

# Committee on the Status of Women in Physics Efforts for Gender Equity

Catherine Fiore, PhD  
Massachusetts Institute of Technology

Prepared for the **Women in Materials Science and Engineering Breakfast**  
Boston, MA  
December 2, 2009

## Outline:

- CSWP
- The Gender Equity Conference
- Conversations on Gender Equity



# Committee on the Status of Women in Physics

- The Committee on the Status of Women in Physics (CSWP) was founded in 1972 to address the encouragement and career development of women physicists.
- The Committee consists of nine volunteer members appointed for 3 year terms by the President of the APS.
- Throughout its 37-year history, CSWP has been an active sponsor of studies, programs and publications to foster women in physics.
- [http:// www.aps.org/about/governance/committees/cswp/index.cfm](http://www.aps.org/about/governance/committees/cswp/index.cfm)

## A partial list of activities:

Publishes CSWP Gazette twice yearly

Conducts site visits on climate to universities/national laboratories

Sponsors Career Development Workshops twice a year

Administers M. Hildred Blewett Scholarship

Sponsors Childcare Grants for the National meetings

Sponsors networking activities at the National meetings

Participates in the IUPAP conference on Women in Physics

Gender Equity Conference

Gender Equity Conversations Visits

# CSWP site visits

- Site visits are only done at the request of the organization's leadership
- The goal is positive – to improve the climate for women in physics
- Management is expected to actively participate and promote employee participation
- The survey process invites the participation of the entire workforce including men
  - Includes the opportunity to provide anonymous comments to the site visit team
- Information is requested on many aspects of the institution

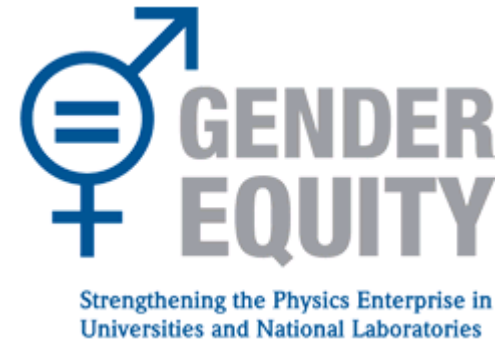
The goals of these visits are three-fold:

1. Identify a set of generic problems commonly experienced by minority and/or women physicists.
2. Intervene to solve many of these generic problems.
3. Address problems arising in the particular physics department or lab visited and help improve the climate for minorities or women (both students and faculty) in the facility.

# CSWP site visits

2009	MIT ** University of Oregon Nat'l Superconducting Cyclotron Lab * **	2003	Purdue University University of Minnesota Duke University Ohio State University	1994	SUNY at Stony Brook University of Texas/Austin Stanford University Harvard University University of Rochester North Carolina State University
2008	Fermi Nat'l Accelerator Laboratory* ** Lawrence Berkeley Nat'l Laboratory*	2002	Argonne National Lab * University of Wisconsin University of Iowa NASA/Goddard * **		
2007	Vanderbilt University Indiana University	2001	University of Maryland (return visit)	1993	Michigan State University University of New Mexico Kansas State University
2006	JILA/Boulder*	2000	College of William & Mary UCAR/NCAR * Penn State University	1992	RPI Williams College University of Illinois at Urbana Champaign
2005	University of Michigan NIST/Gaithersburg * NIST/Boulder * Iowa State University	1998	University of California/San Diego	1991	University of Pennsylvania Bryn Mawr College University of Virginia
2004	University of Washington Colorado School of Mines University of Arizona	1997	Columbia University University of Colorado/Boulder	1990	University of Maryland
		1996	California Institute of Technology		

# Gender Equity Conference: Strengthening the Physics Enterprise in Universities and National Laboratories



**Sponsored by the APS  
Committee on the Status of  
Women in Physics with  
support from NSF and DOE  
May 6-8 2007**

## Topics:

- Defining the Issues
- Equity and Bias
- Challenges and Opportunities
- Recommendations to Increase Recruitment, Hiring, Retention, and Promotion
- Training the Next Generation
- Challenges and Opportunities for the Funding Agencies



Physics Department Chairs from 50 major research universities, representatives from over a dozen national labs plus representatives of several funding agencies attended.

# Defining the Issues:

## Continued growth in US productivity depends on continued growth in STEM sector

Over 50% of productivity increase over past half century ascribed to science and technology.

From 1965 to 1995 the size of the US science and technology workforce grew from 11% to 15%.

The census bureau projects that by 2050, the percentage of the potential workforce in the US comprised of white males will drop from 38% to 26%.

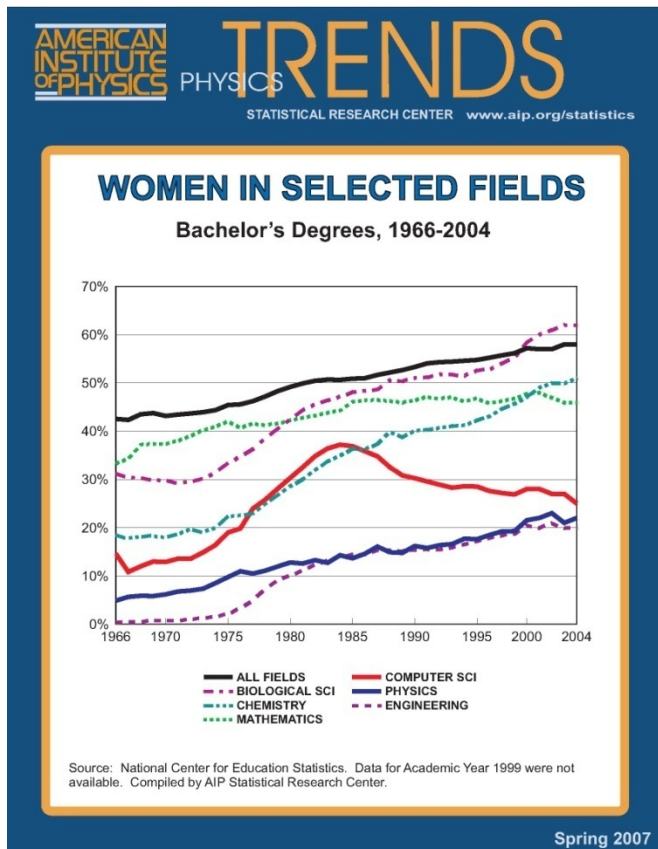
Currently most STEM degrees other than in biological sciences are earned by white males.

To maintain an adequate science and technology workforce, we must increase participation by under-represented groups: women, Hispanics, African-Americans.



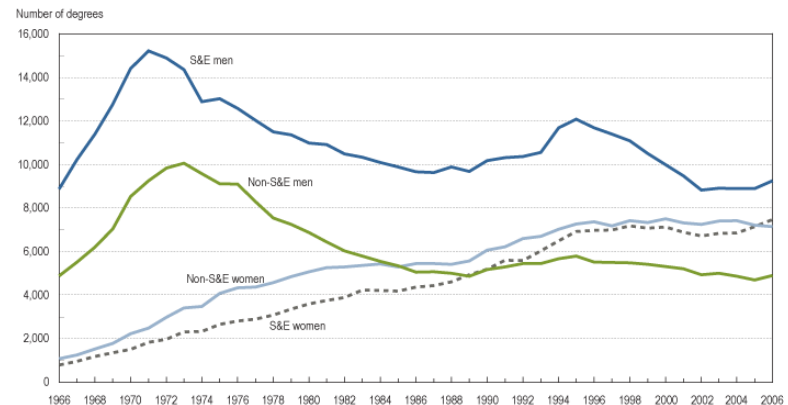
Arthur Bienenstock, past president of APS, showed that the needs for educated STEM workers can only be met by increasing participation by women and under-represented minorities.

# Defining the Issues: Growth Trends in Science and Technology



Participation by women is rising in most STEM fields—physics and engineering are still well behind biology and chemistry

## Doctoral degrees awarded in S&E and non-S&E fields to U.S. citizens and permanent residents, by sex: 1966–2006



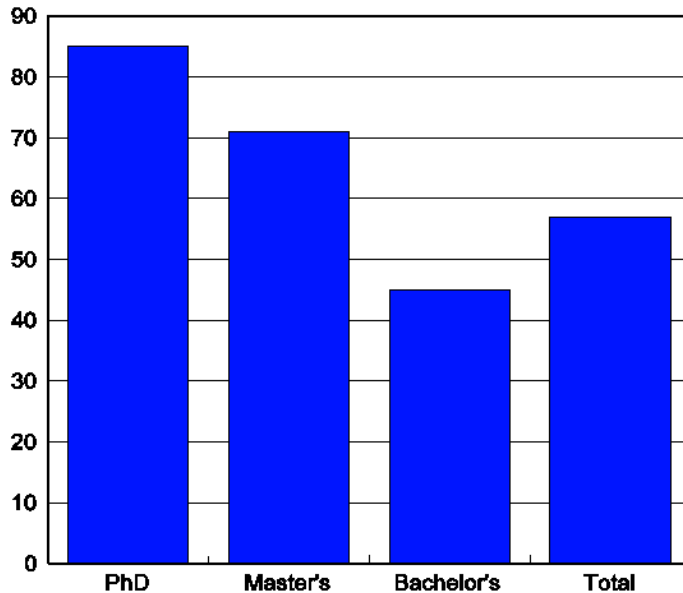
SOURCE: National Science Foundation, Division of Science Resources Statistics, Survey of Earned Doctorates, 1966–2006.

Growth in science and engineering doctorates since 1985 is from increased participation by women



# Defining the Issues: Equity in the Academy

**Percent of physics departments with women faculty in  
professorial ranks, 2006**



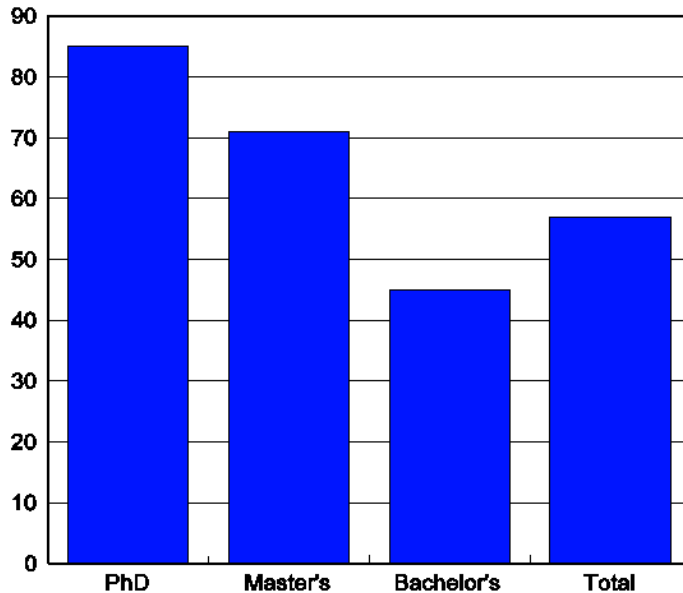
*AIP Statistical Research Center, 2006 Academic Workforce Survey.*

Most PhD granting institutions now have at least one or more women in the physics faculty.

As of 2006, 43% of all physics departments had no women faculty

# Defining the Issues: Equity in the Academy

**Percent of physics departments with women faculty in professorial ranks, 2006**



AIP Statistical Research Center, 2006 Academic Workforce Survey.

Most PhD granting institutions now have at least one or more women in the physics faculty.

As of 2006, 43% of all physics departments had no women faculty

Women disproportionately populate non-tenure track faculty positions.

Women faculty percentage is higher at bachelor and masters granting institutions

**Percent of faculty positions in physics held by women.**

	1998	2002	2006
<b>Academic Rank</b>			
Full Professor	3	5	6
Associate Prof.	10	11	14
Assistant Prof.	17	16	17
Instructor/Adjunct	N/A	16	19
Other ranks	13	15	12
<b>Type of Department</b>			
PhD	6	7	10
Master's	9	13	16
Bachelor's	11	14	19
<b>OVERALL</b>	<b>8</b>	<b>10</b>	<b>13</b>

AIP Statistical Research Center, 2006 Academic Workforce Survey.

# Defining the Issues: What is holding women back?

Beyond Bias and Barriers: Fulfilling the Potential of Women in Academic Science and Engineering

A report by the National Academy of Science, 2007

The over arching conclusion of this report is that women in science and engineering are held back from achieving their full potential, not by a lack of drive or talent, but by unintentional biases and by institutional structures that hinder their advancement.



Alice Agogino, UC Berkely, an author of this report, stressed the impact of department and laboratory leadership on successful recruitment and retention

# Equity and Bias:

## Exploring Unintended Bias

- ❑ Virginia Valian, Hunter College: Ingrained cultural perceptions about gender play a strong role in how women are regarded and treated in the physics community.
- ❑ Schemas are tools used in the human brain for efficient storage and retrieval of information important to survival- a shorthand summary of observations- they encode stereotypes and presumptions into mental images
- ❑ If one has stored an image of a physicist as a male, overly focused on research to the exclusion of all else, then the tendency is to give greater credence to those who fit the inner image.
- ❑ This adds up over time to an advantage for the traditional candidate in hiring and promotion decisions.
- ❑ It is critical that search committees, compensation committees, tenure committees, be trained to recognize and counteract these unintended biases
- ❑ Example: letters of recommendation use different terms for different candidates, e.g. independent vs team player.

# Challenges and Opportunities

## The problem:

- ❑ Caretakers fear that they are perceived as less serious; Fear that co-workers see them as shedding responsibility.
- ❑ May take unreasonable steps to avoid such perceptions:
  - Not taking adequate time off for childbirth
  - Missing school functions
  - Not taking advantage of tenure clock policies

## Solutions:

- ❑ Make childbirth policies “opt out” rather than “opt in”
- ❑ Encourage all genders to be open about caretaker responsibilities



Robert Drago, Penn State University, described the negative perception of caretaker responsibilities and the “bias avoidance” phenomenon.

# Challenges and Opportunities

## Recruitment:

- Identify potential candidates early

## Hiring:

- Train search committees
- Broadly define job description
- Pay attention to the two body problem

## Retention:

- Improve climate
- Networking
- Implement Effective Policies

## Promotion:

- Make promotion process transparent
- Effective mentoring



Ana Mari Cauce, University of Washington,  
Pat Falcone, Sandia National Laboratories  
Myron Campbell, University of Michigan,  
Mildred Dresselhaus, MIT  
Mary Ann Mason, Berkeley  
participated in a panel discussion: “Challenges to Institutions; Recruitment and Hiring, Retention and Promotion”

# Recommendations to Increase Recruitment, Hiring, Retention, and Promotion

Patricia Rankin, University of Colorado:

- Change must be both top down and bottom up
- Workshops for women to improve negotiation, networking, and communication skills are essential
- Commitment to institutional improvement by senior management also necessary

Sue Rosser, Georgia Tech:

- Advance grants are an important tool in increasing participation and advancement women in science and technology



Attendees joined breakout sessions over lunch to discuss issues of recruitment, hiring, retention and promotion

# Recommendations to Increase Recruitment, Hiring, Retention, and Promotion

Laurie McNeil, University of North Carolina:

- Use innovation to deal with two body problem—try pooling with nearby institutions

Natalie Roe, Lawrence Berkeley Laboratory:

- Use broadly defined job descriptions to increase candidate pool
- Have formal mentoring program for junior employees
- Increase transparency around evaluation and promotion process



Panel members summarize the results from the break out sessions, add information about successful programs



# Training the Next Generation

Establishing a healthy climate for women students

Barbara Whitten:

- Increase recruitment of women majors
- Have student study lounges for majors
- Improve quality of introductory courses
- Promote community events for students: SPS, pizza lunches with faculty, using majors as tutors

Howard Georgii:

- Meet with the women students and pay attention to their needs



Meg Urry, Yale, joins Barbara Whitten, Colorado College, Howard Georgii, Harvard and Keiven Stassun, Vanderbilt (not pictured) to discuss best practices for students.

# Training the Next Generation

Meg Urry (standing in for Marc Kastner of MIT):

- MIT provides childcare accommodation for graduate students
- Women students have a dedicated lounge area and monthly dinner courtesy of a generous alumna
- Women graduate students pair with undergraduates to provide mentoring
- Women graduate students participate in recruitment of new graduate students

Keiven Stassun:

- Vanderbilt partners with HBCU Fisk University to seamlessly move — Fisk masters students into doctoral programs at Vanderbilt
- Effective for increasing participation of both men and women in physics



# Challenges and Opportunities for the Funding Agencies

Pat Dehmer:

The government is committed to fighting discrimination

The funding agencies are concerned with future shortfalls in the STEM workforce

Judith Sunley:

NSF has a long track record for encouraging increased participation for women in science and engineering.

Advance grants to university programs are designed to increase participation

NSF tracks gender information in the grant process



Nora Berrah, conference chair, introduced Judith Sunley, NSF, and Pat Dehmer, DOE to discuss commitment of the US government to increase participation by women and minorities in science and engineering fields

# Challenges and Opportunities for the Funding Agencies

Make grant process more family friendly:

- Increase length of grant period to cut paperwork
- Provide extensions for maternity coverage
- Provide mechanism for dealing with maternity for post-doctoral students
- Provide for child-care needs with grant related travel

Eliminate gender and racial bias in grant decision process

Educate students early in grant application process:

- Bring post-doctoral students into grant review process
- Encourage graduate students to participate in grant preparation



Arthur Bienenstock moderates a panel comprised of Erich Rolting of DOE, Joe Dehmer, W. Lance Hayworth, and G. Wayne van Citters, all of NSF who discussed how the funding agencies can help

# Recommendations

30 recommendations were generated and are included in the final report, available at <http://www.aps.org/programs/women/workshops/genderequity/upload/genderequity.pdf>

“Constant collection and monitoring of data to chart equity progress, coupled with attention family friendly policies, subtle biases in promotion and tenure processes, and support from top leadership are needed for women to advance in academic science.”  
Sue Rosser, Georgia Tech

“If you make all your women students and faculty feel more valued by your speech and actions—including speaking up for family friendly practices—and if you publically chastise those that make demeaning or snide comments, you will find the rewards are great.” Judy Franz, APS

“Spreading best practices through workshops makes the environment better for everyone, not just women.” Patricia Rankin, University of Colorado



Sherry Yennello summarized the recommendations generated by the participants

“The best thing you can do for your students—male and female—is to become a feminist.” Howard Georgii, Harvard University

# Going Forward: Gender Equity Conversations

A program to facilitate internal discussion in physics departments of gender equity issues and solutions has been initiated with NSF funding.

The goal is to have the faculty and staff formulate solutions that will fit within the culture of the department. By having departments take ownership of the problems, effective change is more likely.

Teams comprised of 2 or 3 physicists travel to the physics department/national labs to facilitate internal discussion on gender equity in their institution.

Visits are at the invitation of the institution.

The department deploys a host committee, comprised of the department chair, an advocate for improvement who can take ownership of the process, and a department member who understands the culture of the department.

# Gender Equity Conversations

## The Process

After an initial consultation between the visiting and host committee (joint committee) meets with a cross section of people from all groups in the department: staff, undergraduates, graduates, post-docs, and faculty. These participate in an exercise to determine what are the challenges to women thriving in physics in a.) the department, b.) the university, and c.) the broader community. Discussion and summary by the participants distills this into a list of challenges to be addressed.

The joint committee meets in turn with staff, undergraduates, graduate and post doctoral students, then faculty to solicit solutions to the challenges raised.

The joint committee meets with faculty to brainstorm what solutions can be implemented in the department. Cultural impediments to change are explored.

The joint committee prepares a list of action items to be pursued by the department, and prepares notes on the meeting.

# Gender Equity Conversations

## The Program so Far

- Three visits this fall. Three pending. Fifteen are planned by the end of CY2010.
- The perceived challenges at each institution are different.
  - Family friendly issues dominated at one location.
  - Mentoring and advising was the major issue at another.
  - Civility and community issues also emerged.
- Visits have been enthusiastically received. By the end of the day, the process is clearly in the hands of the department.
- The host committees have all drafted a list of action items and committed to begin working on them.



Catherine Fiore, Sherry Yennello, Jarita Holbrook, Mike Thoenessen, and Patricia Rankin prepare for the first Gender Equity Conversations Visit



# Acknowledgements

## **Organizing Committee**

Nora Berrah, Co-chair, Western Michigan University

Arthur Bienenstock, Co-chair ,Stanford University

Kimberly Susan Budil , Lawrence Livermore National Laboratory

Catherine Fiore, Massachusetts Institute of Technology

Theodore Hodapp, American Physical Society

Patricia Rankin , University of Colorado

Claudia Megan Urry , Yale University

Sherry J. Yennello, Texas A&M University

## **APS Staff Liaison**

Sue Otwell

## **Funding Agency Representatives**

Beverly Kobre Berger  
National Science Foundation

Tammy Bosler  
National Science Foundation

Dana Lehr  
National Science Foundation

Kathleen McCloud  
National Science Foundation

Wendy Fuller Mora  
National Science Foundation

Linda Blevins  
US Department of Energy

Eric Rohlfing  
US Department of Energy