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Effective Strategies to Diversify STEM Faculty

Your name here

Your school here



Teams of Faculty Developed Recommendations

- Faculty, administrators and diversity experts from 7 universities worked as teams to evaluate and propose these strategies for use in STEM departments
 - New Mexico State University, University Texas, El Paso, University New Mexico, University Washington, University California Irvine, University Texas, Brownsville, Michigan Tech
 - Colleges of Engineering, Arts & Science, Agriculture & Home Economics
 - Deans, Department Heads/Chairs, Professors
- Process:
 - Spring 2005—Information gathering
 - Summer 2005—Working retreat to develop presentation
 - Fall 2005—Review process



Why Is Diversity Imperative? Academic Administrators' Answers:

- “A matter of national need.”
- “S & E workforce impacts our ability to compete in the global marketplace. All talent is needed.”
- “We cannot afford to lose women and URM* students.”
- “Female and URM faculty will help attract and retain female and URM students.”
- Quality of Education – “diversity of viewpoints and experiences provides a richer educational environment for students and faculty alike.”
- “Diverse teams are more effective problem solvers.”

* **URM:** “under represented minority,” includes **African Americans, American Indians and Alaska Natives, Pacific Islanders, and Latinos/as.**



National Science Foundation Identifies Diversity as a National Need

If our 21st Century science and engineering workforce is not representative of our citizenry, we as a nation will miss the most promising opportunity for continued U.S. success. The loss will cut two ways – it will rob worthy individuals of the chance to enrich their lives and to contribute to the engine of our economy and culture, and it will undermine the ability of our nation to prosper within an increasingly competitive world.

– Joseph Bordogna, former Deputy Director, NSF, September 17, 2003,
Engineering Societies Diversity Summit II.



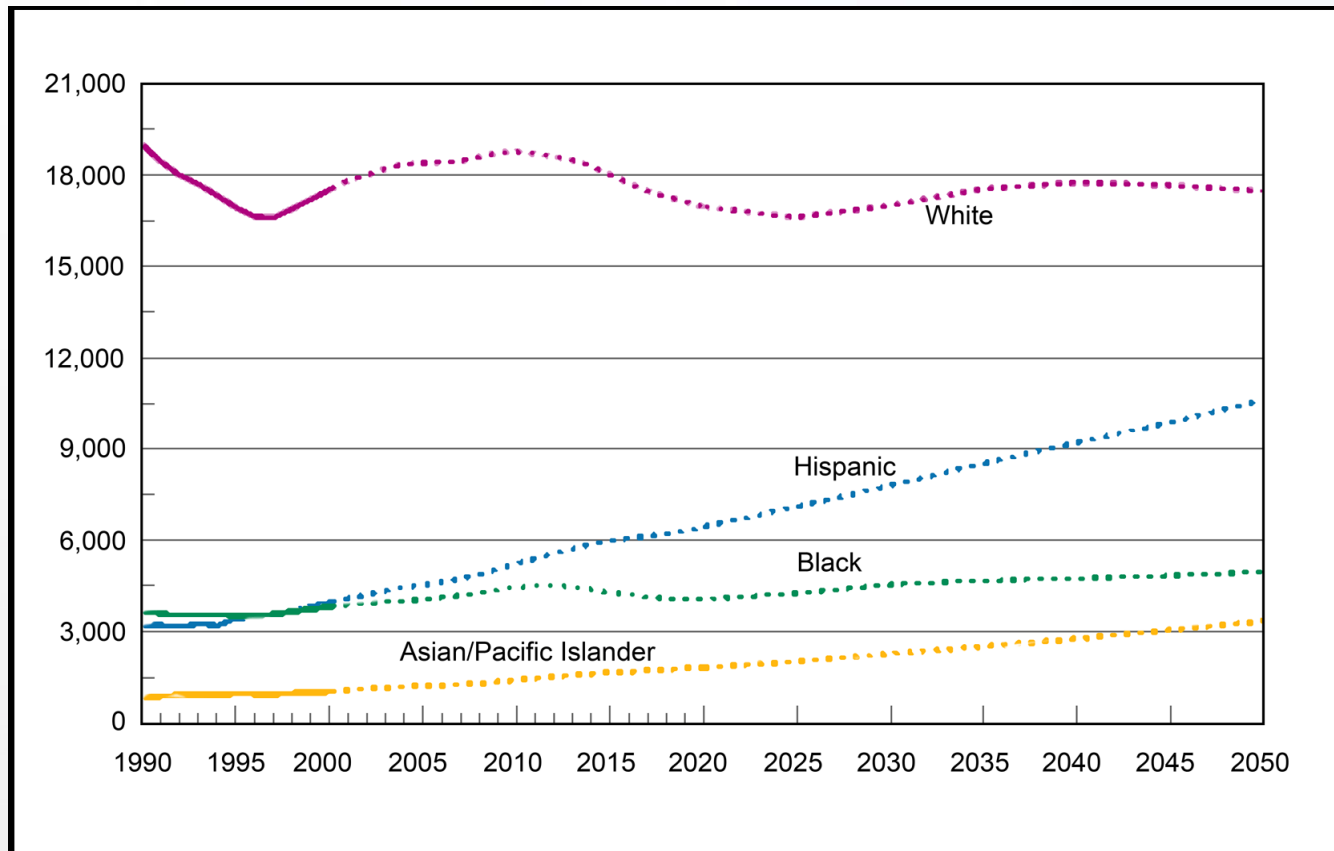
The “Leaky Pipeline”

- Women and URM students are often “lost” along the pipeline.
 - Pipeline transitions: HS→B.S.→M.S.→Ph.D.
 - Hostile climate.
 - Demands of family responsibilities.
 - Lack of role models.
 - First generation to attend college.



Student Population Projected to be 50% URMS by 2050

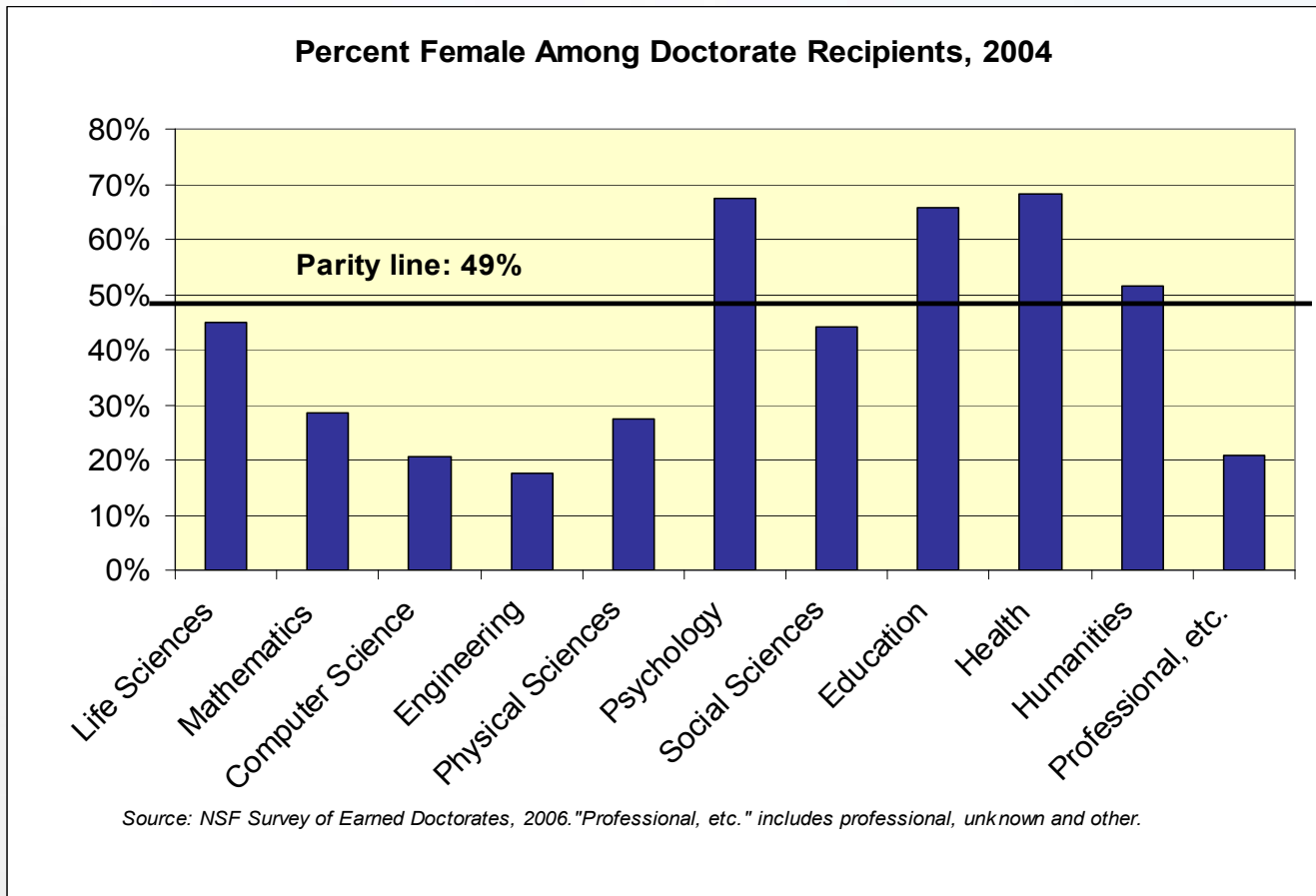
U.S. Population 18-24 Years Old, by Race/Ethnicity: July 1990-99 and Projections to 2050



Source: National Science Foundation, *Women, Minorities and Persons with Disabilities in Science and Engineering*, 2004.

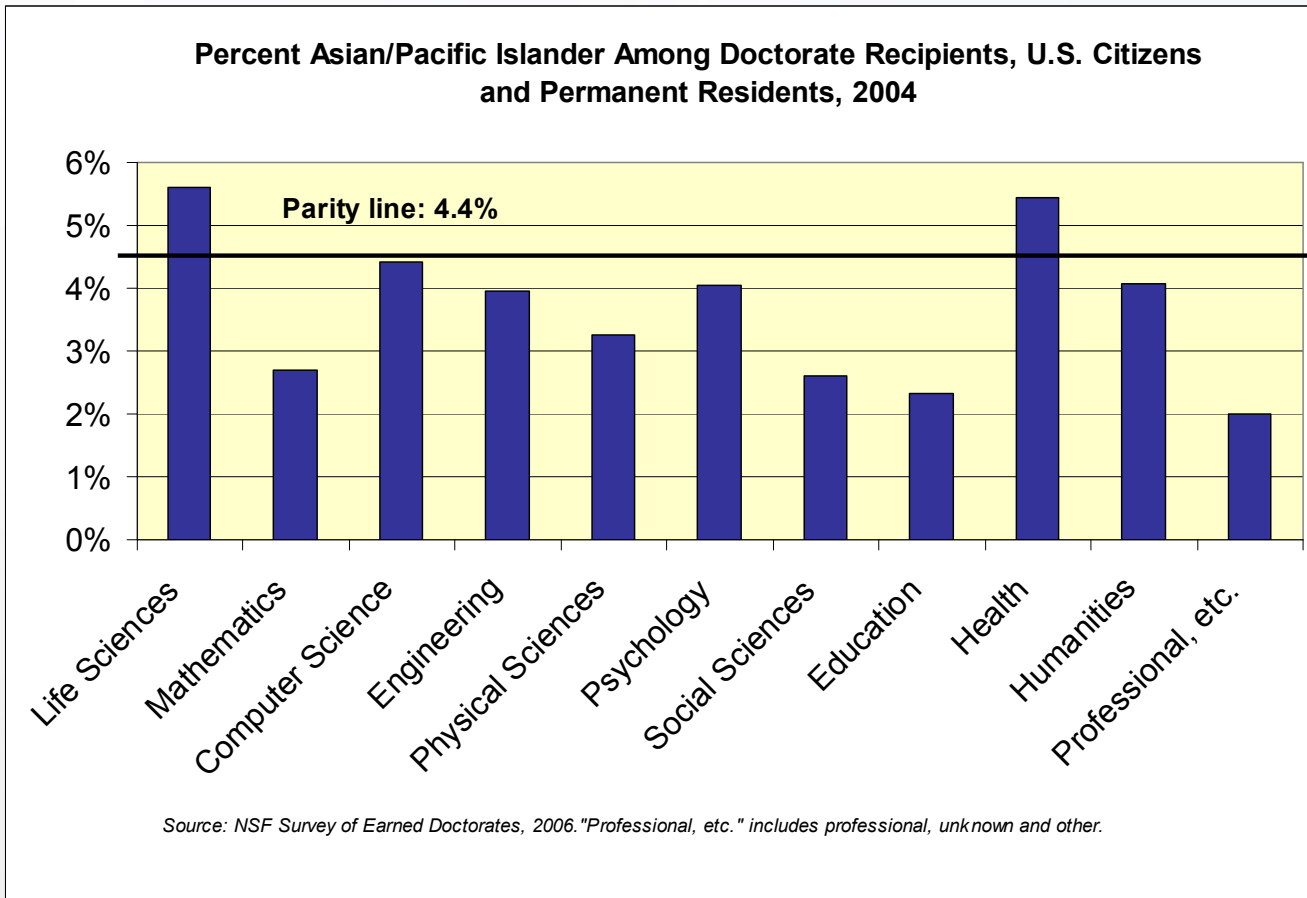


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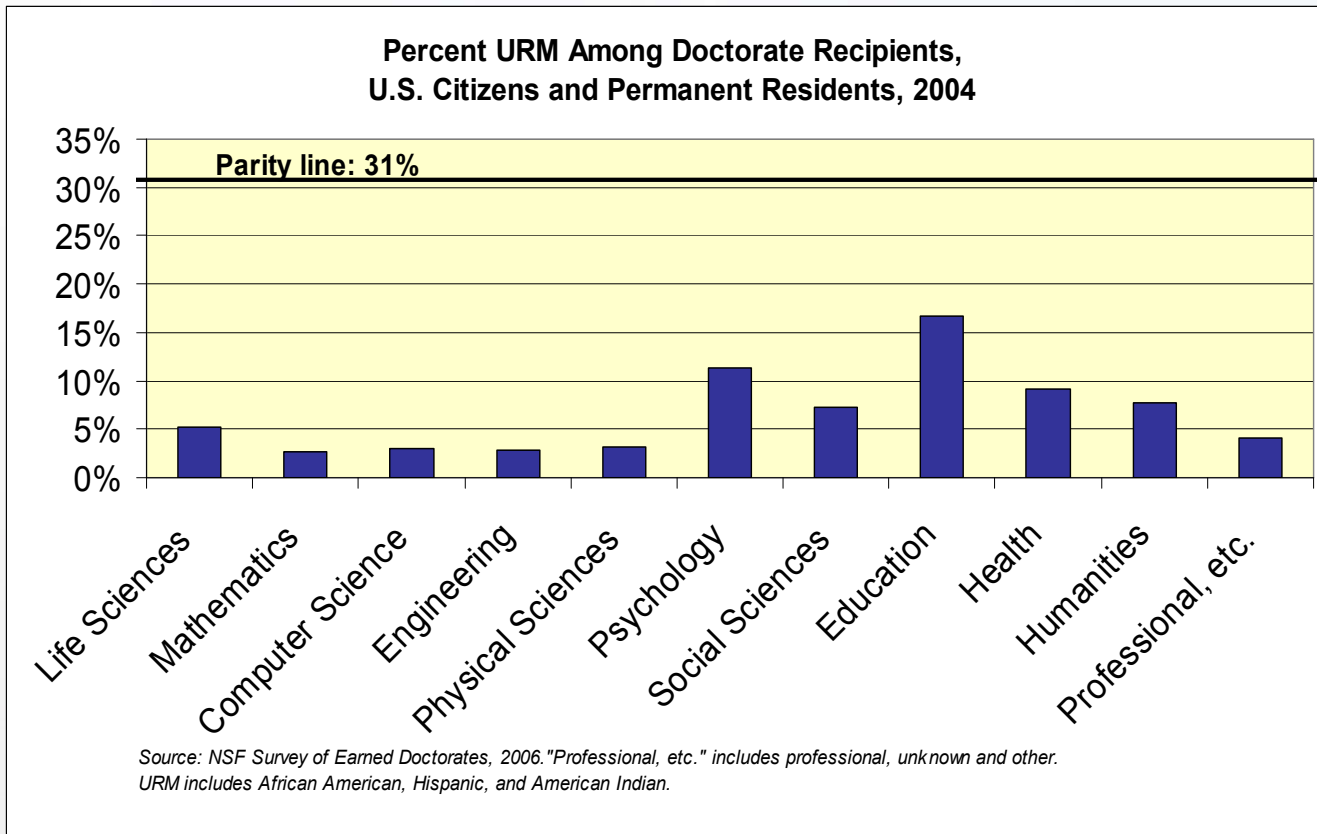


Faculty Diversity





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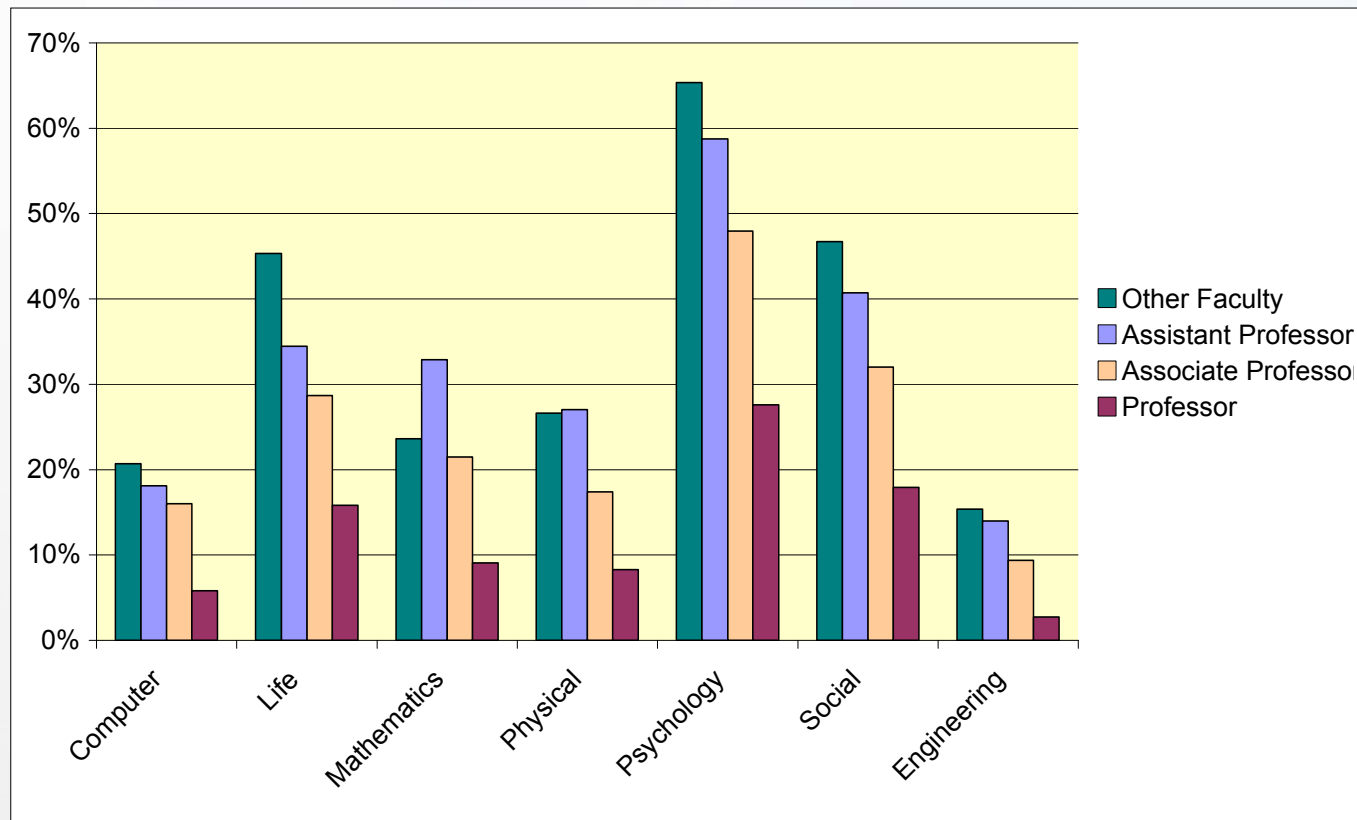


Faculty Diversity

- Discipline-specific “pipeline” bar charts for percent female, URM and Asian/Pacific Islander are available at the end of the slide show.



Women as a Percent of Ph.D.s Employed in Universities & 4-Year Colleges by STEM Field and Rank, 2001



Analysis of original data from: National Science Foundation. *Women, Minorities and Persons with Disabilities in Science and Engineering, 2004.*



Top Ten Rationalizations Participants Have Heard for Not Hiring Women and URM

#10 Women and URM are not interested in academic careers.

#9 There are no “qualified” women and URM.

#8 Women with children are not serious academics.

#7 Women and URM do not apply.

#6 We can't compete for them.

#5 Women and URM are too expensive to hire.

#4 We can't find women or URM that fit our special needs.

#3 Why should we spend more time getting these applicants?

#2 It's too expensive to advertise more widely.

#1 If it ain't broke, why fix it?



Objectivity is Compromised by Unconscious Bias (Cognitive Errors)

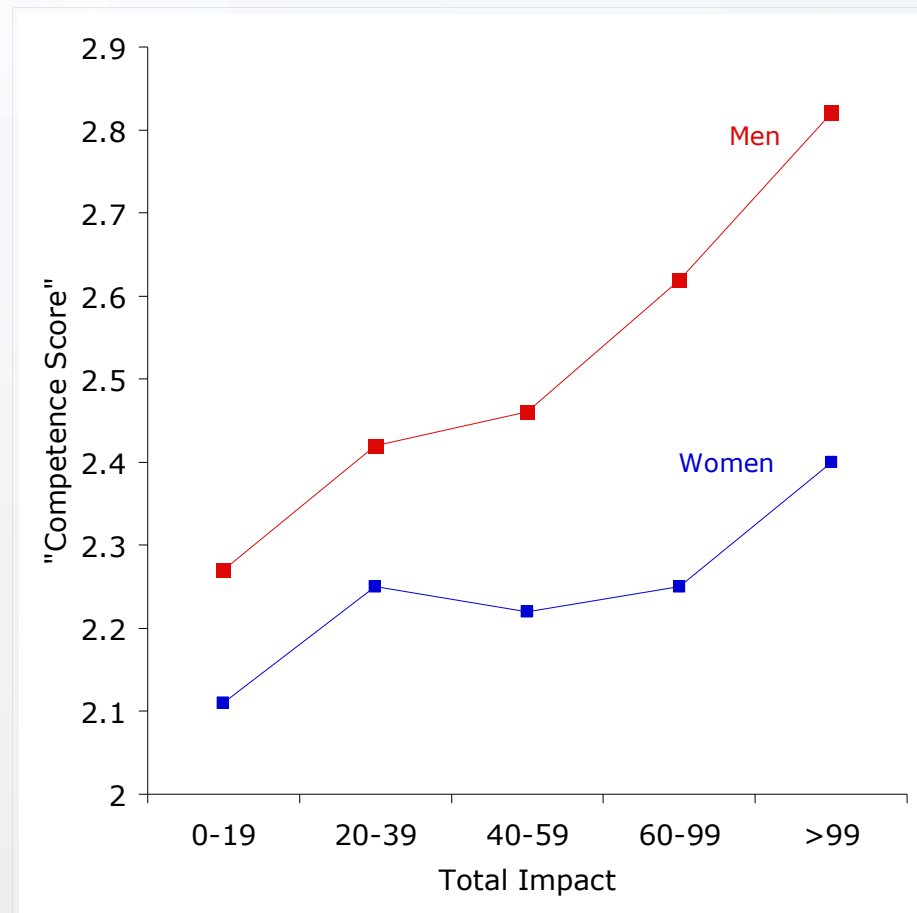
- Peer review process assumed to be objective.
- Unconscious errors.
 - Often unintentional.
 - Everyone makes them.
 - Making decisions quickly is more susceptible to problems due to unconscious bias.
 - Go either way: can be advantage or disadvantage.



Example of Gender Bias

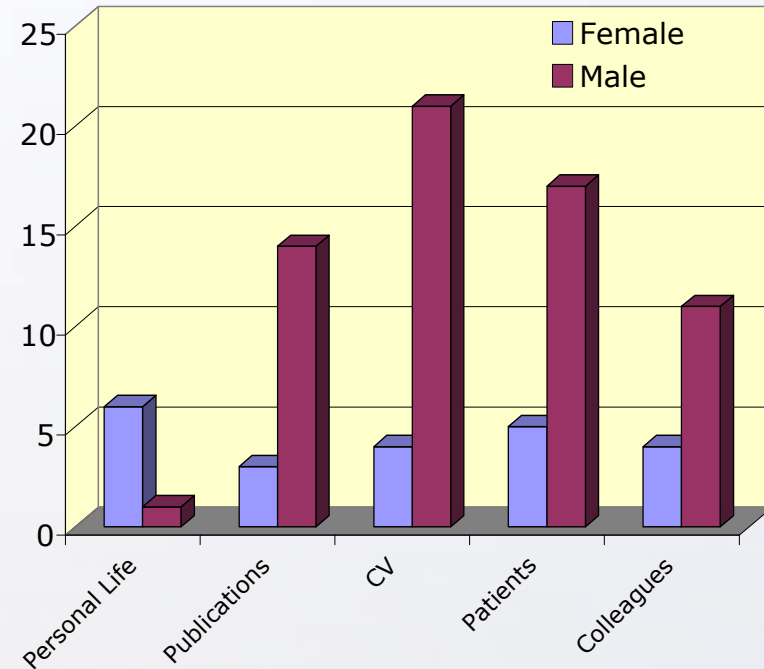
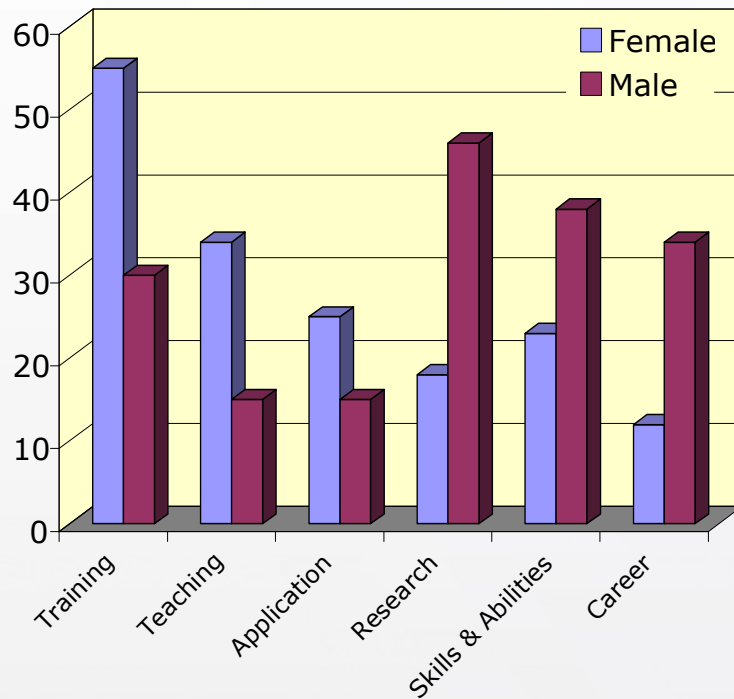
- Study of Swedish Medical Research Council review of post-doctoral fellowship applications.
- Women needed to produce more than 99 “impact factors” to be perceived as competent as men with only 20 impact factors.

*Wennerås & Wold, 1997,
Nature 387:341-343.*





Example of Gender Bias



Trix and Psenka (2003) "Exploring the color of Glass: Letters of Recommendation for Female and Male Medical Faculty" Discourse & Society 14: 191-220.



Consequences of Cognitive Errors (Unconscious Bias)

- First impressions
- Negative/positive stereotyping
- Elitism
- Raising the bar
- Cloning
- Good fit/bad fit
- Provincialism
- Self-fulfilling prophecy
- Premature ranking/digging in
- Wishful thinking: opinions not facts
- Character over context

Adapted from Moody 2005.



Resources for Discovering Personal Biases

- Rising above cognitive errors: guidelines for search, tenure review, and other evaluation committees. Moody (2005).
<http://www.DiversityOnCampus.com>
- ADEPT Tool: interactive case studies in portfolio evaluation developed by the Georgia Tech ADVANCE Program.
<http://www.adept.gatech.edu/download.htm>
- Self Assessment: Implicit associations test.
<https://implicit.harvard.edu/implicit/demo/index.jsp>



How to Effect Change and Promote Diversity

- Establish clear and transparent written guidelines and procedures that minimize cognitive errors.
- Promote diversity and ensure an equitable workplace at every level of the institution.
- Acknowledge that effective hiring and retention will attract individuals that will provide diversity for competitive advantage.

Effective Strategies to Diversify STEM Faculty



Strategies for Effective Hiring



Hiring is a Shared Responsibility

Actions	Participants
Candidate identification	Faculty
Verbal negotiation of salary and start-up	Department chair
Resource allocation	Department chair, dean, other administrators, faculty
Written offer	Dean, EEO, personnel/human resources, etc.



Faculty Actions That Promote Diversity in Recruitment

- **Recruit all the time.**
- Invite diverse speakers to departmental seminar series (who may become future recruits).
- Be proactive in recruiting -- don't wait to search.
 - Develop professional contacts with women and URM.
 - Develop professional contacts with doctoral students at professional and society meetings.



Faculty Actions to Increase Diversity in the Search Process – Cast a Wide Net

- Craft an advertisement with:
 - Broad position description.
 - Emphasis on flexible work/family balance policies.
 - Emphasis on institutional commitment to diversity.
- Post ads on appropriate websites.
- Contact national organizations and alumni lists.
- Create a diverse search committee.
- Be consistent in interview process.
- Use phone interviews to create a longer “short list”.
- Have women and URM candidates meet with other women and URM faculty regardless of discipline.



Faculty Actions During File Review

- Make process transparent and minimize cognitive errors.
 - Use a matrix.
 - Insist on concrete evidence in each dimension.
 - Have each applicant's file presented to the committee by a committee member.
- Look at multiple dimensions of the job.
 - Productivity/fundability.
 - Teaching needs.
 - Possible collaborations.
 - Record on diversity.
 - Evidence of good citizenship/leadership potential.
- **Avoid ranking early in the applicant review process.**



Department Chair Actions to Increase Diversity in Recruitment

- Verbalize how diverse faculty strengthen the institution, department, and program.
- Construct search committee to maximize diversity.
- Ensure that search committee members are appropriately informed about diversity and aware of unconscious bias.
- Involve all faculty in broadening the pool of applicants.
 - If possible, use advertising language that will attract the broadest possible pool.
 - Look for the best person rather than a carbon-copy of the person who previously held the position.
 - Use the search to broaden the expertise of your department/program.
- Maintain a timely search.



Construction of the Search Committee

- Invite members from other departments or programs.
- Members should:
 - Recognize the significance of diversity as it contributes to the institution's goals and competitiveness.
 - Have diverse points of view.
 - Come from diverse backgrounds.
- Identify non-committee members or representatives from program offices to meet with candidates during campus visits to provide more information about your university and community.



Department Chairs' Actions During Candidate Review

- Promote the department and the university to the candidates.
 - Demystify P & T and performance evaluation process.
 - Describe support given to junior faculty.
- Insist upon equal and respectful treatment during:
 - Review of applicants' packets.
 - Phone and campus interviews.
- Maintain contact with candidates on short list.
- Work aggressively on dual career or partner-accommodation packages.



Deans' Actions to Increase Diversity in Recruitment

- Meet with search committees.
 - Emphasize institutional priorities, including diversity.
 - Stress importance of best practices.
- Post relevant work/family policies on the college webpage or include in a brochure.
- Incorporate diversity into the college's strategic goals and objectives.



Deans' Resource Allocation Actions

- Facilitate institutional support.
- Ensure that search committees have adequate funding and administrative support by offering:
 - Timely letters.
 - Competitive and equitable start-up packages.
 - Dual career accommodations.
- Reward chairs/heads who use “best practices” in searching.

Effective Strategies to Diversify STEM Faculty



Strategies for Effective Retention



A Collegial Work Environment Provides a Foundation for Recruitment and Retention of All Faculty

- Set up process to develop a “code of conduct” (essential).
- A departmental retreat can be one strategy to develop a code:
 - Find a good moderator who is not in your group.
 - Someone who understands higher education.
 - Experts at your university (e.g., school of business).
 - Experts at other universities.
- Refer to AAUP statement.
- Be aware that things that look fine to senior faculty may not for junior faculty.
- Review code on a regular basis.



Best Practices: Retention

Creating a collegial, welcoming, and open environment

- Value diversity in the department.
- Resolve conflict and harassment rapidly.
- Be transparent in operations, including fair and open P&T guidelines
- Mentor faculty.
 - Facilitate and monitor carefully.
 - Volunteer to review colleagues' work.
 - Enhance research collaborations.



Best Practices: Retention Institutional Efforts

- Hold orientation sessions for new faculty.
- Institute flexible and accommodating work/family policies and practices.
 - Dual career hires.
 - Family/personal leave.
 - Tenure clock.
 - On-site daycare.
- Support career development.
 - Use annual review process as opportunity to plan and support.
 - Support at junior and mid-career levels.



Mid-Career Retention

- Ensure equity in job assignments and rewards for job performance.
- Create a collegial work environment.
- Provide opportunities to obtain seed money for new professional directions.
- Accommodate family and health needs.
- Encourage leadership.
 - Endorse women and minorities as leaders.
- Ensure competitive salaries.



Data Resources

- Various reports on science and engineering education and labor force are available from the Commission on Professionals in Science and Engineering:
<http://www.cpst.org/>
- Data on the gender and ethnicity of faculty at the top fifty departments in various fields of science and engineering “The Nelson Diversity Surveys” by Nelson, D. J.: Norman, OK, <http://cheminfo.chem.ou.edu/faculty/djn/diversity/top50.html>
- Availability data are computed by the University of California, Office of the President and made available online at: <http://www.ucop.edu/acadadv/datamgmt/welcome.html>
- The National Science Foundation publishes data on doctoral recipients every two years. The most current data are available at: <http://www.nsf.gov/statistics/nsf06308/>
- Other data from the National Science Foundation can be obtained from the Division of Science Resource Statistics website: <http://www.nsf.gov/statistics/>
- NSF’s most recent Science and Engineering Indicators report is available: <http://www.nsf.gov/statistics/seind06/>



Participating Teams



New Mexico State University

NSF Grant PIs: Lisa M. Frehill, Mary O'Connell, and Elba Serrano

College of Agriculture and Home Economics

Team Leader: **LeRoy Daugherty**, Associate Dean

Team Members:

Ron Byford, Department Head, Extension Plant Services

Don Caccamise, Department Head, Fishery & Wildlife Science

Dean Hawkins, Professor, Animal & Range Science

College of Arts and Sciences

Team Leader: **Waded Cruzado-Salas**, Dean

Team Members:

Aravamudan Gopalan, Department Head, Chemistry & Biochemistry

Dan Howard, Department Head, Biology

Gary Kyle, Department Head, Physics

Rene Walterbos, Department Head, Astronomy

College of Engineering

Team Leader: **Steven Castillo**, Dean

Team Members:

Martha Mitchell, Department Head, Chemical Engineering

Ken White, Department Head, Civil & Geological Engineering



Participating Teams, cont'd.



University of New Mexico

College of Arts and Sciences

Team Leader: **Richard Santos**, Associate Dean

Team Members:

Julia Fulghum, Department Head, Chemical & Nuclear Engineering

Sally Seidel, Professor, Physics and Astronomy

Ron Yeo, Department Head, Psychology



University of Texas at El Paso

College of Engineering

Team Leader: **Roberto Osegueda**, Associate Dean

Team Members:

Carlos Ferregut, Division Director, Civil Engineering

Ann Gates, Department Head, Computer Science

Benjamin Flores, Division Director, Electrical Engineering

Patricia Nava, Department Head, Electrical Engineering



University of Texas, Brownsville

Emir Jose Macari, Dean, College of Science,
Mathematics, and Technology



Participating Teams, cont'd.



University of Washington

College of Engineering

Team Leader: **Joyce Yen**, Program/Research Manager

Team Members:

Suzanne Brainard, Executive Director, Center for Workforce Development

Sheila Edwards, Associate Director, Research, Center for Workforce Development

Eve Riskin, Professor, Electrical Engineering

David Allstot, Department Head, Electrical Engineering

UC Irvine

Debra J. Richardson, Dean, Donald Bren School of Information and Computer Sciences

Michigan Tech

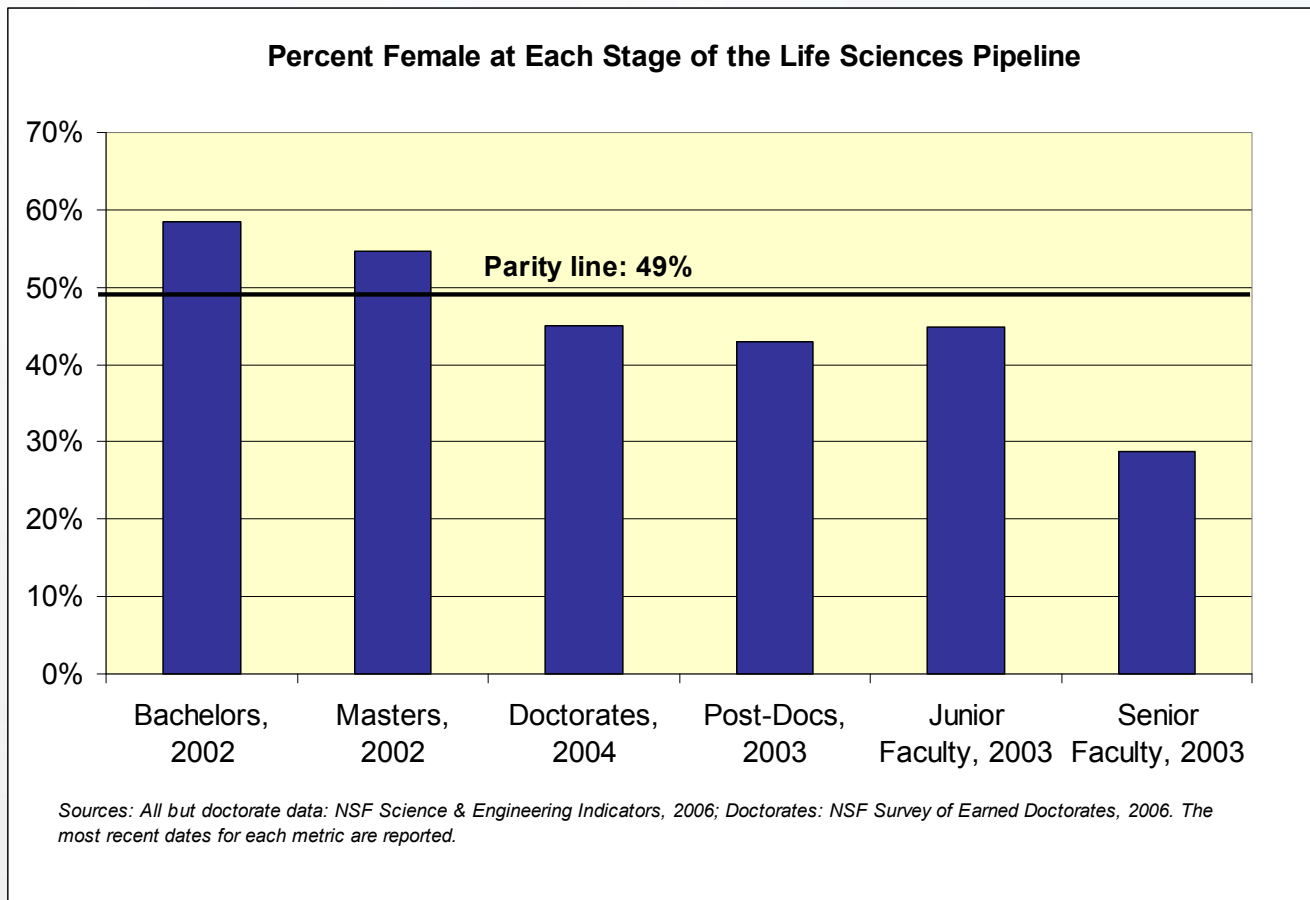
Sheryl Sorby, Associate Dean of Engineering



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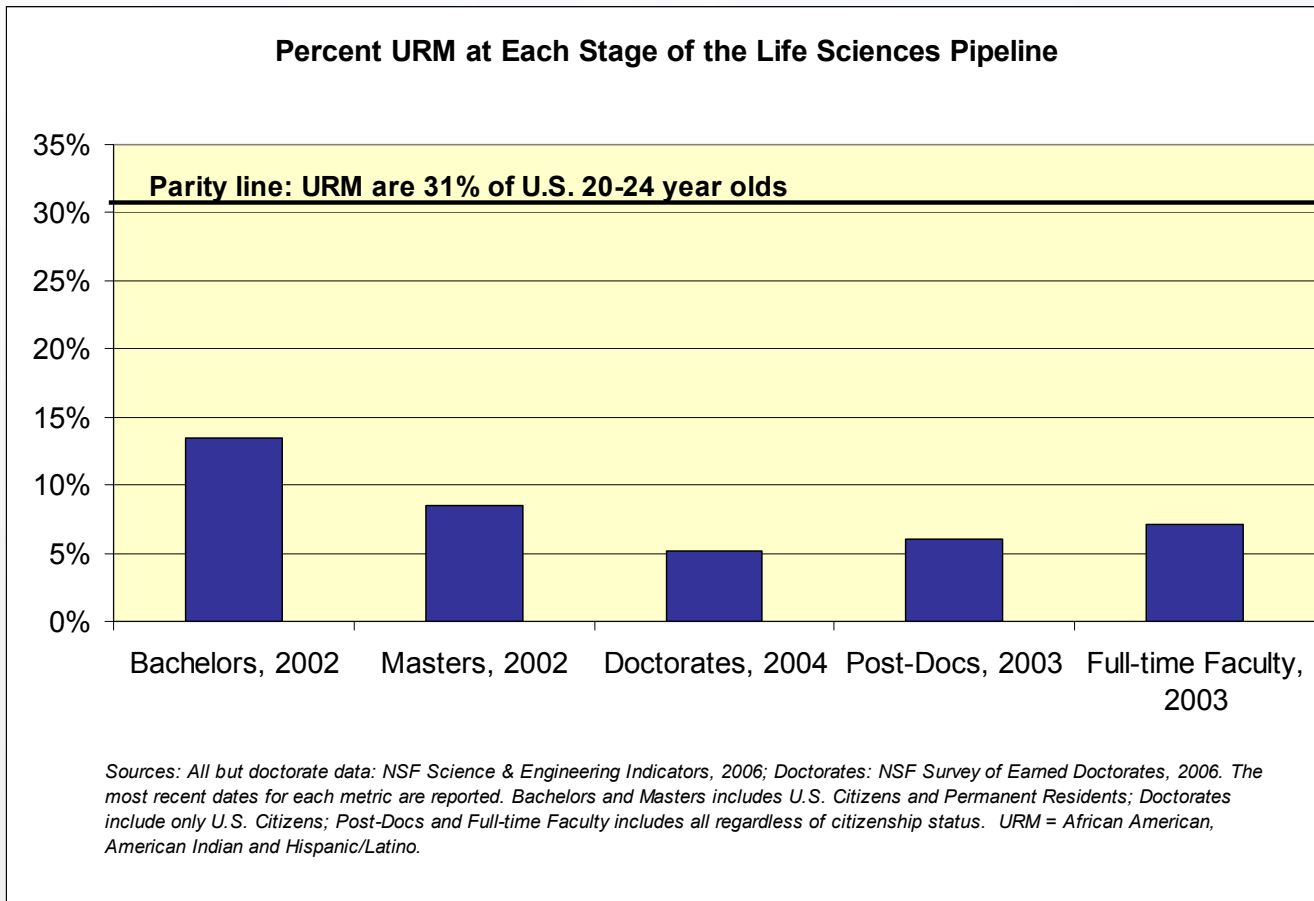


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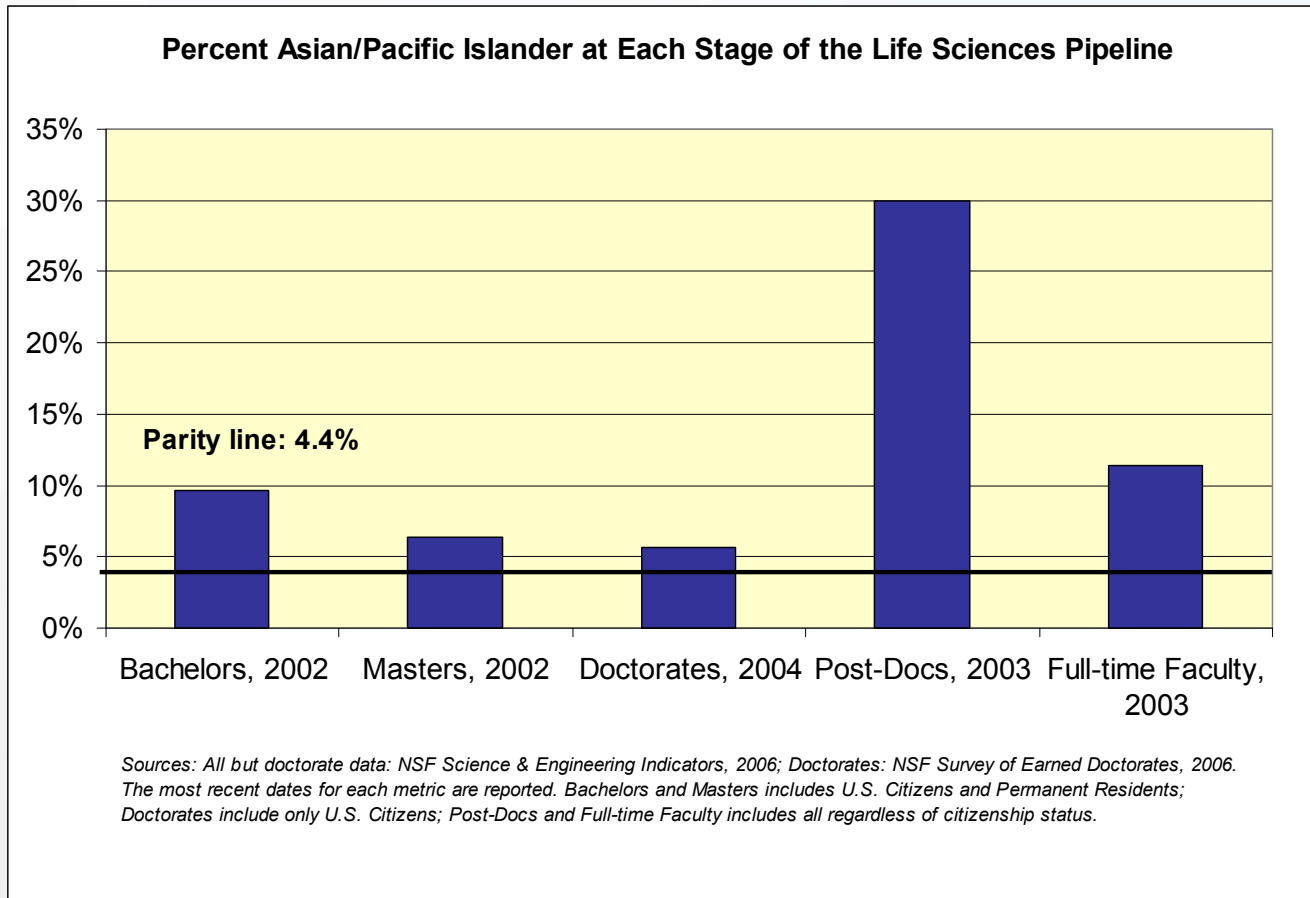


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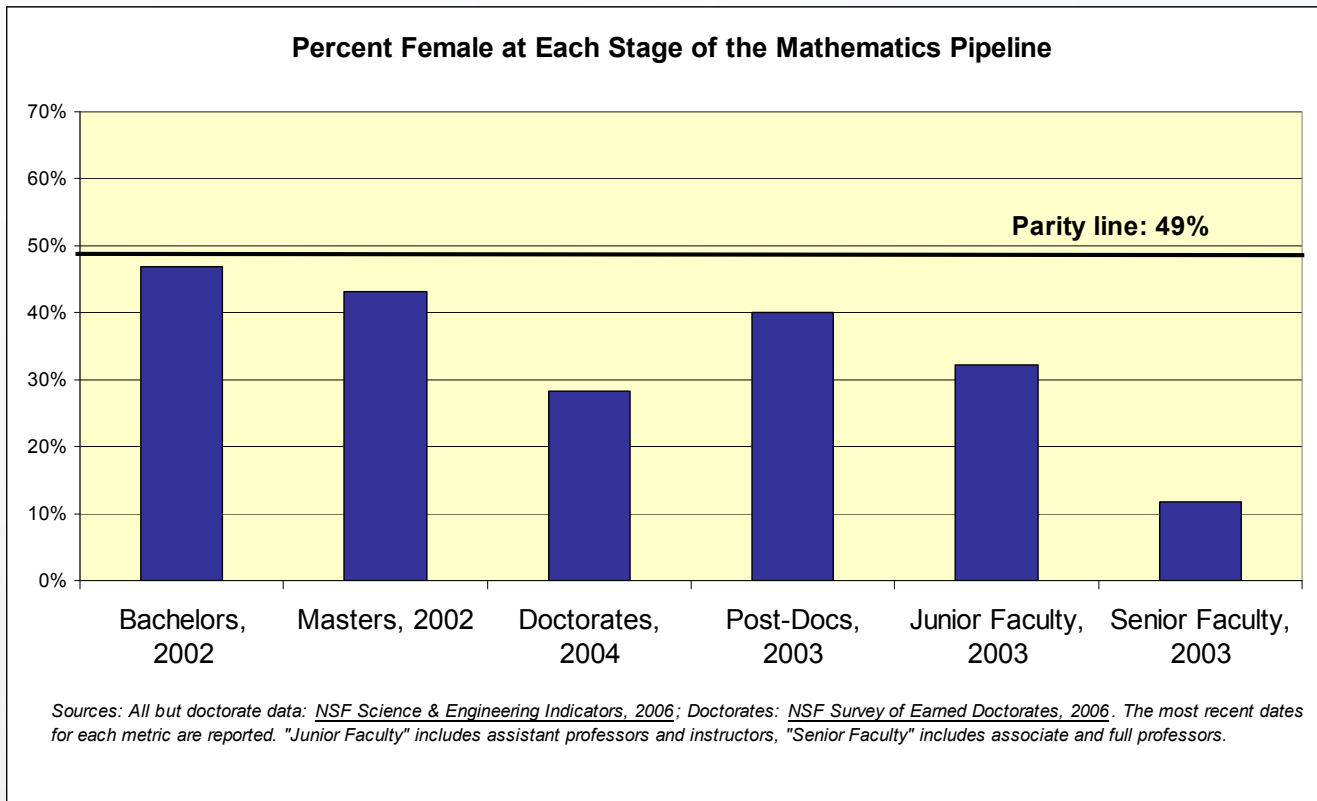


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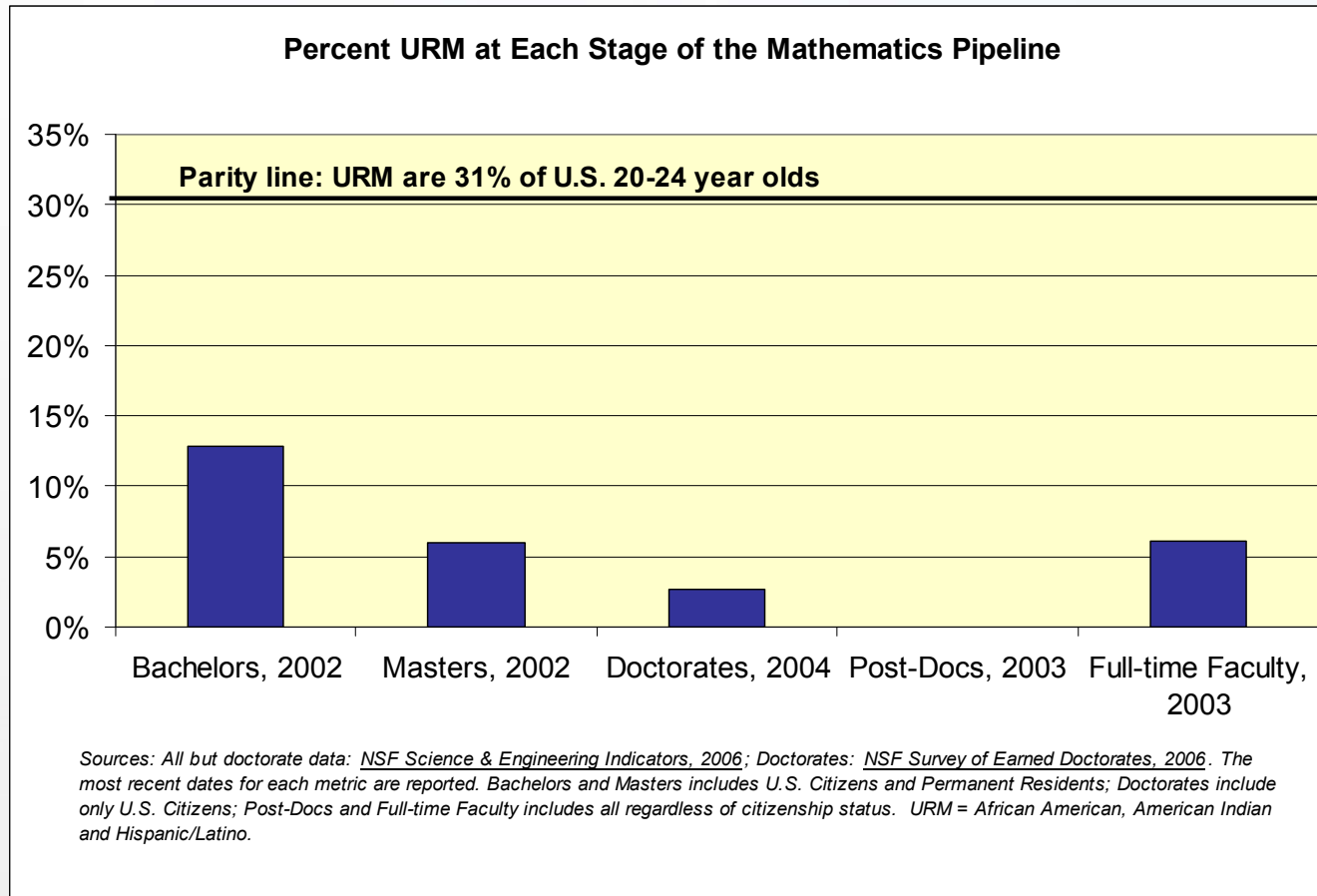


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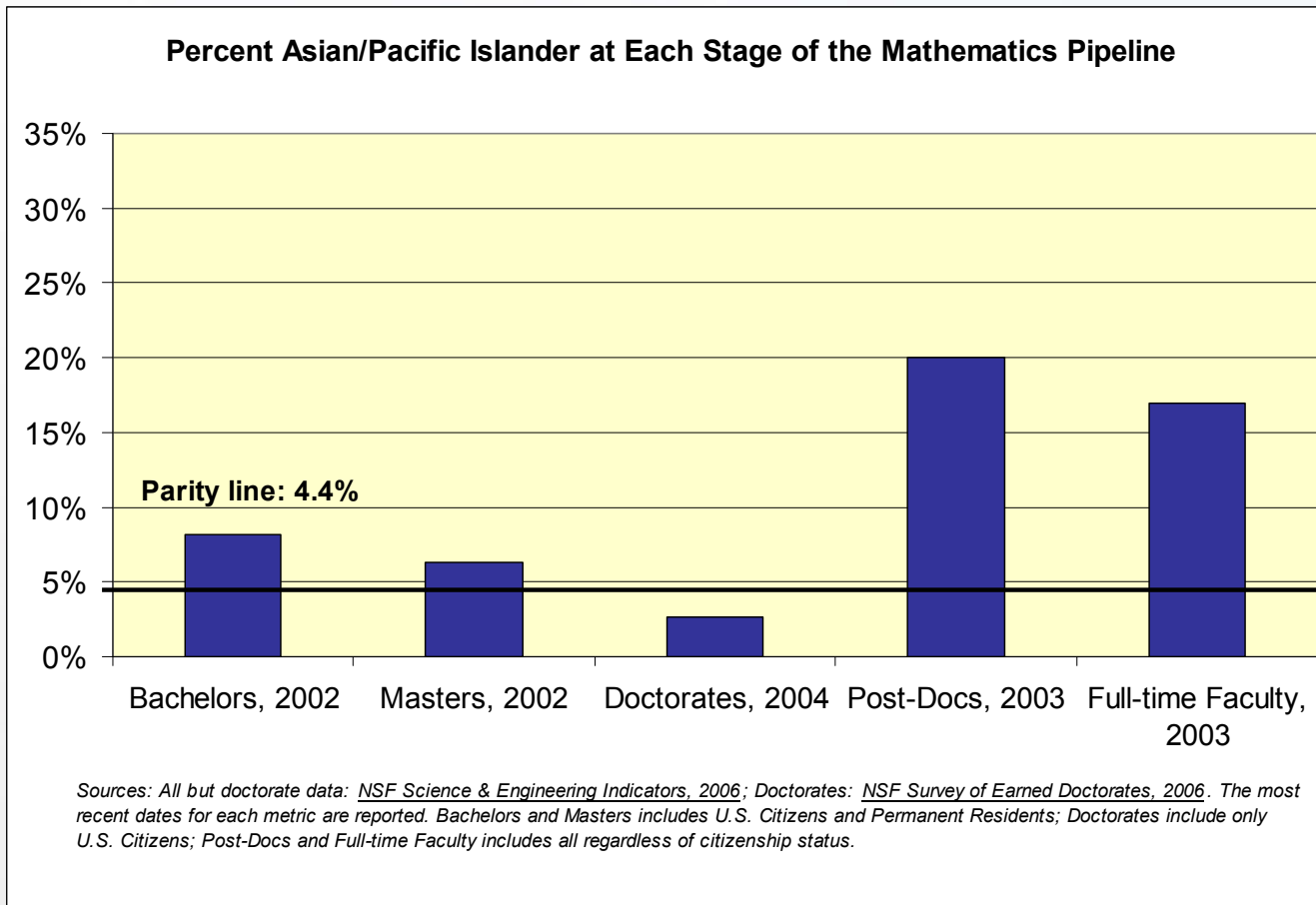


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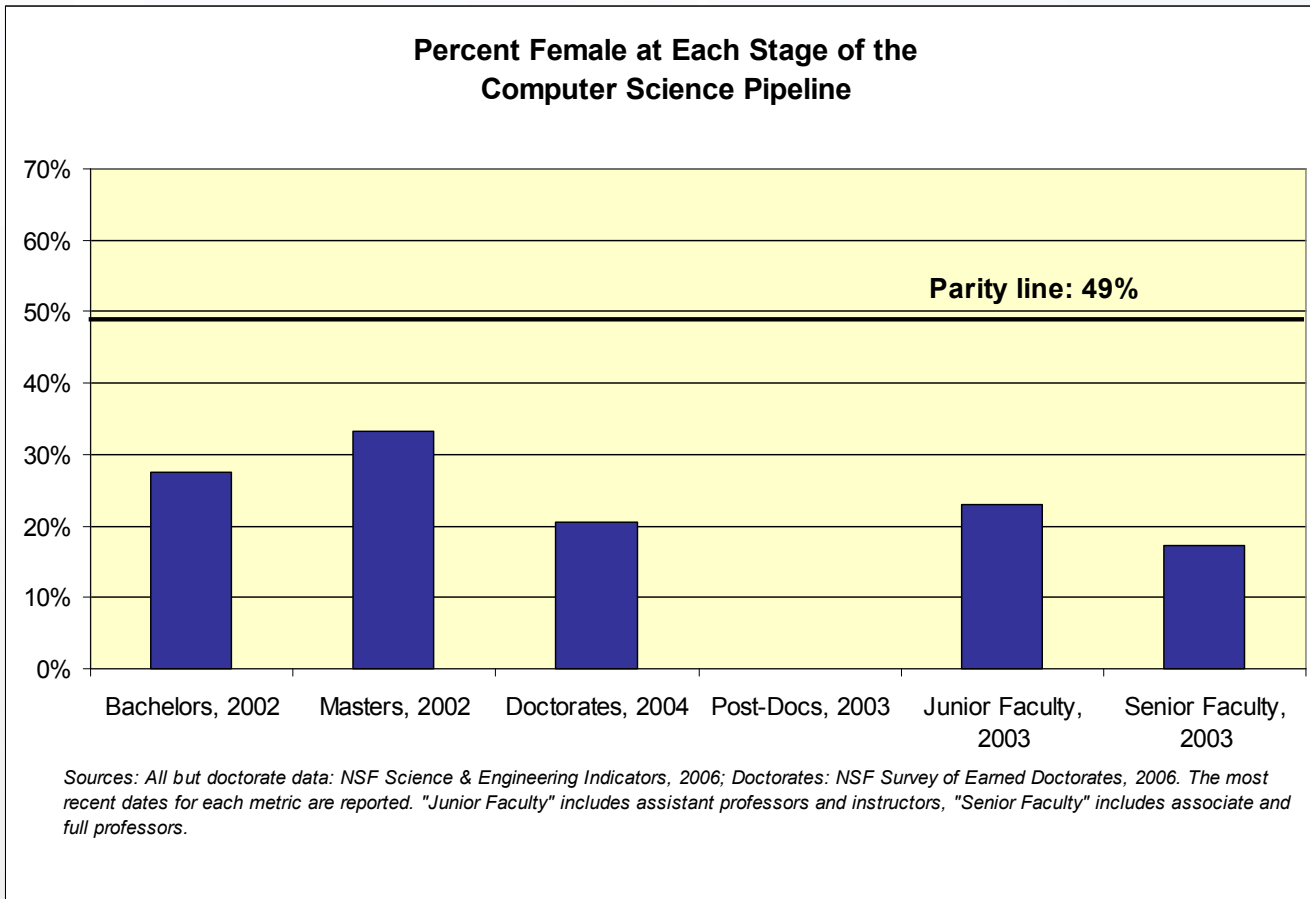


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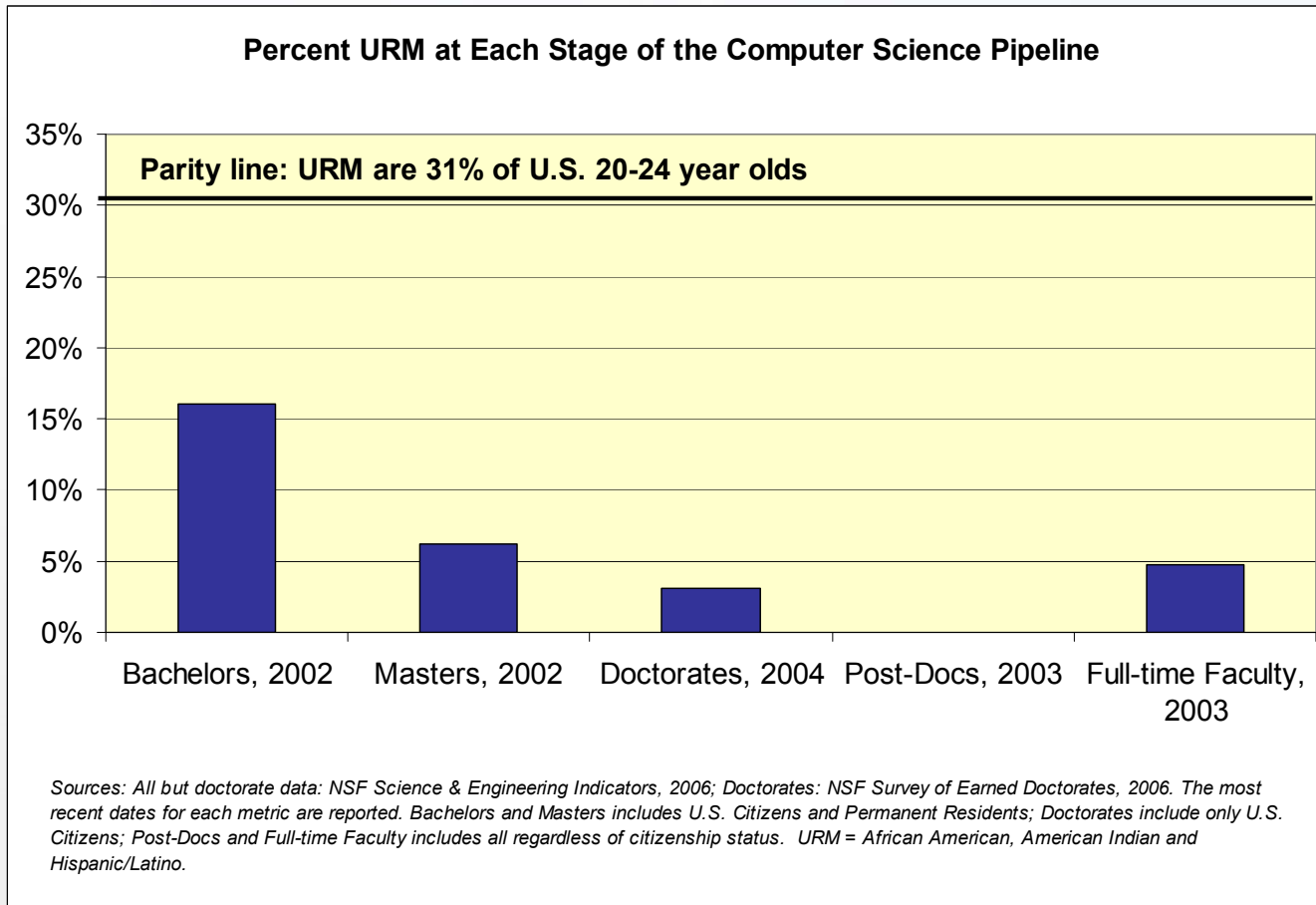


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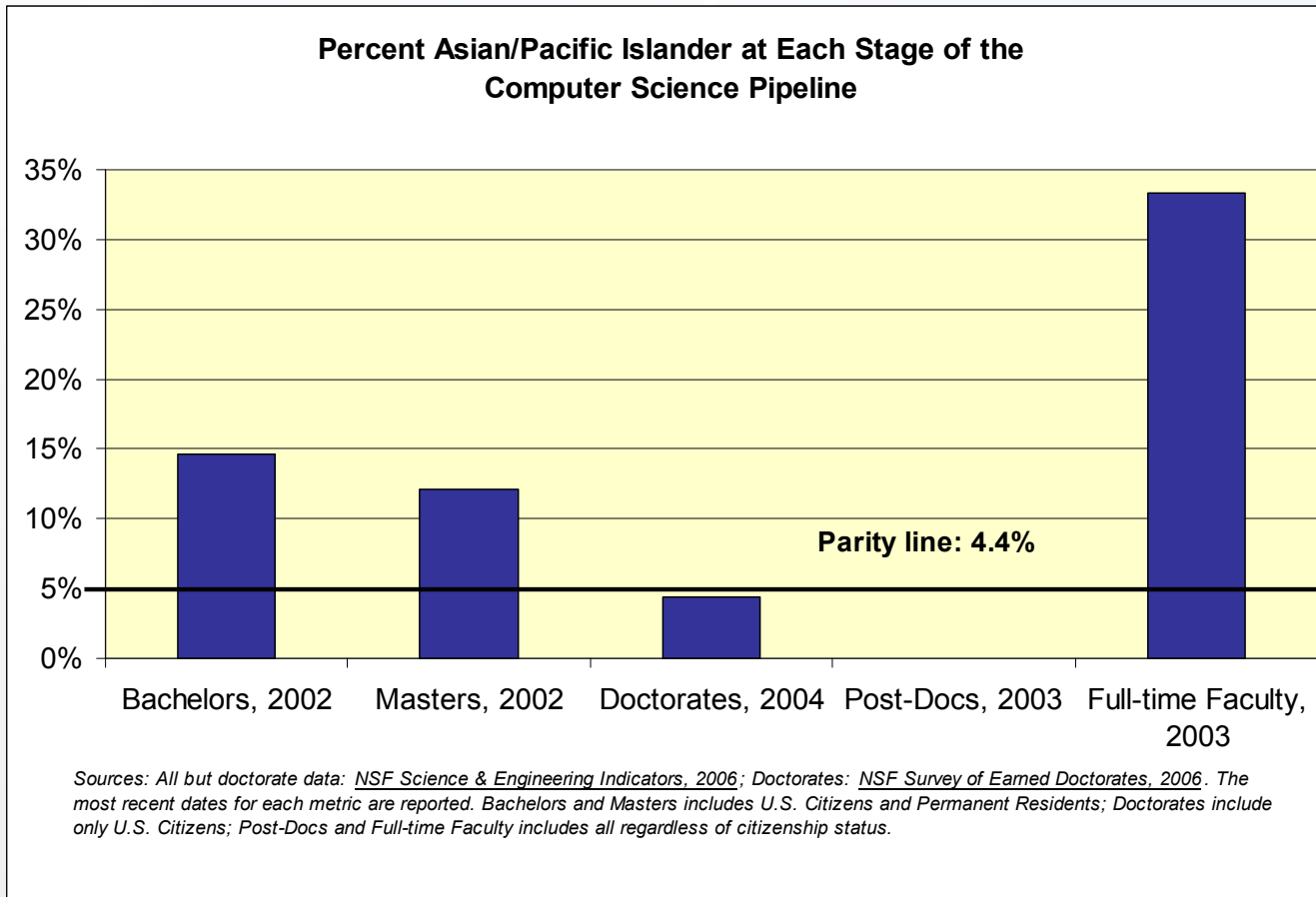


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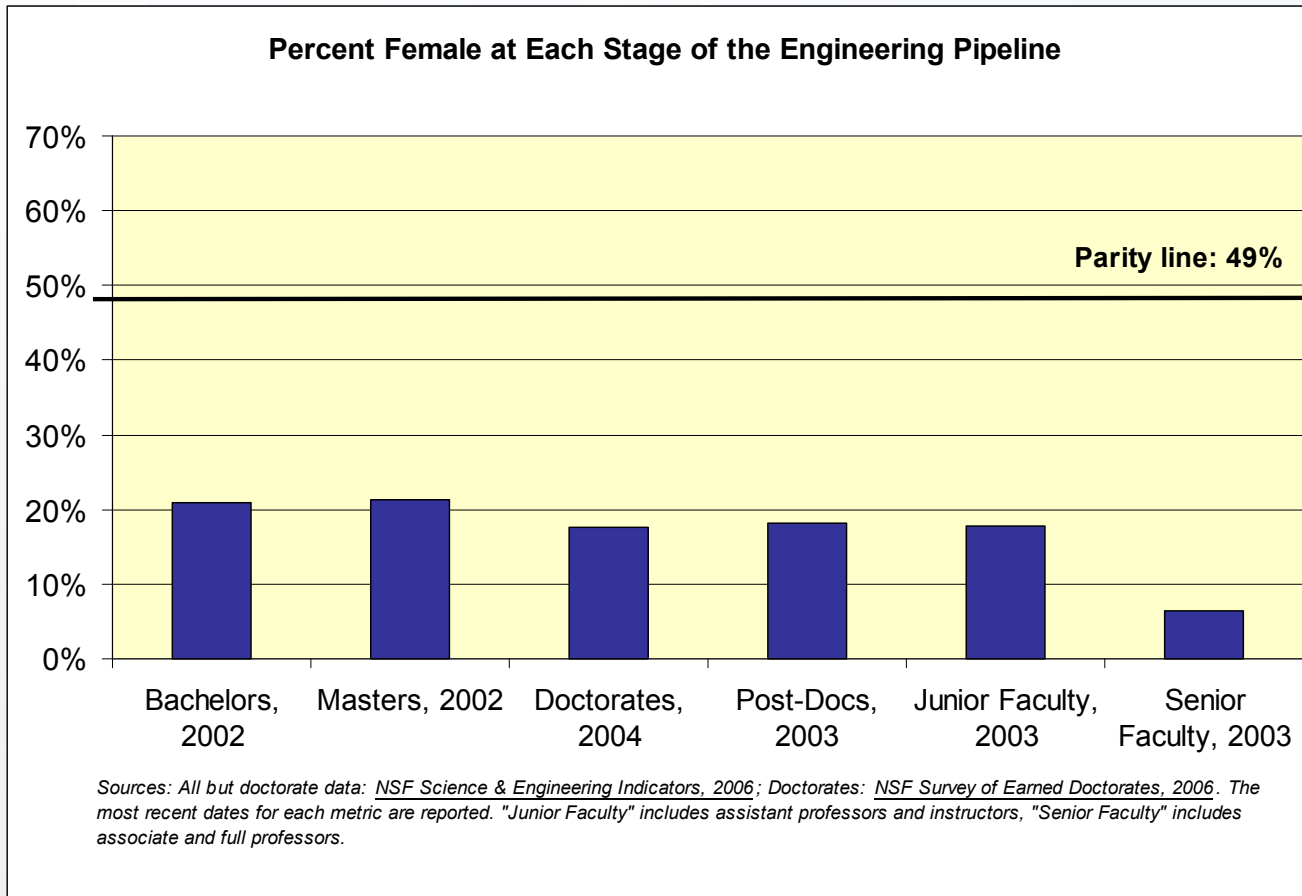


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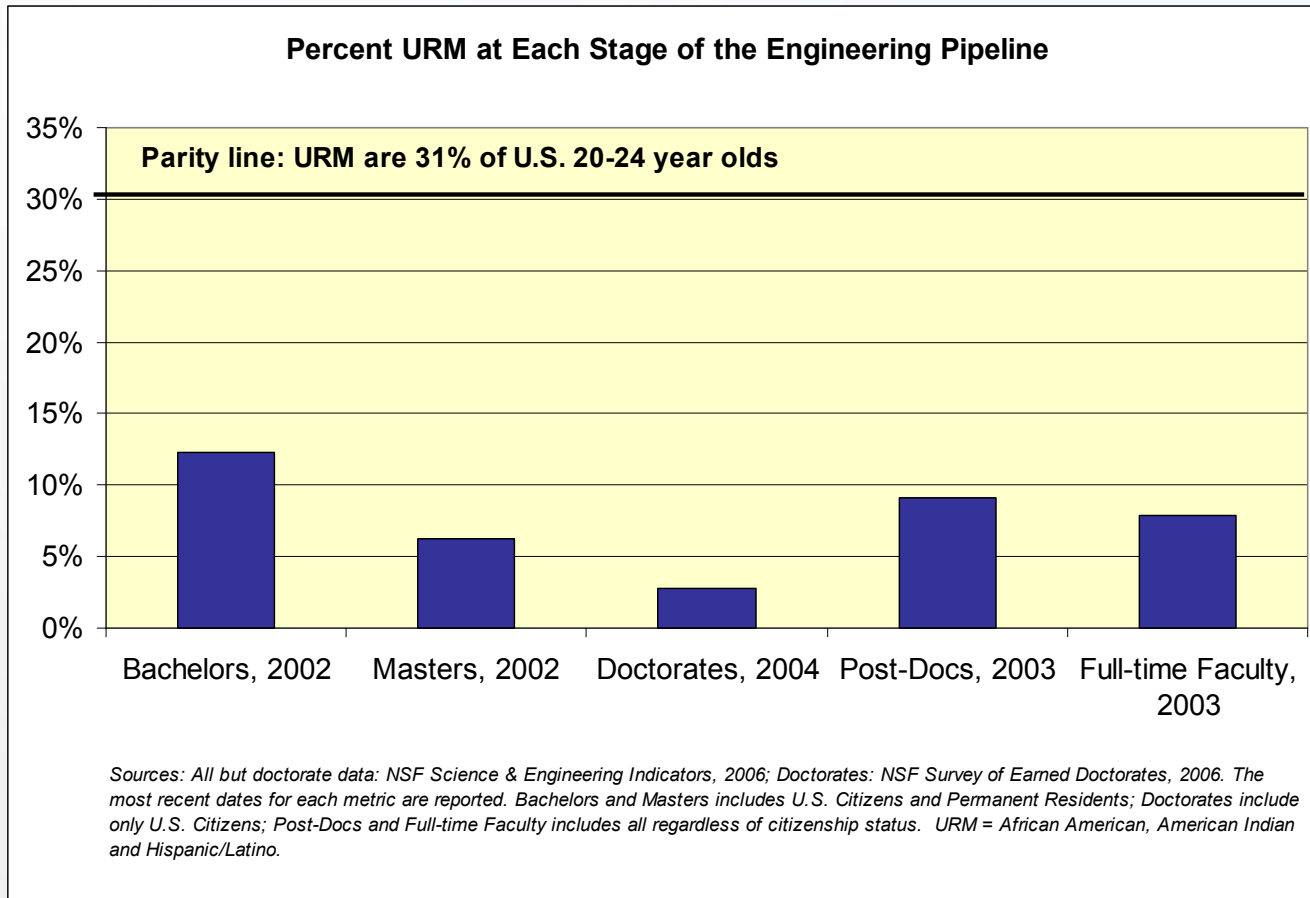


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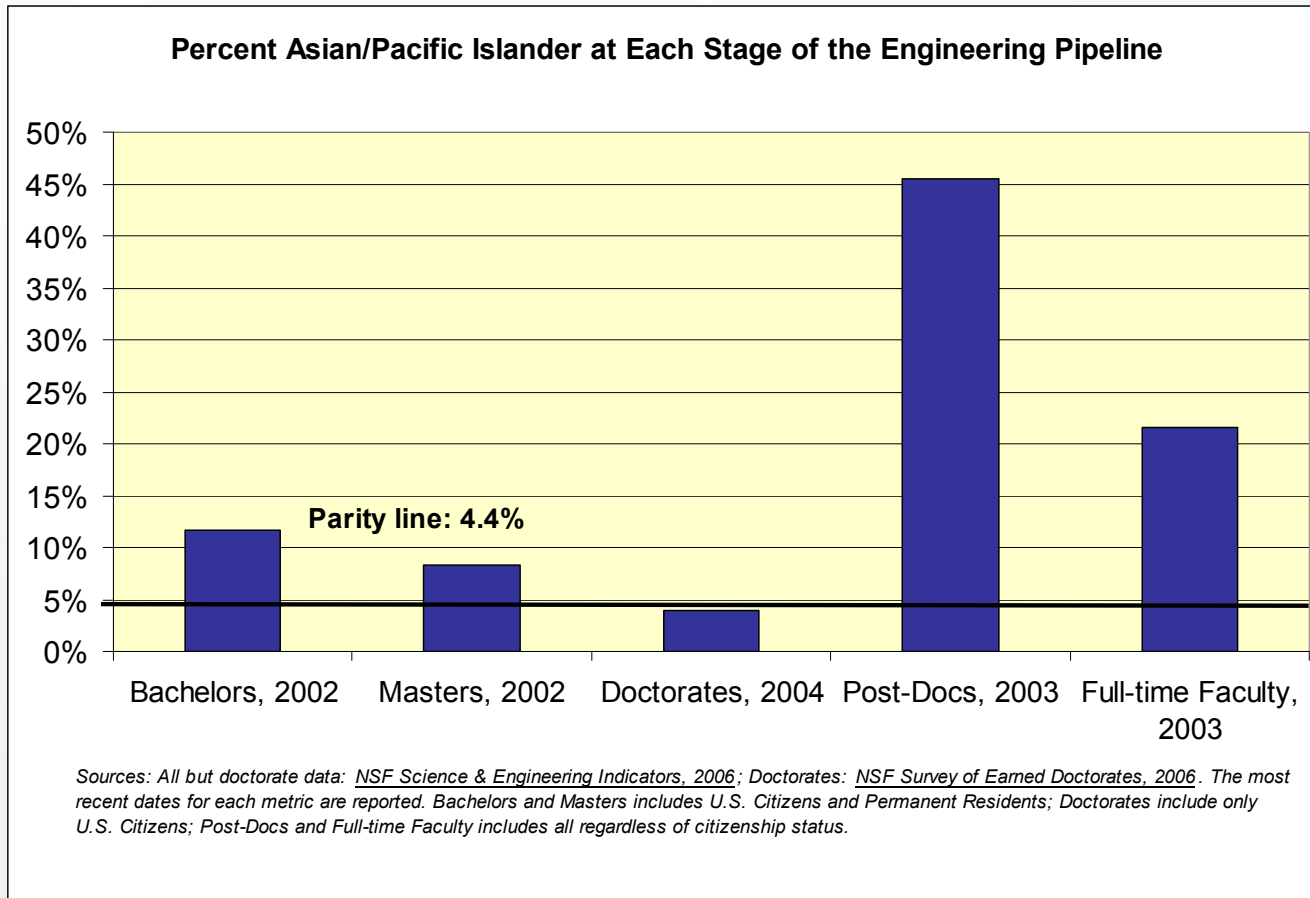


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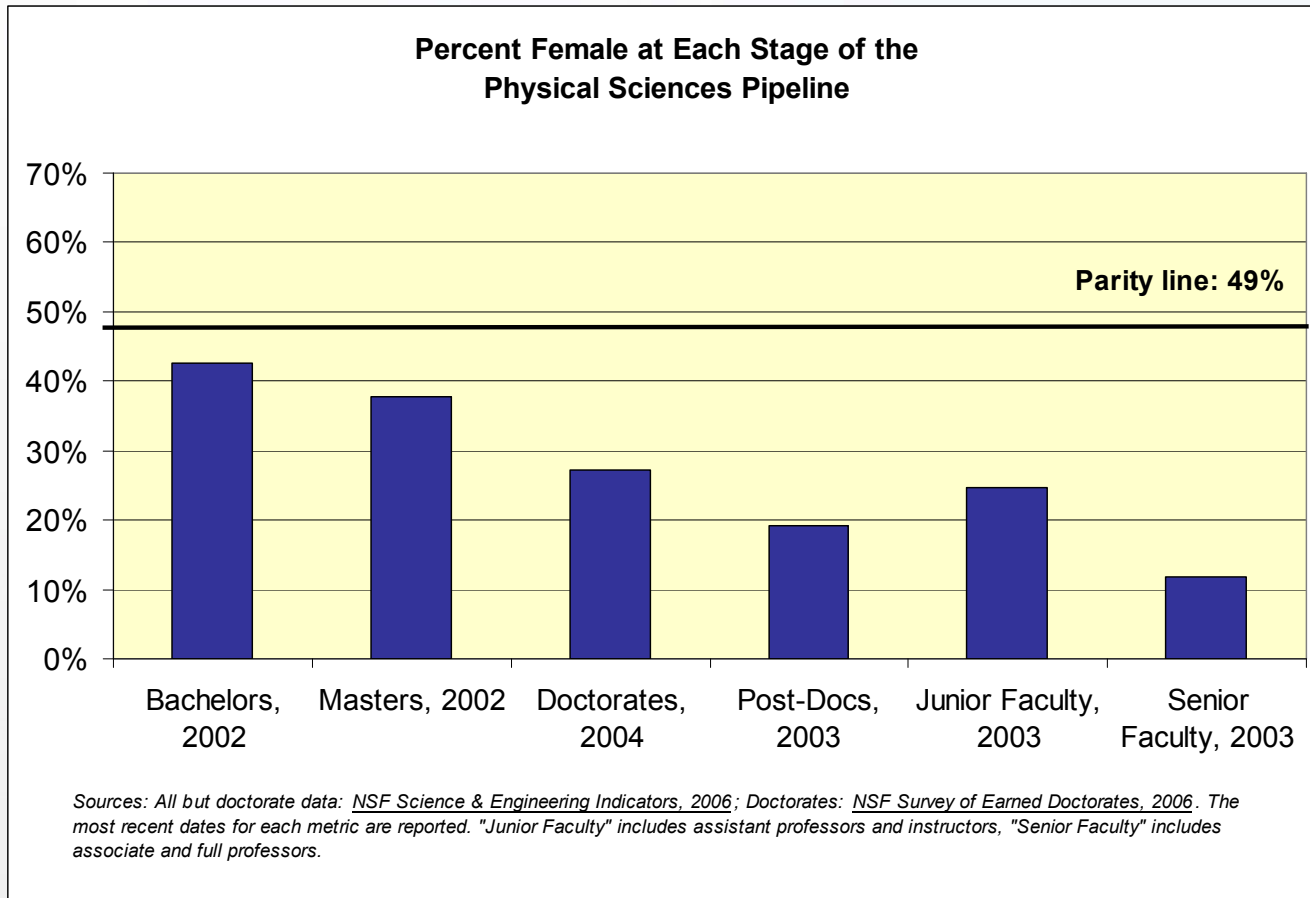


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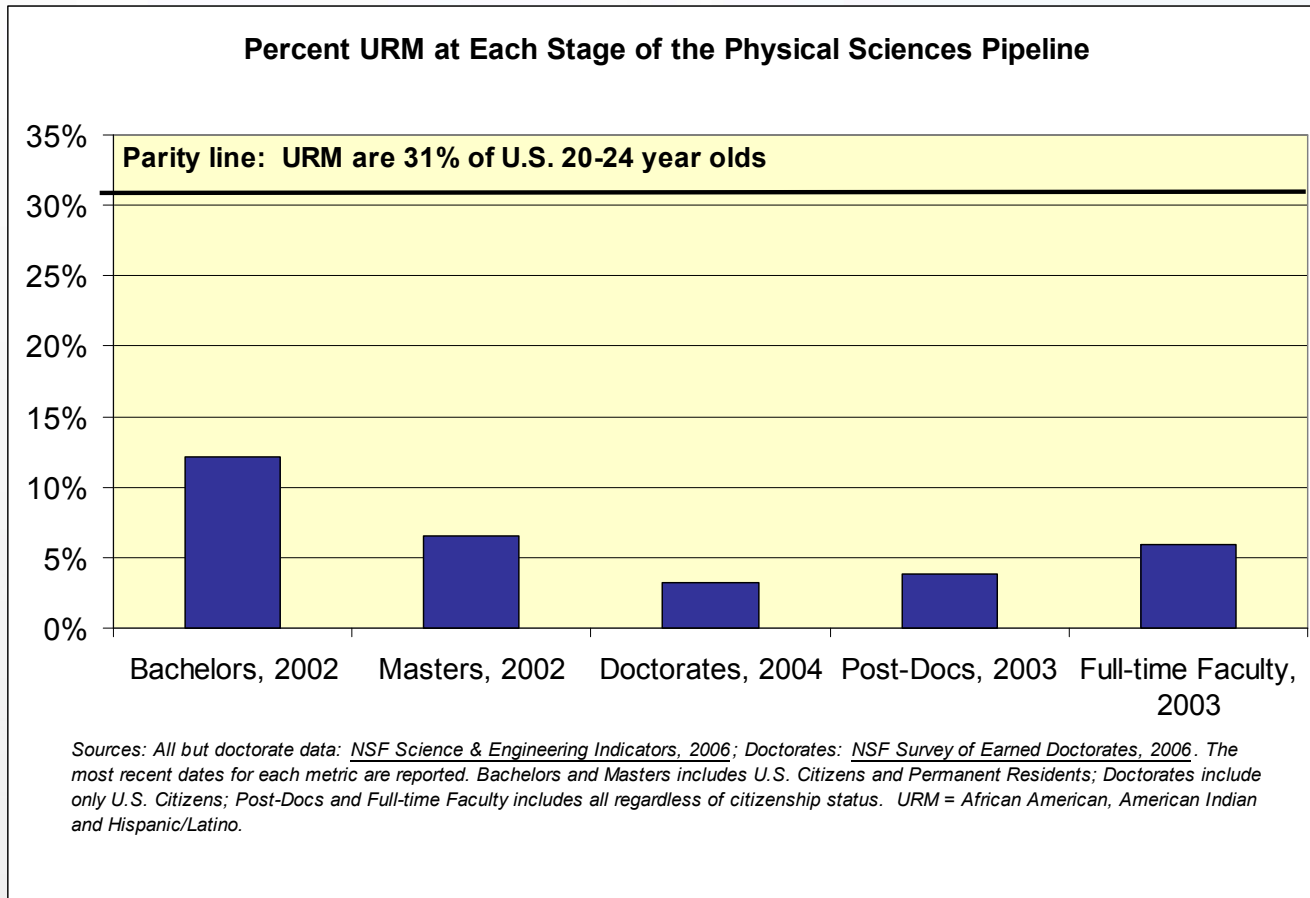


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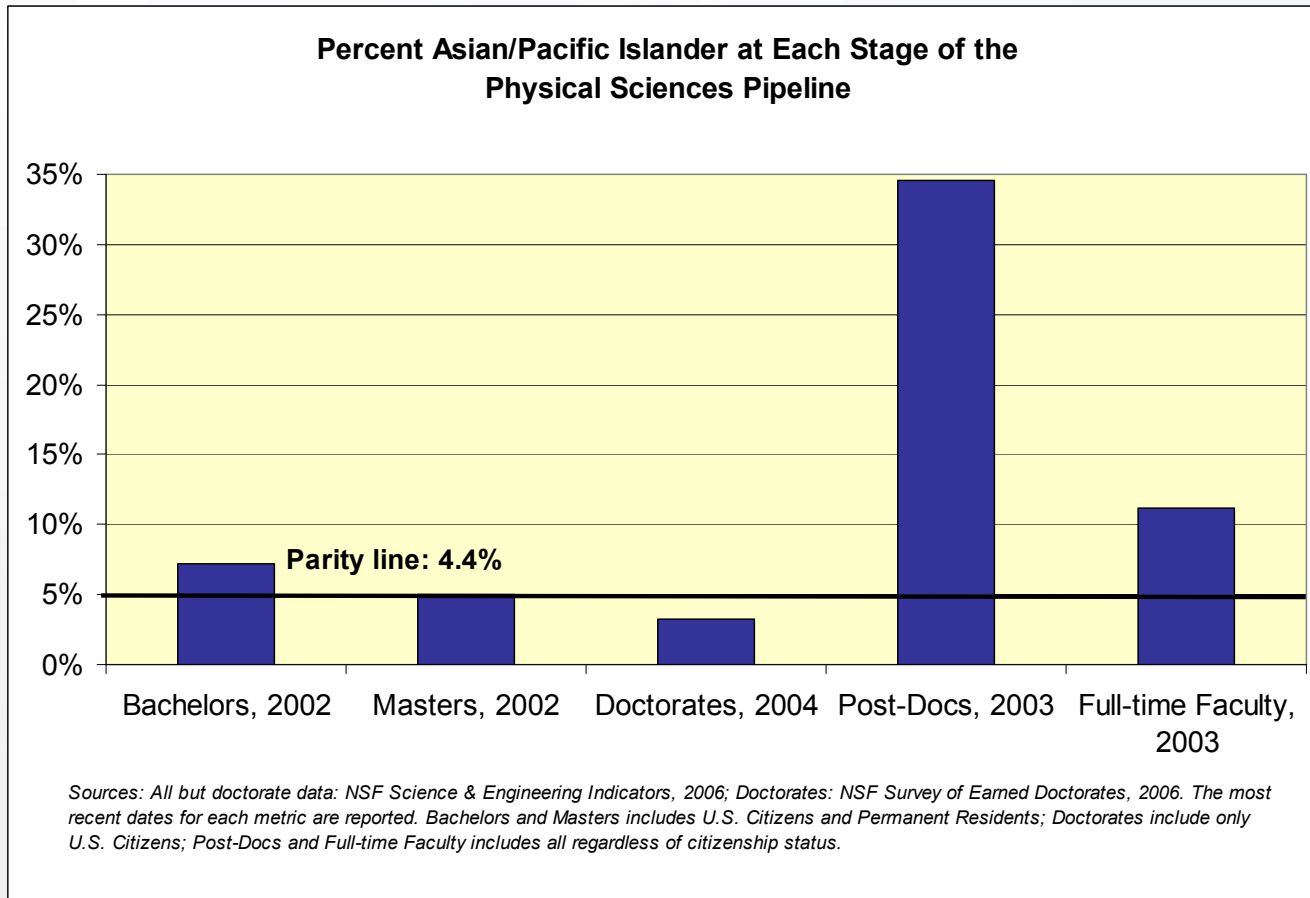


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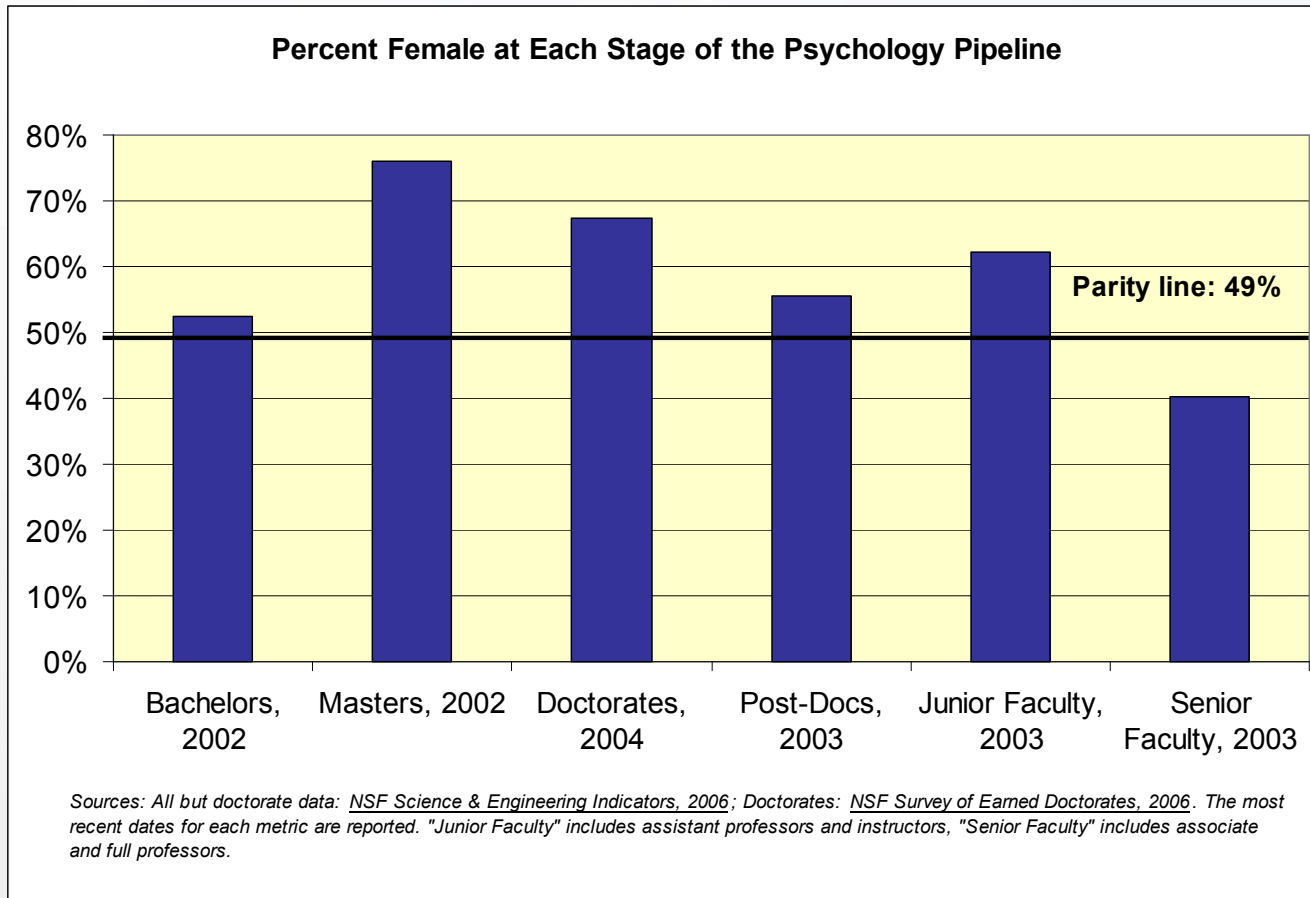


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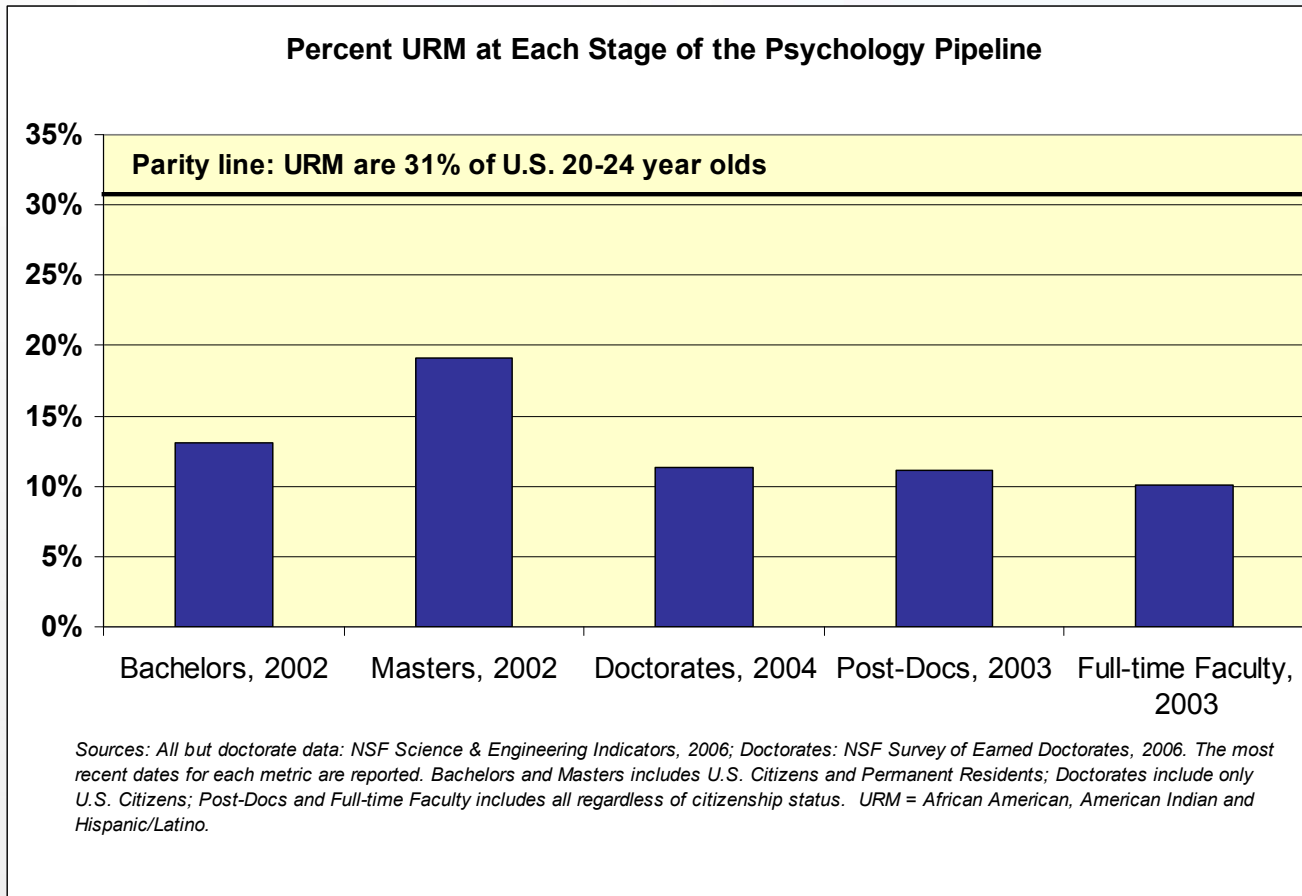


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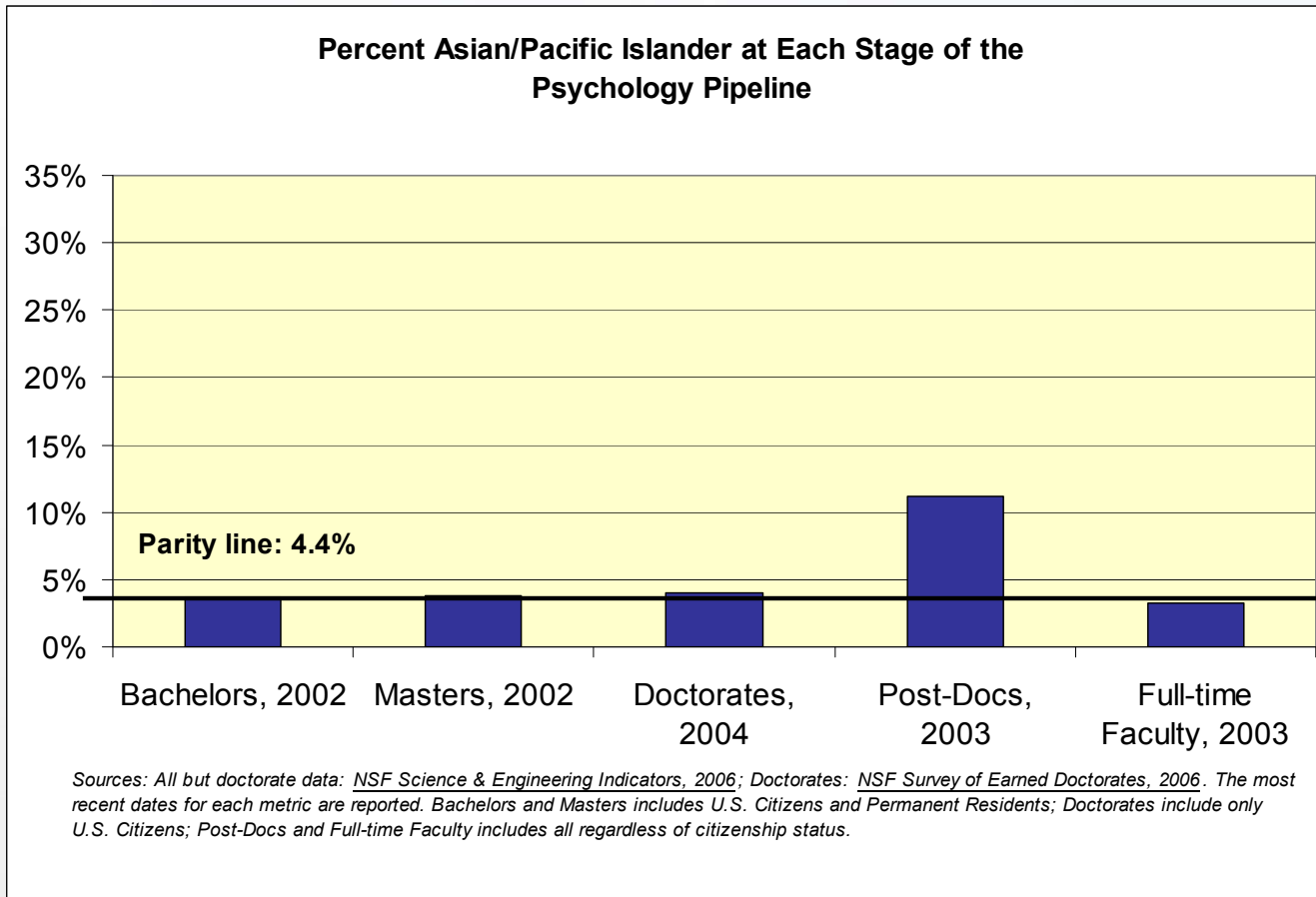


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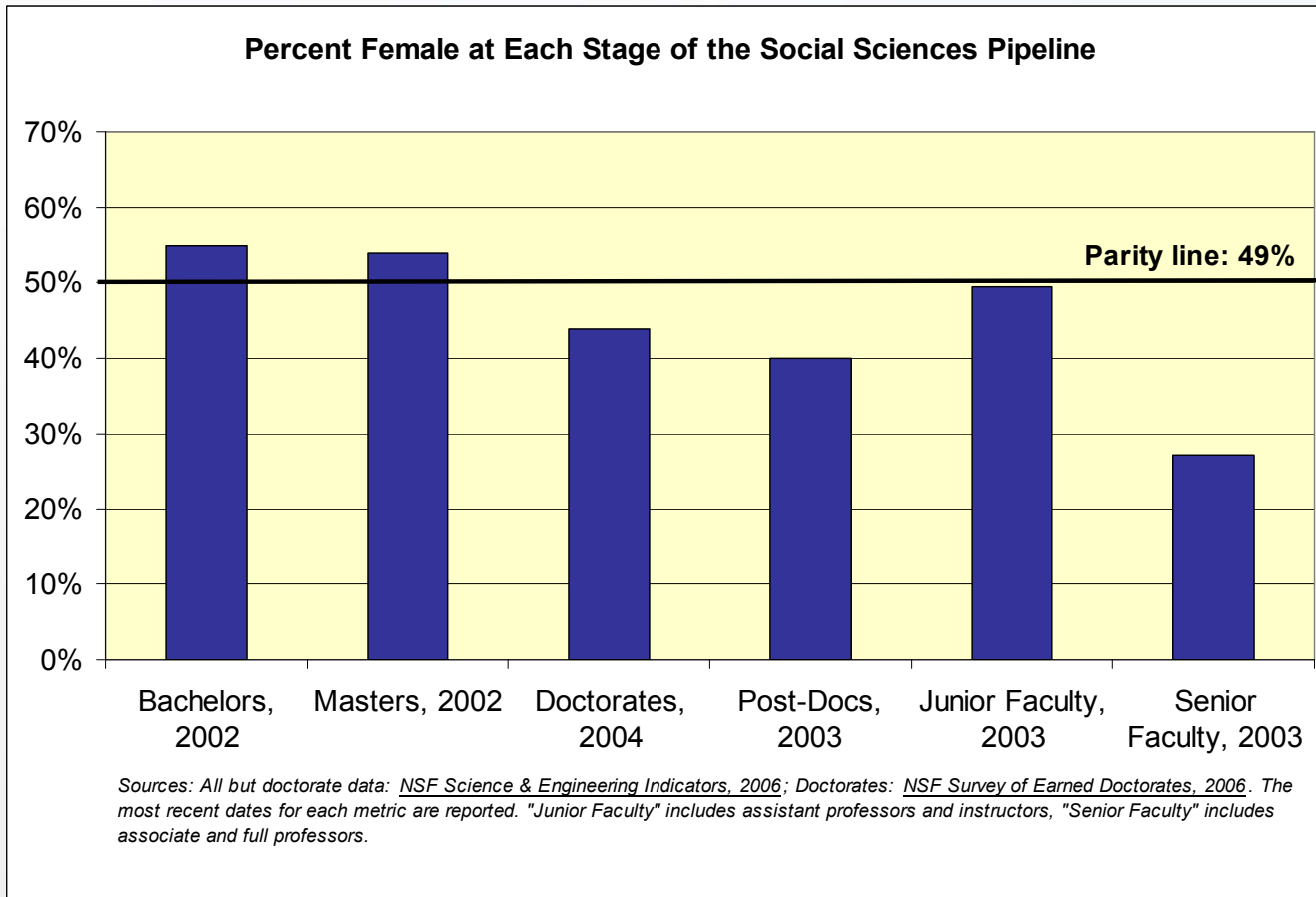


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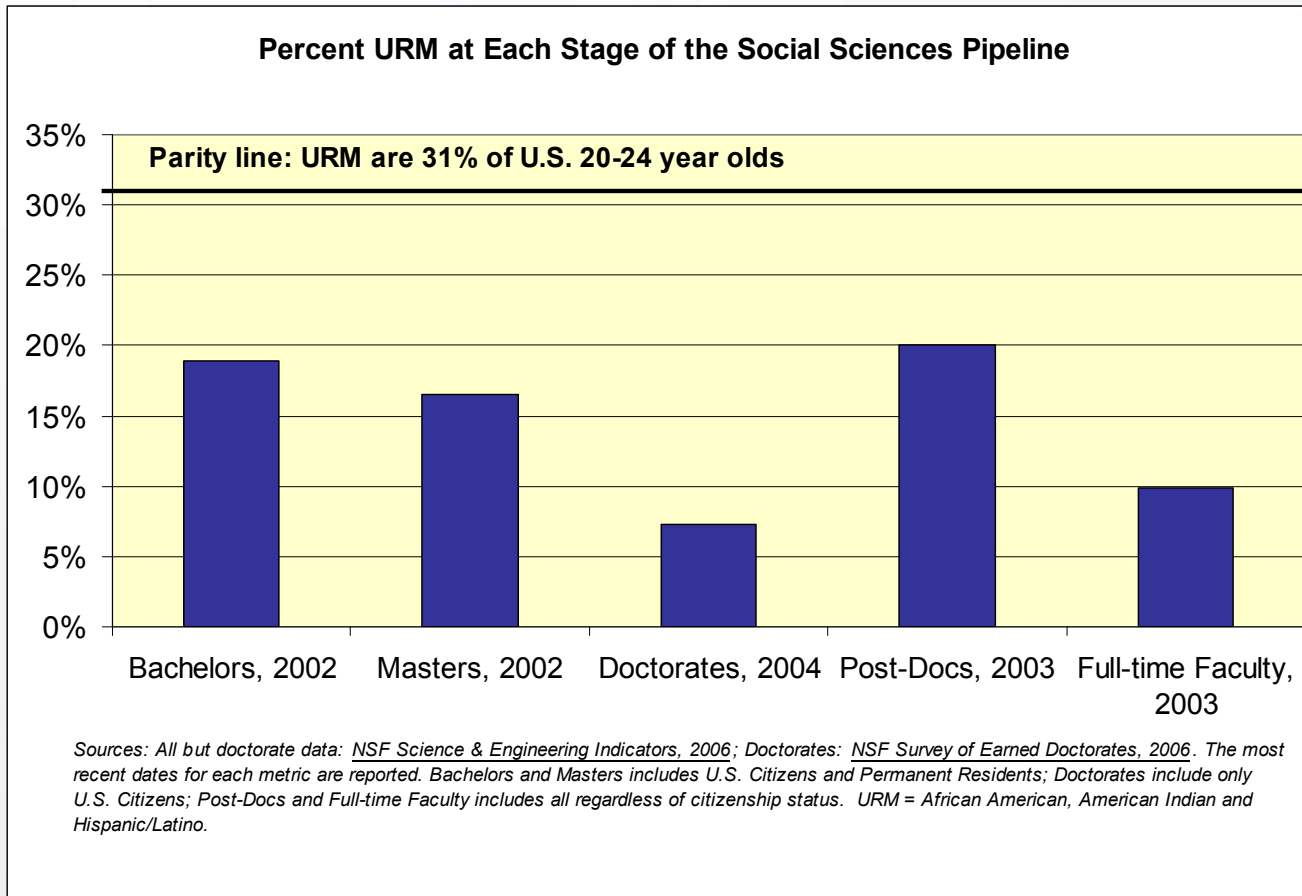


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