



## AAPT Programs & Conferences Tools

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### Interactions of Gender and STEM Environments

**Committee on Research in Physics Education** | **Type:** Inv/Con | **Organizer:** Ramon Steven Barthelemy

#### Description:

**Call for Papers:** This session will present research focusing on the gendered lives of physicists. We particularly encourage submissions from research that does not focus on gender gaps, or the comparisons of men and women to each other.

#### Abstracts Submitted (# 5)

**Abstract Title:** Beyond Representation: Data on Women's Careers in Physics\*

**Paper Type:** Invited

**Author:** Rachel Ivie

American Institute of Physics

1 Physics Ellipse

College Park, MD 20740-3843

301-209-3081 (p)

rvie@aip.org

**Speaker Order:** DF01

The number of women earning physics degrees is increasing, but the percentages remain low. Although the physics and astronomy communities commonly focus on increasing the representation of women, data from two American Institute of Physics studies show differences in areas that have real impact on women's careers regardless of their representation in the fields. For example, data from the Global Survey of Physicists show that women have access to fewer career-advancing opportunities and resources and that this slows career progress. These effects hold constant across a variety of countries. Results from another study, the Longitudinal Study of Astronomy Graduate Students, show several factors that increase women's likelihood of working outside the field. These include rating graduate advisors less favorably and having a "two-body" problem (needing two jobs in the same geographic area).

**Footnotes:** \*Partially funded by NSF and Henry Luce Foundation. \*\*Sponsored by Ramon Barthelemy

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**Abstract Title:** Effects of Workshop Group Gender Balance on Student Exam Performance**Paper Type:** Contributed**Author:** Judy Hardy

University of Edinburgh

School of Physics and Astronomy, James Clerk Maxwell Building, Mayfield Rd

Edinburgh, EH9 3JZ UK

+44 131 650 6716 (p)

j.hardy@ed.ac.uk

**Speaker Order:** DF05

A number of studies have reported on the influence of gender balance in group-based teaching environments on student assessment performance. Inspired by the results presented by Andrew Duffy at the 2014 AAPT Summer Meeting, we have conducted an experimental intervention in our introductory physics class at the University of Edinburgh, UK. This is a calculus-based course at a large, research-intensive university, and is taught in a 'flipped classroom' format. The class consists of around 280 students, around a quarter of whom are female, and is taught in four workshop sections. Within the workshops, the students are seated in groups of five or six. We manipulated the seating arrangements (without highlighting our intentions to the students) such that in two of the sections, groups containing female students were either gender-balanced or contained more females than males ('balanced groups'). In the remaining two sections, groups were allocated randomly, such that there were typically only one or two female students per group ('random groups'). We investigated student performance in these grouping types, and found that female students in balanced groups outperform female students in random groups by nearly 10 percentage points in the final exam, a highly statistically significant result. Male students in the balanced groups also outperformed their randomized equivalents, but not to a statistically significant extent. Causation is difficult to unambiguously determine, but it appears that prior ability in physics, major/non-major status and country of origin of the students are insufficient to explain the observed differences in performance.

**Change Session**☒ No ☐ Yes**Order** (Sorters Suggested order)☐

Comment:

**Abstract Title:** Gender In PER: What's Been Done, How Should We Move Forward?**Paper Type:** Invited**Author:** Jennifer Blue

Miami University - Oxford  
500 East Spring Street, Kreger 217  
Oxford, OH 45056  
(513) 529-5629 (p)  
bluejm@muohio.edu

**Speaker Order:** DF02

Much work has been done on gender in the PER community. Many of these works focus on gender difference in participation, performance and attitudes towards physics. There are three critiques of this work, 1) it does not question whether the performance of men is the most appropriate standard, 2) individual experiences and student identities are undervalued, and 3) the binary model of gender is not questioned. This talk will focus on a brief discussion on what has been covered in the literature base, regarding gender, a proposed conception of gender that is more up-to-date with other fields, and examples that highlight how individual identities are grounded in this new proposed conception of gender.

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**Abstract Title:** Undergraduate Research Outcomes at Primarily Undergraduate Institutions --Does Gender Matter?

**Paper Type:** Contributed

**Author:** Birgit Mellis

University of St. Thomas

Department of Chemistry and Physics, 3800 Montrose Blvd

Houston, TX 77006

7135252129 (p)

mellisb@stthom.edu

**Speaker Order:** DF04

For undergraduate students in the early stages of their scientific careers, one of the most important experiences in deciding whether to continue in STEM fields is participation in undergraduate research. The communication of research results via presentations or publications is a measure of the level of scientific engagement by undergraduate students. We collected data on the on-campus research experiences of nearly 800 undergraduate students in the STEM fields of physics and chemistry at four Primarily Undergraduate Institutions (PUIs) from 2004-2013 and analyzed them regarding the gender of research participants and their advisors, discipline of study, and research outcomes, i.e., in form of theses, presentations, and peer-reviewed publications. The effects of gender in the outcomes will be discussed.

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**Abstract Title:** Women's Persistence in Undergraduate Astronomy: The Roles of Support, Interest, and Capital**Paper Type:** Invited**Author:** Melinda McCormick

Western Michigan University

1903 W Michigan Ave

Kalamazoo, MI 49008-5202

616-212-8851 (p)

melinda.m.mccormick@wmich.edu

**Speaker Order:** DF03

This study uses data from qualitative interviews with successful female graduate students in astronomy to explore female student success in undergraduate physics departments. The data suggest that some of the aspects of Whitten et al.'s 2003 model of the loom were important for these female graduate students when they were undergraduates in astronomy. These aspects include the role of faculty support through an undergraduate's education, the provision of engaging introductory courses, the importance of community amongst students, and more. However, the results also suggest that there are other factors that influence the success of the students, such as a love of the field of study and available resources in terms of different types of capital. The authors argue that in order to increase numbers of female students in the field, these considerations also need to be addressed.

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