

# Teaching for Retention

James H. Stith  
Vice President Emeritus  
American Institute of Physics  
301 390 5914  
[jstith@aip.org](mailto:jstith@aip.org)

# The Issue

- Most Students, especially first generation students, know very little about what physicists do and whether their unique skills and attributes are a good match for a physics related career.
- Few faculty have received mentor training
- Despite years of concerted effort, the proportion of students from underrepresented group remains low and for some, continues to drop.

# Opening Reflection Opening Reflection

What is the value of a diverse physics profession?

What is my definition of diversity?

How do I improve my mentoring skills?

# Which Defines Your Department?

- Sorting and mining.
- Plant the seeds and cultivate the plants.

# Session Objectives

Participants will be able to:

- Reflect on the benefits and challenges of diversity in physics
- Identify the research basis for unconscious bias and stereotype threat and articulate the implications of such studies
- Use case studies to promote discussions about diversity
- Identify some mentoring skills/techniques that improve student success
- Discuss strategies to address the challenges and benefits of diversity
- Reflect on a personal definition of diversity.



# Personal Glimpses

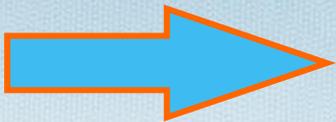
# I Believe...

Those educated in diverse settings are:

- More likely to be intellectually nimble and creative
- More likely to make meaningful contributions
- More likely to be effective team players
- More likely to be successful leaders
- More likely to do the right thing

# What Can We Do To Help Our Students?

Students need  
**good information**  
and effective models  
so they can learn to make  
**good decisions.**



# Characteristics of a Successful Program

- The students were made to feel as if they belonged.
- An atmosphere existed in which the expectation of both faculty and students was that students could and would succeed
- There was an individual that took ownership of the program
- The departmental faculty was willing to share their experiences and excitement about physics with their students
- Students held to high standards in a positive and nurturing environment
- Students were sponsored and promoted into the profession.

# Data on Unconscious Bias and Stereotype Threat

Parents' estimates of math ability are higher for sons than for daughters, despite no gender differences in grades or test scores.

(Yee, D.K. and J.S. Eccles. 1988. Parent perceptions and attributions for children's math achievement. *Sex Roles* 19: 371-333).

# Data on Unconscious Bias and Stereotype Threat

Blind, randomized trial: When asked to rate the quality of verbal skills indicated by a short text, evaluators rated the skills as lower if they were told an African American wrote the text than if they were told a white person wrote it, and gave lower ratings when told a man wrote it than when told a woman wrote it.

(Biernat, M., and M. Manis. 1994. Shifting Standards and Stereotype-Based Judgments. *Journal of Personality and Social Psychology* 66:5-20).

# Data on Unconscious Bias and Stereotype Threat

CVs of real women were assigned a male or female name, randomly, and sent to 238 academic psychologists to review either 1) at the time of job application or 2) at the time of review for an early tenure decision. Respondents were more likely to hire the applicant if a male name was found on the CV at the time of job application. Gender of applicant had no effect on respondents' likelihood of granting tenure when their CV was reviewed as part of an early tenure decision. However, there were four times more "cautionary comments" in the margins of the tenure packages with female names such as "We would have to see her job talk."

(Steinpreis, R. E., K. A. Anders, and D. Ritzke. 1999. The impact of gender on the review of the curricula vitae of job applicants and tenure candidates: A national empirical study. *Sex Roles* 41:509-527).

# Research on Bias

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

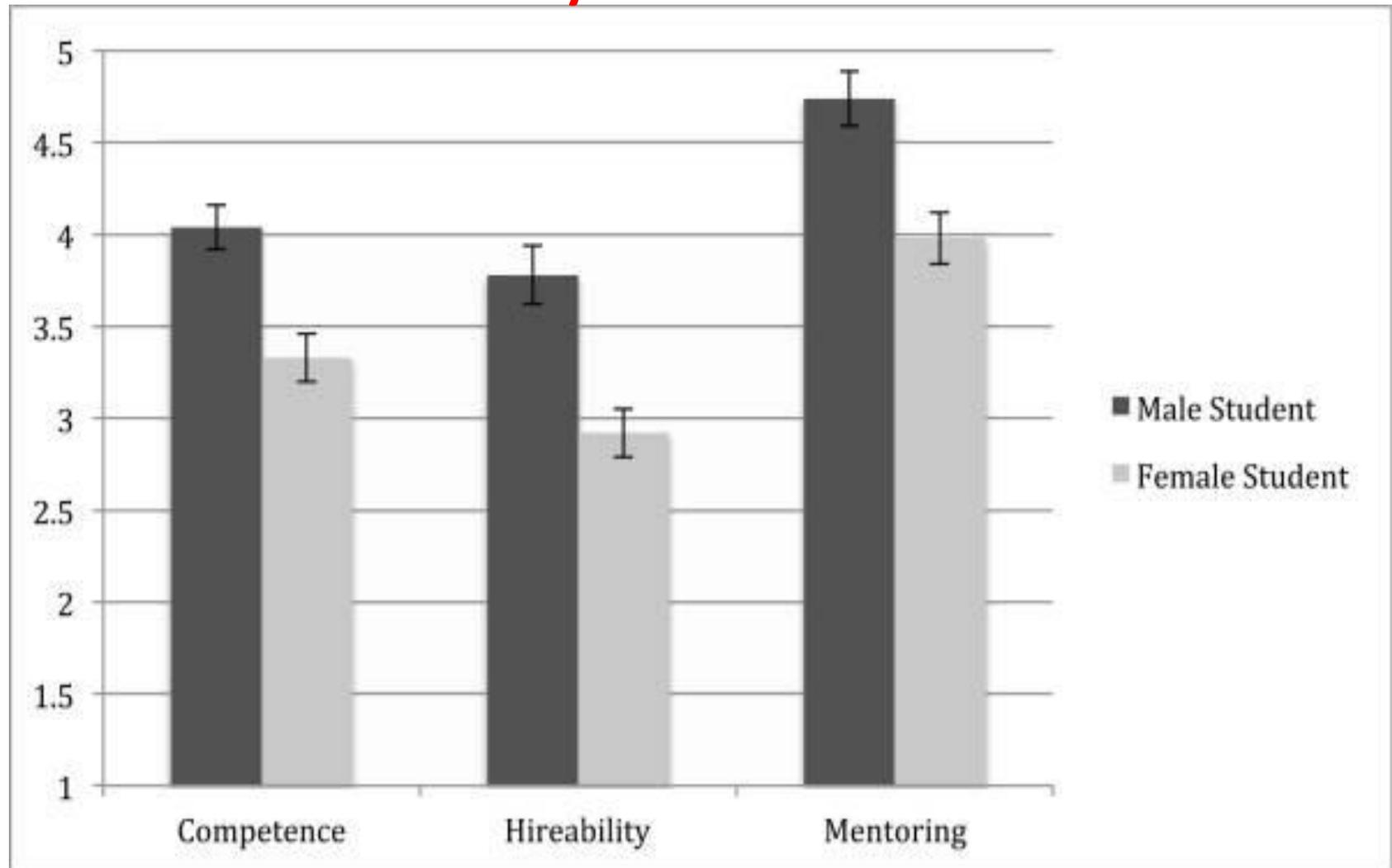
Courtesy: Jo Handelsman

# Reactions to Evidence of Bias

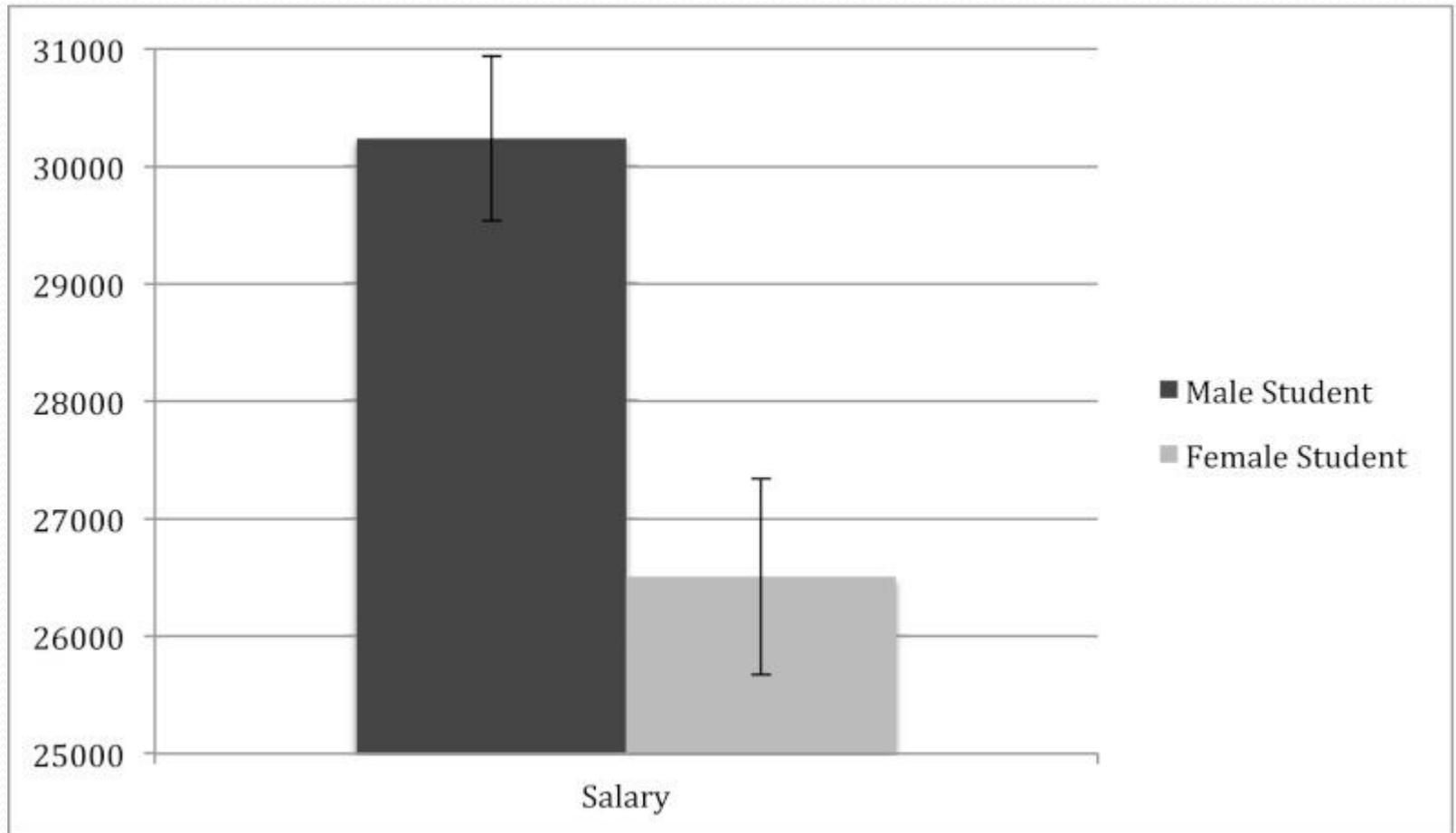
- Not here.....
  - “It’s like that in Sweden, but not here in the U.S.”
  - “It’s like that at rural universities, but not urban ones.”
  - “It’s like that at Harvard, but not at UW.”
  - “It’s like that at UW, but not at Harvard.”
  - “It’s like that in the economics department, but certainly not here in physics!”
- “Women and minorities are just too sensitive”
- “What’s the standard deviation in line 4 of Table 3 of the 19xx study?”

Courtesy: Jo Handelsman

# Competence, Hireability and Mentoring by Gender



# Starting Salary by Gender



PNAS 2012 Oct 9, 109(41)

# Tidbits for Leaders: What the Data Show

- **Images of great black figures positively affected ratings of black applicants** (Blair et al., 2001; Dasgupta & Greenwald, 2001)
- **Subjects will express less prejudice against African Americans if they are instructed to avoid prejudice** (Lowery and Harkin, 2001)
- **Evaluators exhibit less discrimination when the evaluation criteria is constructed first** (Uhlmann and Cohen, 2005)
- **Evaluators are more likely to rely upon underlying assumptions and biases when they cannot give sufficient time and attention to their evaluations** (Martell, 1991)

# Case Studies

- Why case studies?
- Spend time talking about your assigned case study with colleagues at your table. Be prepared to share/compare your strategy/conclusions with the larger group.
- In addition to the specific question asked, think about what your institution might do to address the issue presented in the case

# Assignments

Case Study	Tables
Which is the better approach?	Even
The First Day of a Physics Class	Odd

# Which is the better approach?

Paul Smith, an instructor in a physics class, is explaining to the class how to work out a particular problem. Sally, a student in his class, observes “Mightn’t it be faster to ...?” and continues by explaining her approach. Smith patiently explains that that is not the way it’s done and goes on to explain the problem. A few minutes later Sally raises her hand again and asks “Excuse me, but I’ve worked out the problem my way, I get your answer and my way seems more efficient. Would you at least tell me why it is wrong?” Smith is irritated and is about to go on when another student, John interrupts and says, “Sally is right. You should do it her way. I did it and it is a lot faster.” Smith looks over the problem again and then remarks to the class, “Well, I guess it’s never too late to learn new tricks. Thank you John, and you too, Sally.”

# The First Day of a Physics Class

You are a faculty member observing a recently hired instructor teaching his first day of a junior level physics course. Amy, a forty year old student in the department, is taking the course and as she sits down in the second row, you notice that she is the only female in a class of 20. The instructor walks in, announces the name of the class and says, “Is everyone sure they are in the right place?” He then turns around, looks straight at Amy, “This is Physics 500. Are you sure you are in the right place.” She looks at him and says, “I’m quite sure.” He goes on for another few minutes and asks her again for the third time. After class, the instructor comes to your office as scheduled and wants to know how you think he did. **What do you say?**

# Who gets the credit?

Marie Louise Moreau wondered whether she was the only student in her chemistry group who had read the assignment before coming to class. She had expected more when she had taken a plane from Haiti to study at a prestigious college in the United States.

She spoke up. “Well, when I was doing the reading,” she said, “there was a note in the sidebar that said you should add titrant slowly near the endpoint. That way, when the solution changes color, it is easier to tell how much titrant was added.”

Joe, her group’s self-appointed leader, looked at her with doubt. Could she be right? He didn’t want to rely on Marie’s word alone. “Adam!” he called to their TA.

Joe repeated Marie’s statement to Adam. “Is that true?” he said.

Good memory, Joe,” said Adam, clapping Joe on the shoulder. “That’s right. You’re an asset to your group.”

**What should Marie Do? What should other students in the group do?**

# Session Recap

We have:

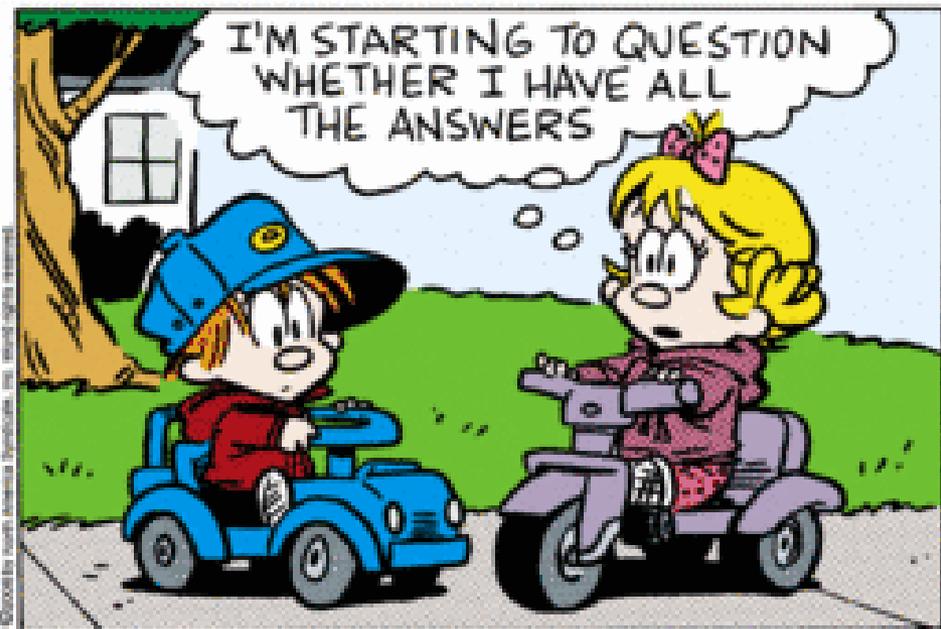
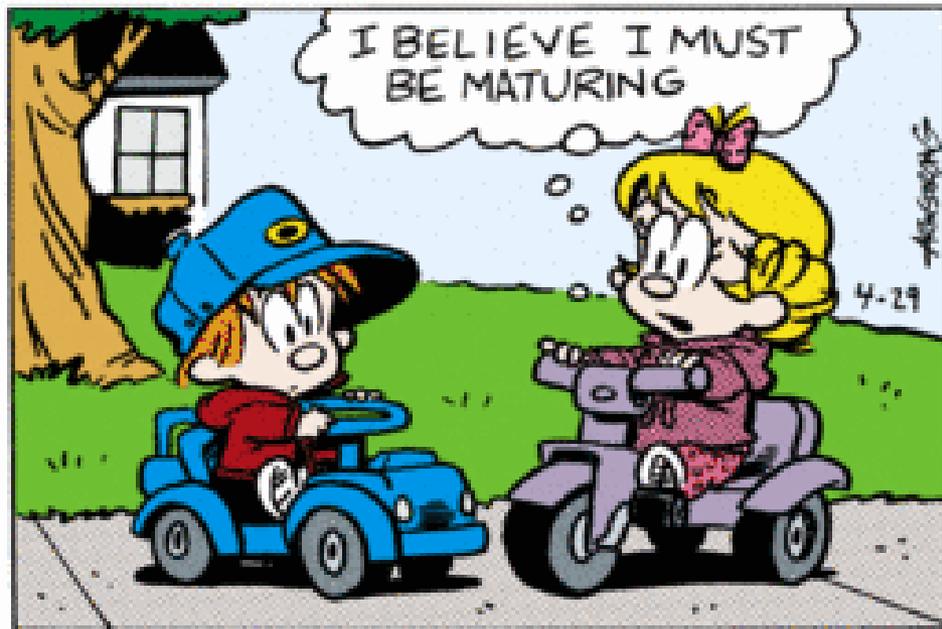
- Reflected on the benefits and challenges of diversity in physics
- Identified some research basis for unconscious bias and stereotype threat and articulated some implications of such studies
- Used case studies to promote discussions about diversity
- Identified mentoring skills/techniques that improve student success
- Discussed strategies to address the challenges and benefits of diversity
- Reflected on a personal definition of diversity.

# Closing Reflection

# Closing Reflection

What are 1 or 2 elements of your conception of diversity that you had not considered before this session?

What role do you see for mentoring as a tool for creating a more inclusive department?



# Acknowledgements

- Many students who taught me to listen
- Diversity Institute Team, Univ. Wis.-Madison  
<http://www.cirtl.net/DiversityResources/>
- Dr. Christine Stanley – Texas A&M
- Dr. Jo Handelsman – Univ. Wis.-Madison



Thank You!