

# Diversity and Undergraduate Physics in the 21<sup>st</sup> Century

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# Diverse

ISSUES IN HIGHER EDUCATION

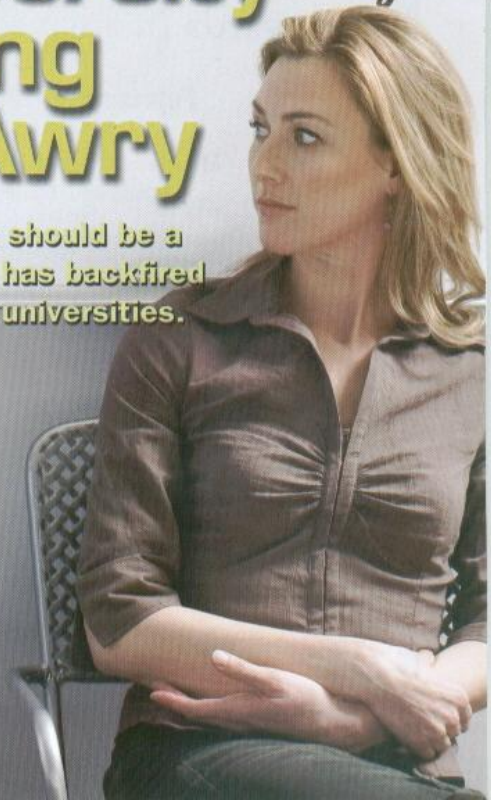
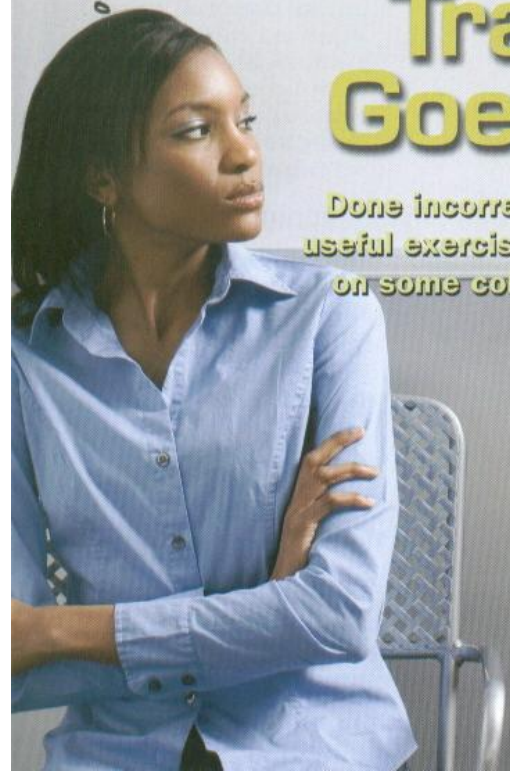
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*She doesn't  
have a clue.*

*Why is it  
always about  
race?*

## When Diversity Training Goes Awry

**Done incorrectly, what should be a  
useful exercise can and has backfired  
on some colleges and universities.**



University

PROGRESS REPORT  
ON BRIDGING THE  
DIVIDE BETWEEN  
RACE AND GENDER...

WELL,  
WE'RE  
GETTING  
CLOSER

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# Personal Glimpses

# Defining Moment?

Prince Edward County, VA (1964)

# I Believe !

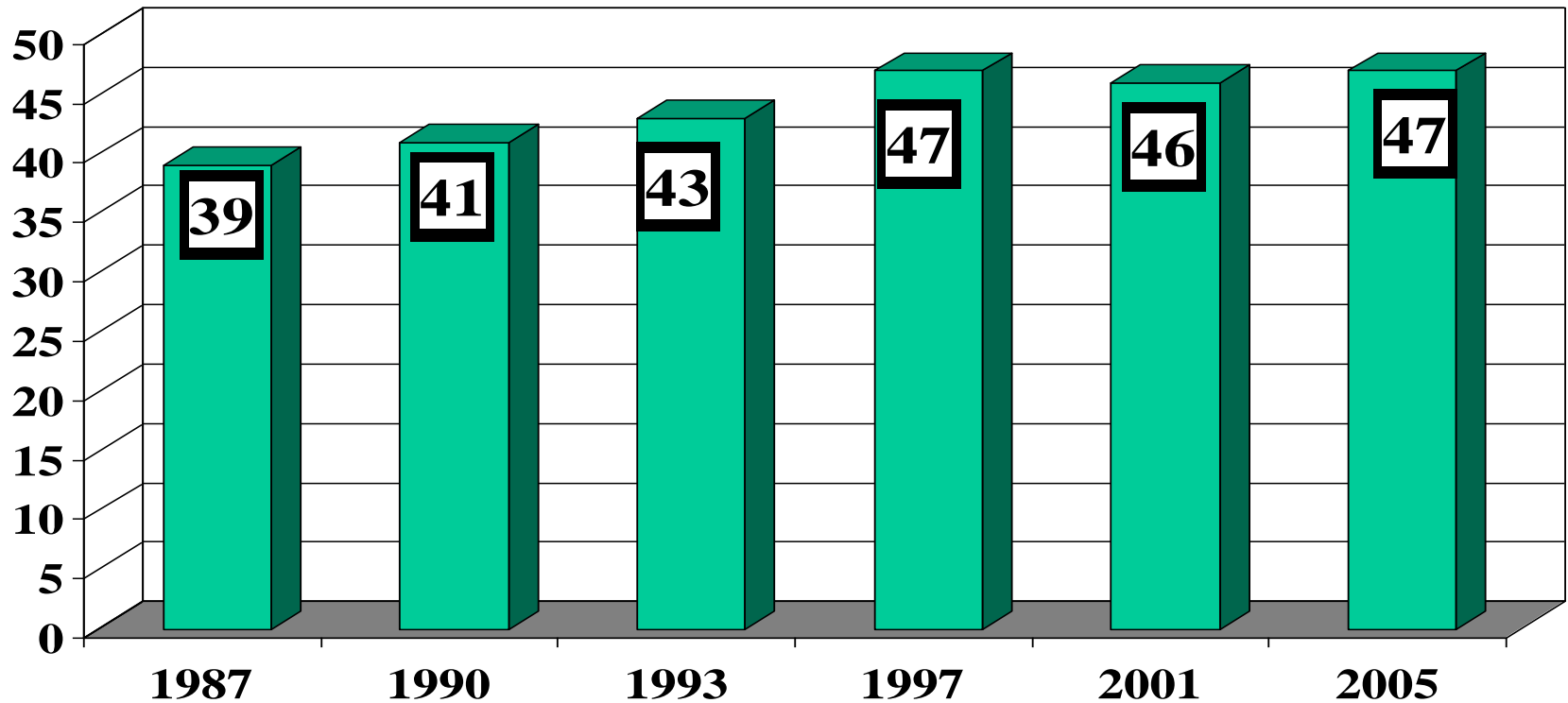
Those educated in diverse setting are:

- More likely to make meaningful contributions
- More likely to be team players
- More likely to be successful leaders

# What do we need to know and do to diversify the scientific community?



# Girls As a Percentage of Total High School Physics Students

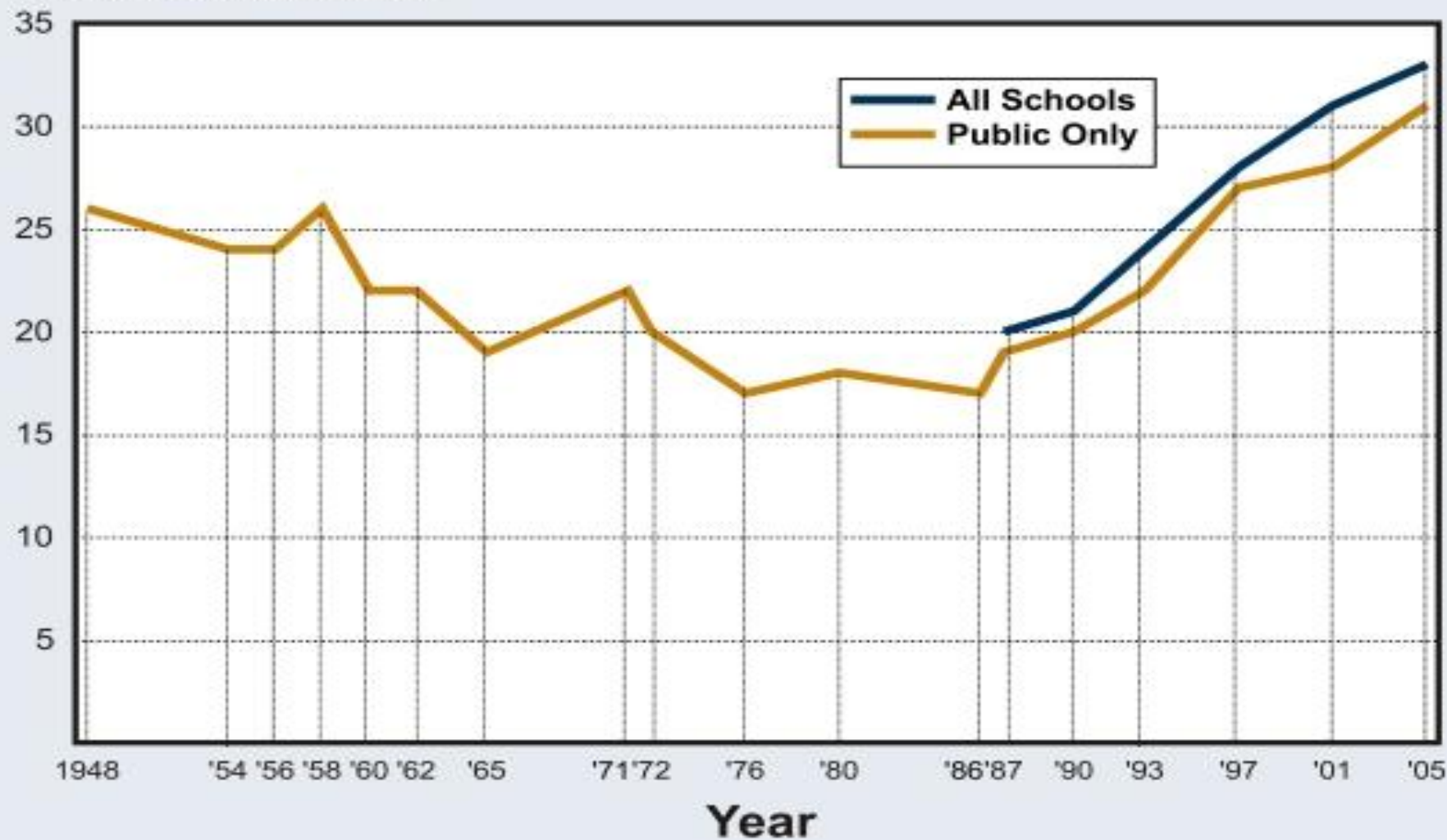


Source: AIP Statistical Research Center



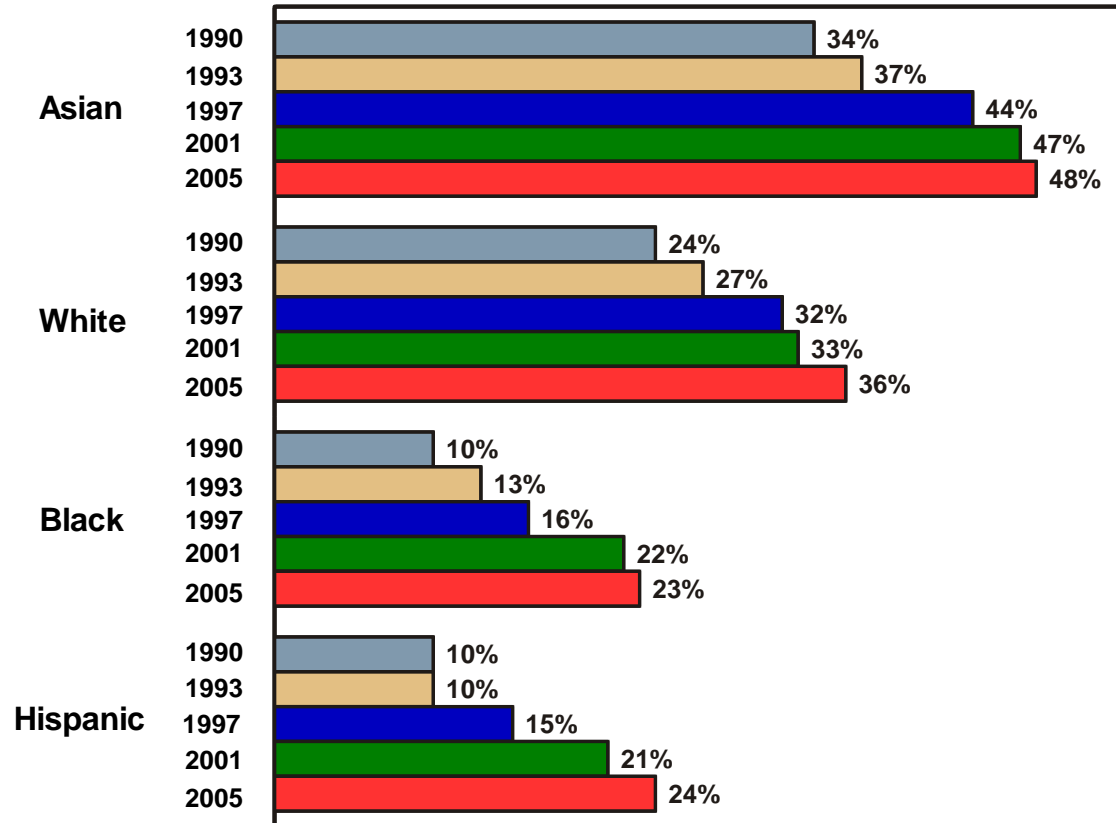
Figure 1. Physics Enrollment in U.S. High Schools, 1948-2005

% of seniors who have taken  
or are taking physics



AIP Statistical Research Center; 1986-87, 1989-90, 1992-93, 1996-97, 2000-01 & 2004-05 High School Physics Surveys;  
Pallrand et al. (1985); Dept. of Education., Nat'l Center for Education Statistics (Various Years)

# Percent of Students in Each Racial Group Taking Physics

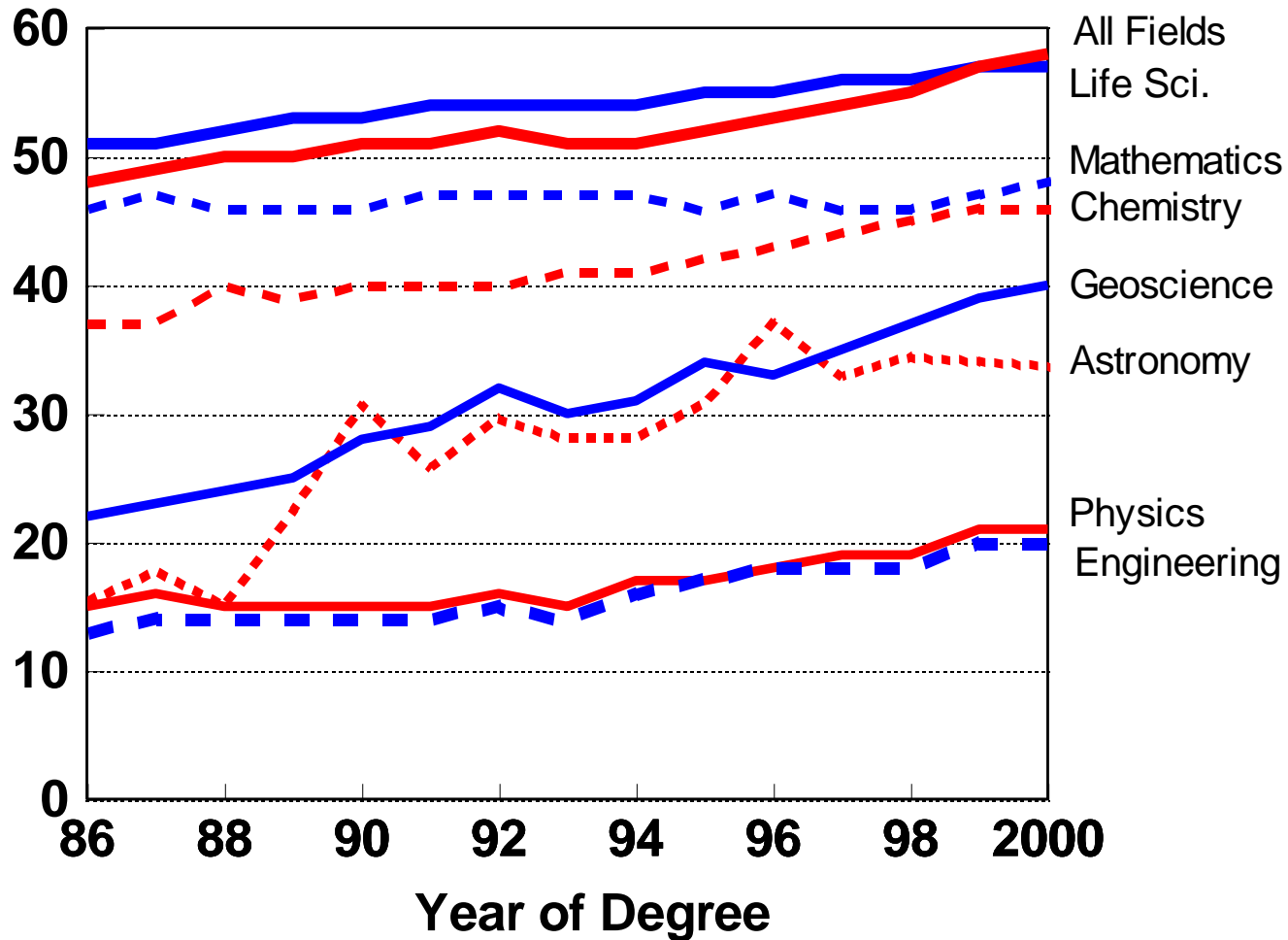


AIP Statistical Research Center: High School Physics Surveys

# Percent of physics bachelor's earned by women, classes 1978 through 2007.

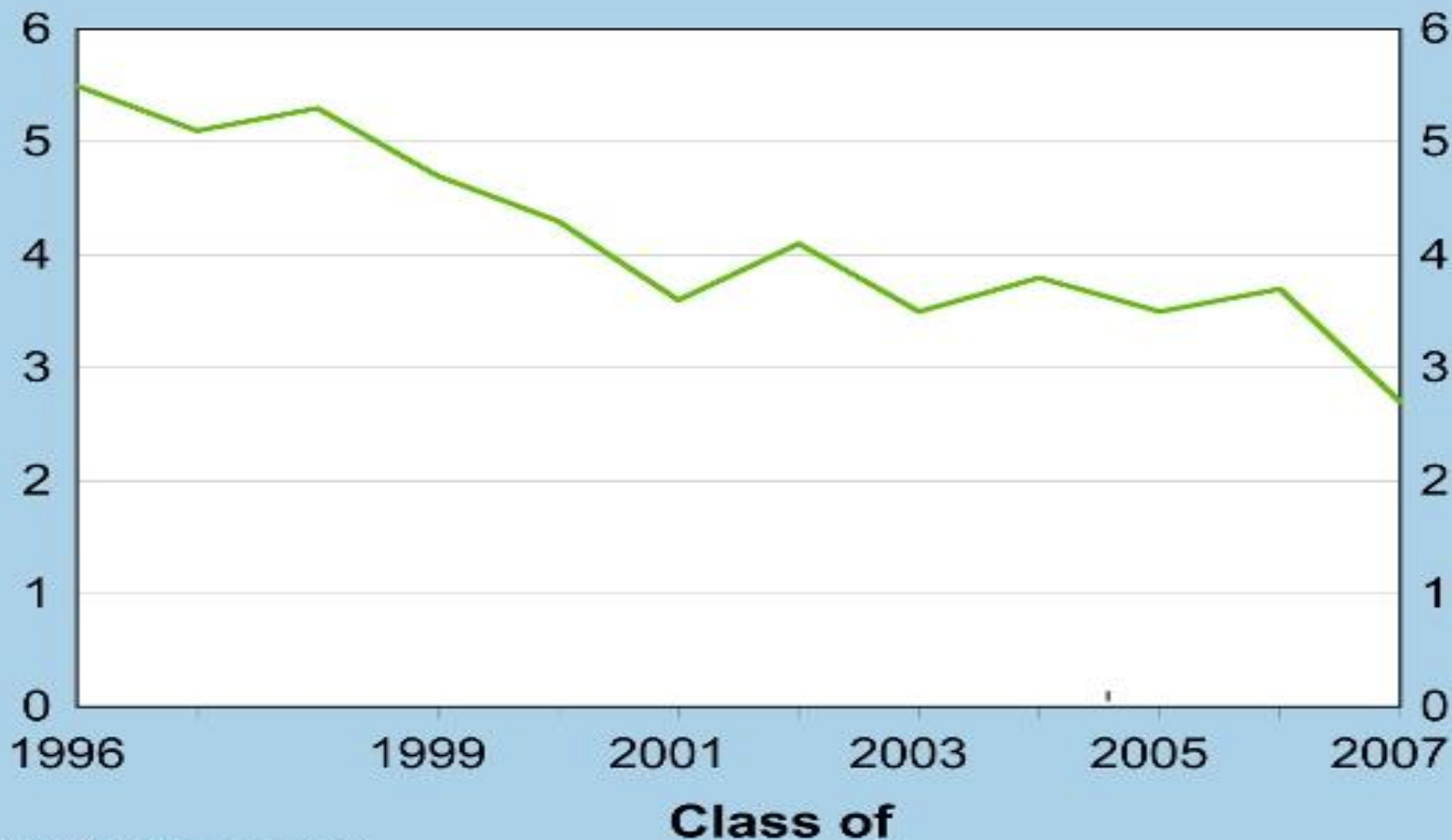


# Percent of Bachelor's Degrees Earned by Women in Selected Fields, 1986 to 2000



**Percent of physics bachelor's\* who were African American, classes 1996 through 2007.**

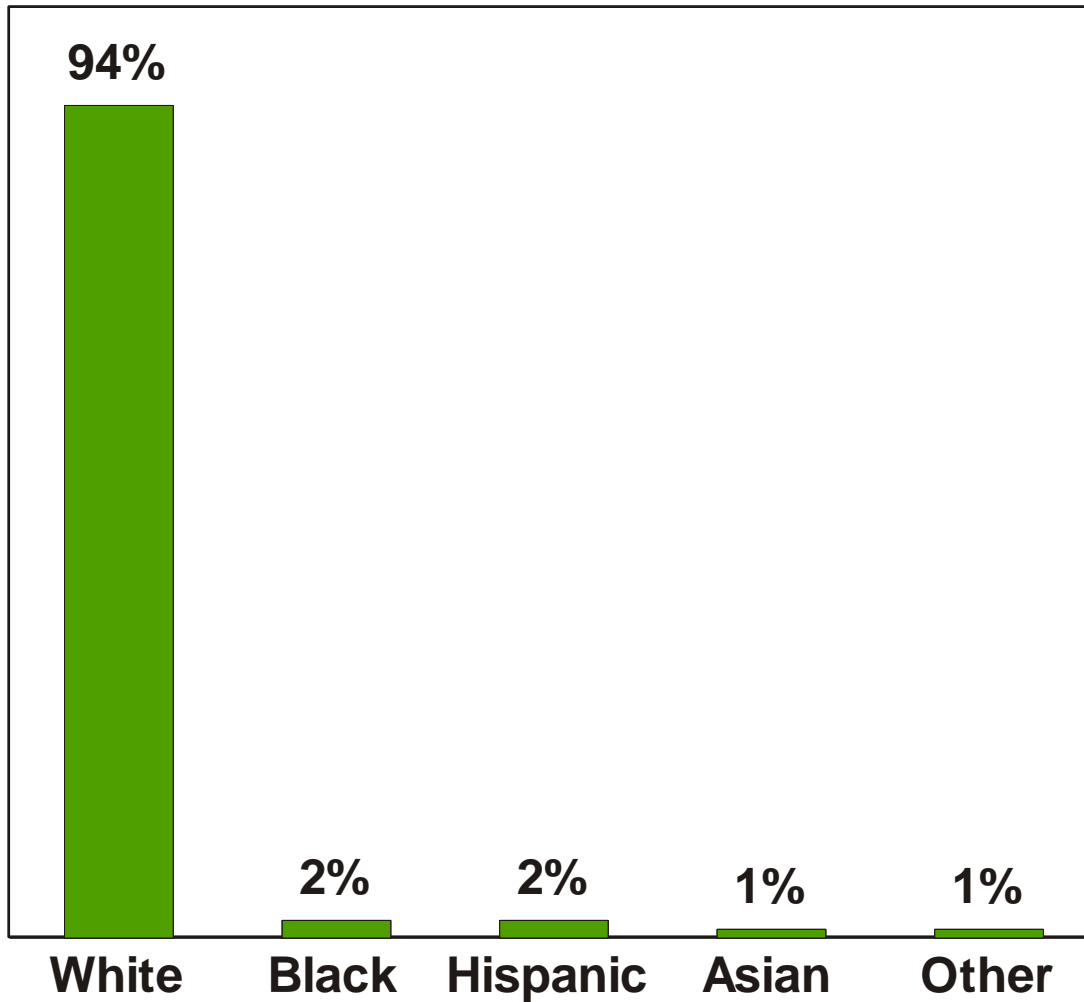
**Percent**



\* US Citizens only

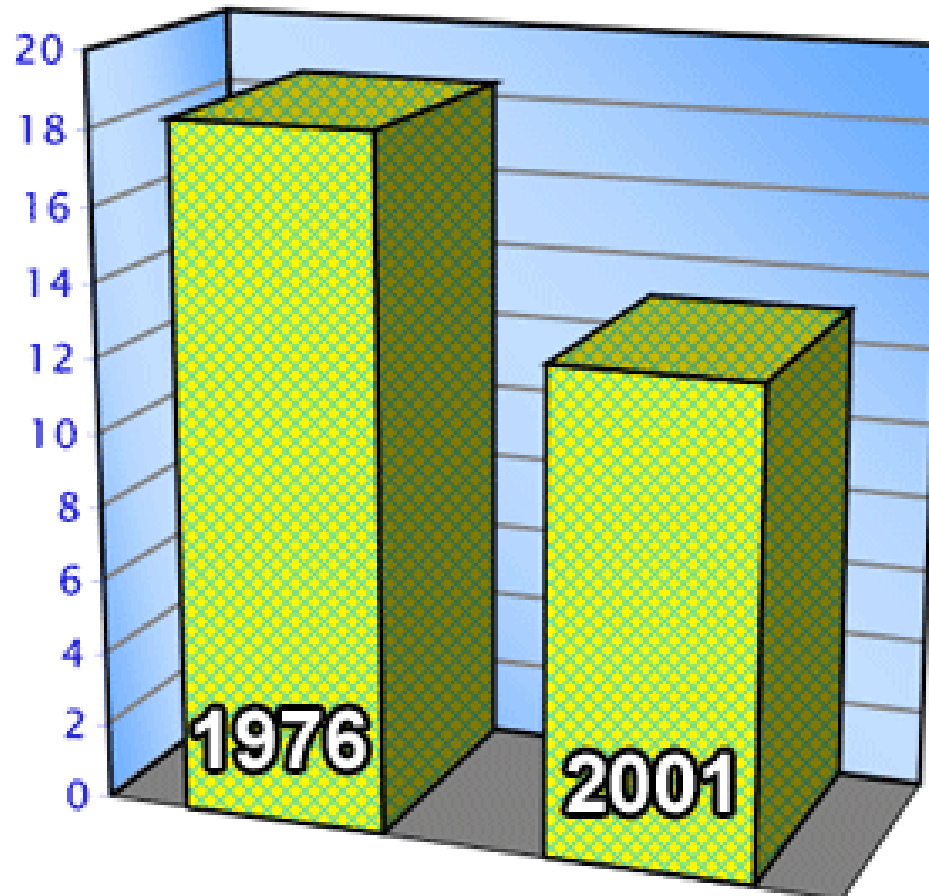
<http://www.aip.org/statistics>

# Race of High School Physics Teachers

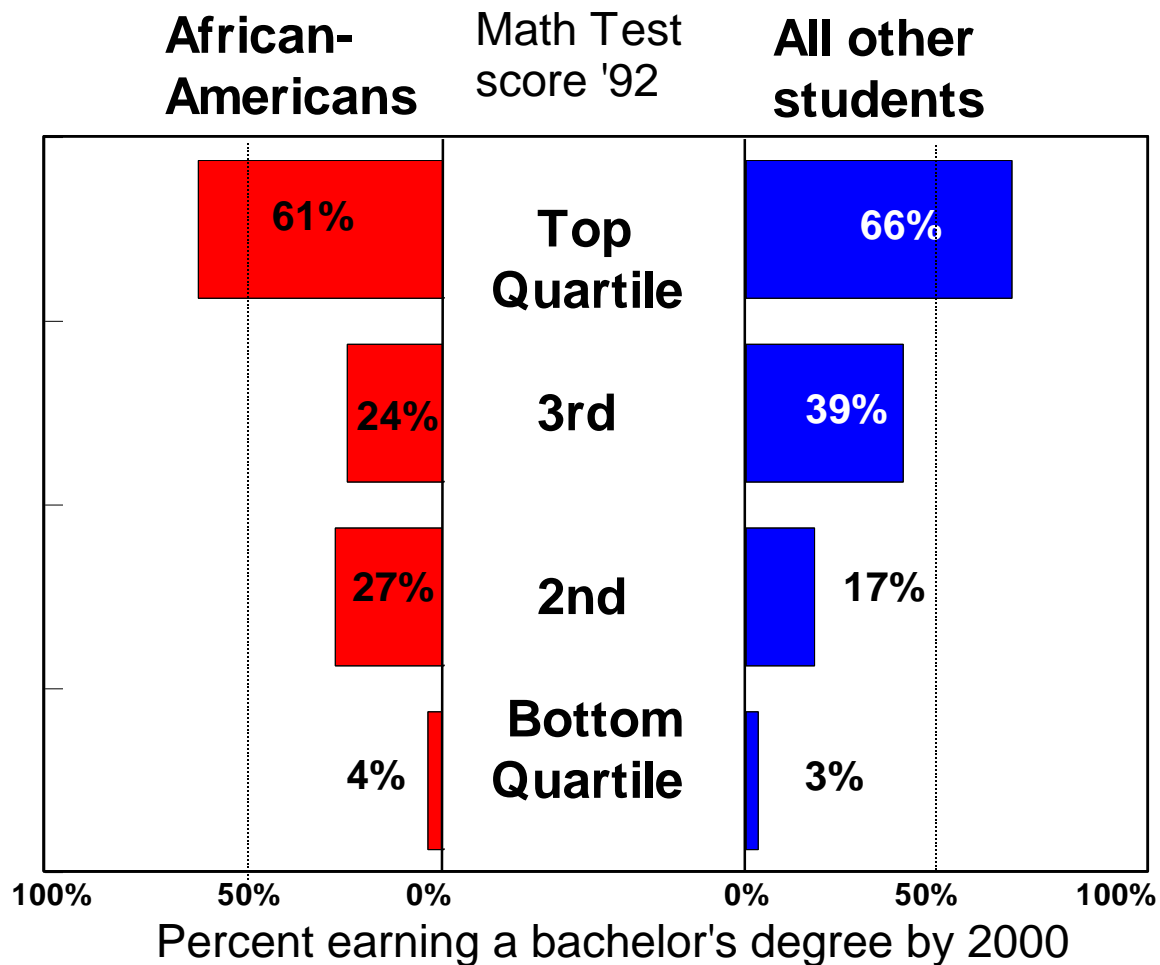


Source: 2000-01 AIP High School Physics Teacher Survey Rutgers – 6-05-10

## Percentage of All African-American College Students Who Were Enrolled at a Historically Black College or University



# Likelihood of earning a bachelor's degree by 2000, African-Americans compared to all others.



Source: NCES National Education Longitudinal Survey 1988, compiled by AIP Statistical Research Center



# Why Do Students Leave Science?

Tobias, S. 1990 They're not dumb, they're different.

climate, facts vs. concepts, what vs. why

Hewitt, N. and Seymour, E. 1991.

poor teaching, no support; weed-out mentality

Malcolm, S. 1991 and other studies.

atmosphere, discrimination, alienation, exclusiveness

**NOT THE ANSWER:** lack of intelligence, personal problems, laziness, poor TAs

# Research on Bias

- In every study, significant effect of gender or race of person evaluated
- **NO** significant effect of gender or race of person doing the evaluation

# Research on Bias

## Auditions for symphony orchestra positions

- Started using a screen, carpeting to hide gender of person auditioning
- Resulted in as much as a 60% increase in frequency of women being selected

*Goldin and Rouse, 1997*

»Rutgers – 6-05-10

Courtesy: Jo Handelsman

# Research on Bias

- Double-blind peer-review process
- 8% increased in women articles accepted for publication

» *A. Budden-New Scientist* – Jan 19,  
2008 (WSJ)

»Rutgers – 6-05-10

# Visual Priming

Images of great black figures positively affected ratings of black applicants

*(Blair et al., 2001; Dasgupta & Greenwald, 2001)*



# Reactions to Evidence of Bias

- Not here.....
  - “It’s like that in Sweden, but not here in the U.S.”
  - “It’s like that at rural universities, but not urban ones.”
  - “It’s like that at Harvard, but not at UW.”
  - “It’s like that at UW, but not at Harvard.”
  - “It’s like that in the economics department, but certainly not here in chemistry!”
- “Women and minorities are just too sensitive”
- “What’s the standard deviation in line 4 of Table 3 of the 1988 study?”

“Until our scientific and technological workforce reflects our diversity, we are not working to our potential as a nation.”

Constance A. Morella  
Former member, U.S. House of Representatives  
8<sup>th</sup> Congressional District, MD

# The Darden Perspective

- Are we paying attention to the differences that matter?
- Are we gaining knowledge about how those differences matter?
- Are we experimenting with how to do business as a result of those differences?



# The Greatest Fears.....

- Are we losing better minds than we are retaining?
- Are we losing “different” thinkers?
- Are we losing the most curious students?
- Are reducing the quality of education?

# Some Thoughts

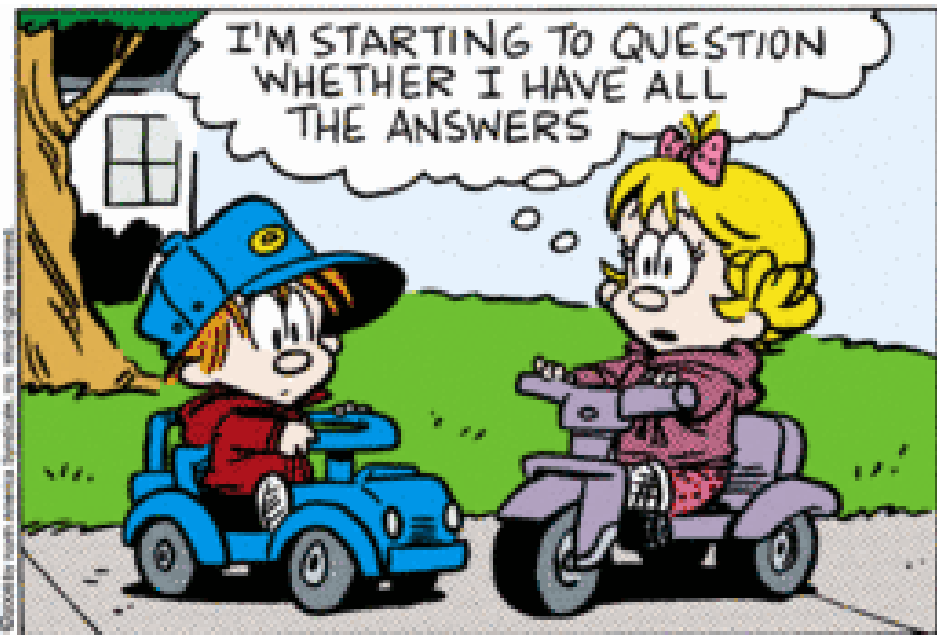
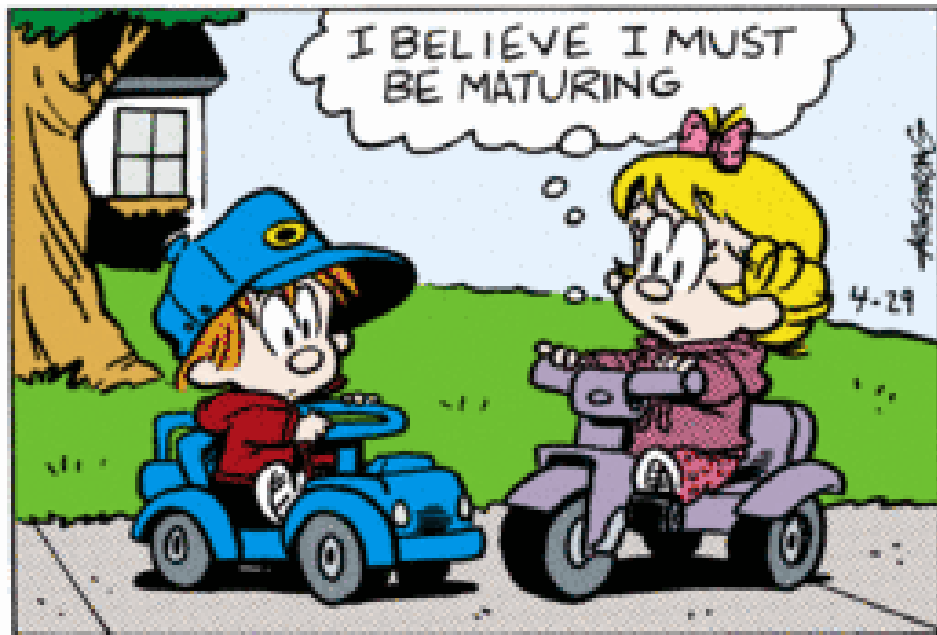
- Is the curriculum more than content?
- What set of experiences do you want students to have?
- To what extent are you having conversations with the customers?
- Are we focusing on what we know vs conventional wisdom?

# Some Thoughts

- Measure what is important, not what is easy (Measure what we value rather than valuing what we can measure)
- As you interact with prospective students– answer the question “What’s in it for them?”

# Things To Remember

- If at first you don't succeed, take time to figure out why
- If it's worth doing, it will take longer that you thought it would



# Acknowledgements

- Countless Students
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Madison