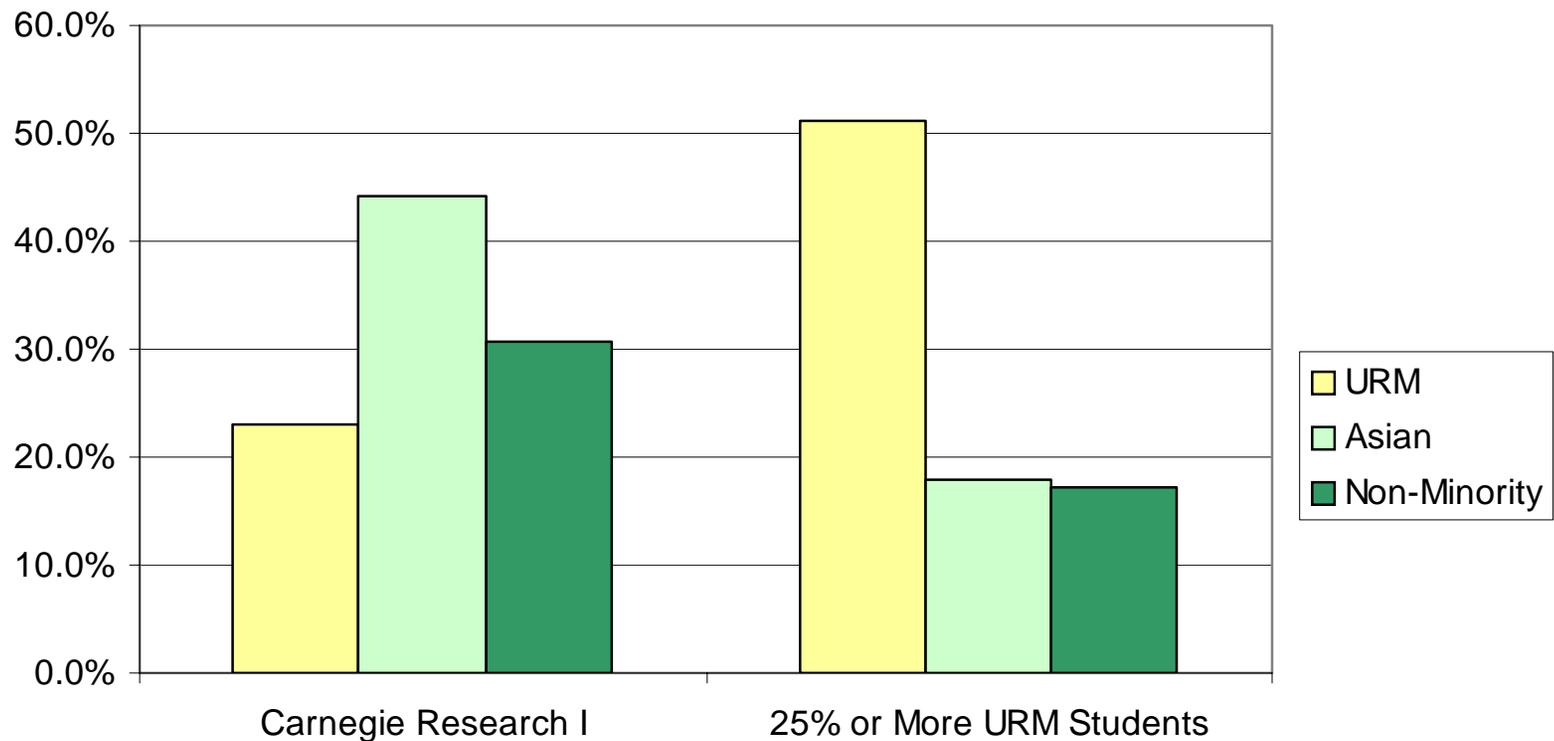


Source: CPST analysis of National Study of Postsecondary Faculty, 2004. "NS/E/HS" refers to the natural sciences, engineering and health sciences.



URM faculty are less likely to be at Carnegie R1s than Asian or Non-Minority faculty and more likely at schools that serve URM students.

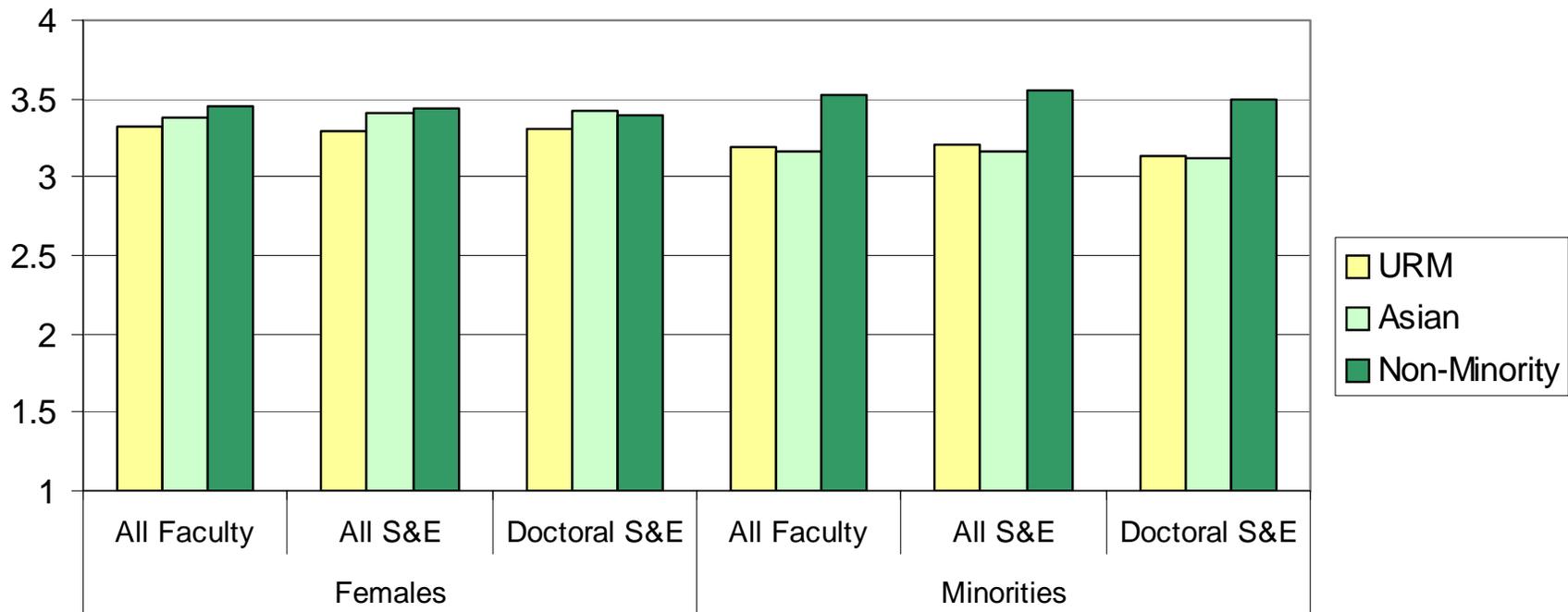
**Characteristics of Current Institution, All S&E Faculty by Ethnicity**



Source: CPST analysis of NSOPF 2004 weighted data. S&E includes natural, physical, and health sciences and engineering.

Most faculty agree that females are treated fairly but URM and Asian faculty are less likely than Non-Minority faculty to agree that minorities are treated fairly.

**Mean Agreement That Group is Treated Fairly, by Respondents' Ethnicity**  
 1 = Strongly Disagree to 4 = Strongly Agree



Source: CPST analysis of NSOPF 2004 weighted data. S&E includes natural, physical, and health sciences and engineering.

# Thanks!

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