

The GW Department of Physics is proud to announce the Fall 2015

Frances E. Walker Lecture

Factors Affecting STEM Retention Inside and Outside the Physics Major

Dr. Gay Stewart

Eberly Professor of STEM Education

Department of Physics, West Virginia University



The University of The University of Arkansas – Fayetteville implemented changes in its undergraduate physics program beginning in 1994 that dramatically increased the number of students graduating with a major in physics from an average of 1-2 students per year for most of the years from 1990-1998 to 27 graduates in 2012. With the selection of the department as a PhysTEC program in 2001, the number of physics students entering high school teaching also began to dramatically increase. Upon joining the West Virginia University physics department, we began to quantitatively investigate the effect of physics classes on the retention of STEM (Science, Technology, Engineering, and Mathematics) majors. Exceptional variation between instructors in the introductory physics sequence produced strong fluctuations in final grade distributions and conceptual learning. Differences in physics classes were also related to changes in students' beliefs about their own abilities, their self-efficacy, and their feelings of belonging within the university, the major, and within study groups. Happily, and counter to public expectations, the personality profile of STEM students was consistent with that of the general population. I will discuss some of the interesting results and future directions of this work.

When: Thursday, October 22nd, 2015 – 3:45 pm

Where: B1270 Lehman Auditorium, S.E.H.

800 22nd Street, N.W.

About the Speaker:

Gay Stewart received particle physics from the University of Illinois, Urbana-Champaign in 1994. In 1993, she attended a conference on undergraduate faculty enhancement and became interested in physics education research. She accepted a faculty position at University of Arkansas in 1994, where she and her collaborator John Stewart focused on three primary interrelated issues: improving the introductory sequence to better prepare students to succeed in science and engineering degrees, improving the preparation of physics majors for the variety of career options open to physicists, and the preparation of future faculty, for both the high school level and the professoriate. The undergraduate program at UA saw dramatic improvement, with a 10-fold increase in number of graduates. UA was one

of six initial primary program institutions of the Physics Teacher Education Coalition (PhysTEC) and produces approximately two percent of the high school physics teachers with physics degrees nationally. Gay first received NSF support for her work in 1995. As a teaching assistant mentor, she developed a preparation program that grew into one of four sites for the NSF/AAPT "Shaping the Preparation of Future Science Faculty," still active. She was co-PI of an NSF GK-12 project that placed fellows in middle school mathematics and science classrooms. The results were so favorable that helping math and science teachers to work together was a component of the \$7.3M NSF-MSP, the *College Ready in Mathematics and Physics Partnership*. In 2014, Gay transitioned to West Virginia University, where she is the Eberly Professor of STEM Education, as well as professor of Physics and director of the WVU Center for Excellence in STEM Education. She is also co-director and PI of their UTeach replication site, WVUteach.

About the Lecture Series:

The Frances E. Walker Fund for Women in Physics was established by Dr Mary Anne Frye to acknowledge her mother, Frances E. Walker and to support programs that encourage and increase the participation of women in the study of physics. The Walker Lecture Series brings prominent women physicists and astrophysicists to campus to highlight their accomplishments and incorporates a mentoring segment for students. The fund also supports a fellowship that is designed to give promising female U.S. citizens the opportunity to engage in research projects under the guidance of a GW Physics Department faculty member.

Dr Frye received a B.A. in Physics in 1970 and earned a Ph.D. in Physiology in 1975 from the GW Columbian College of Arts and Sciences. Frances E. Walker graduated from GW with a B.A. in 1927 and a M.A in Latin in 1931.

The George Washington University Physics Department:

The GW Physics Department has a strong commitment to undergraduate and graduate education and has active research programs in astrophysics, biophysics, nuclear physics, and physics education. Currently, our gender demographics are:

- two of the 17 tenure-line faculty are women,
- two special contract faculty are women,
- four of the 12 postdocs is a woman,
- eight of the 28 graduate students in our Department are women, and
- seven of the ~ 20 junior and senior undergraduate students are women.

For more information on the Physics Department and a link to our Fall 2014 Newsletter, please go to <http://physics.columbian.gwu.edu>

Each gift, no matter how large or small, makes a positive impact on our educational mission and furthers our standing as a dynamic and growing physics department in one of the world's outstanding universities. If you would like to contribute to this fund or another department initiative, you may make a gift to the Department in a number of ways:

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