OPENING STATEMENT

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U.S. House Committee on Science

Ranking Member, Subcommittee on Space and Aeronautics

HEARING: *Undergraduate Science, Math and Engineering Education: What's Working?*

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I am pleased to join the Chairman in welcoming our witnesses to today's hearing on exploring ways to improve undergraduate science, technology, engineering and math education - or STEM education, for short.

I would like to specifically welcome Dr. Weiman and Dr. Seymour; both have ties within my district at the University of Colorado. As many here know, Dr. Weiman won the Nobel Prize in Physics in 2001. However, what is most relevant to this hearing is how Dr. Weiman has leveraged this Prize to focus on improving undergraduate physics education. I hope Dr. Weiman will share with the Committee some of what he is doing in this area.

Dr. Seymour, the former director of the Ethnography and Evaluation Research at the University of Colorado, is also joining us today. She is the author of *Talking About Leaving: Why Undergraduates Leave the Sciences*. This book evaluates why students are attracted to STEM fields and what causes them to switch fields of study. It also highlights the interaction of students with faculty.

I would like to again welcome both of you, and all of our witnesses for coming to discuss this important topic.

I see this hearing as addressing two important issues: how do we attract and retain students in associate and baccalaureate degree programs in STEM fields, and how do we ensure that all undergraduate students receive a quality educational experience in their STEM courses, regardless of the career path they choose.

Policy discussions of undergraduate STEM education tend to focus on numbers - are we producing too few scientists and engineers; are other countries out-producing us; can we stay competitive unless we greatly increase production?

Well, I certainly agree we must be sure that we are meeting the needs of the private sector and government for STEM graduates, and there is considerable evidence that we are doing so at present.

I believe the key issue is not only numbers but also the quality of STEM graduates and the capabilities they develop during their post-secondary education.

Project Kaleidoscope, which has been working for ten years or more to improve undergraduate STEM education, recently released a report, *Recommendations for Urgent Action*, that lays out the questions we should ask in assessing whether STEM education is meeting the competitiveness challenge:

What are the characteristics of a successful innovator? What are the characteristics of a life-long learner? What are the characteristics of a contributing and productive participant in the 21st Century workforce?

The answers to these questions should inform STEM educational goals, the kinds of STEM courses offered, and the teaching styles and approaches used in undergraduate education.

Ultimately, the United States cannot out-produce the world in the number of new science and engineering graduates. Rather, we must ensure that our educational system produces graduates with capabilities that set them apart, so that they become successful innovators, life-long learners, and productive members of the nation's workforce.

Today, we will hear from those who are engaged in undergraduate education in a range of educational settings - two-year colleges, primarily undergraduate colleges, and research universities. I am interested in the witnesses' assessment of the current state of undergraduate science education and in their experiences regarding efforts to make improvements.

The basic questions today are what works, and what are the conditions necessary for success? I hope to hear what barriers and impediments exist in improving undergraduate STEM education, and in particular, what kinds of Federal programs have proven to be helpful - or not helpful - in bringing about reform.

Naturally, the Subcommittee would be interested in your comments on the value of NSF-sponsored programs, and on any recommendations you may have for ways to improve the recruitment and retention of students in the science degree track.

I believe a major goal of efforts to improve undergraduate STEM education must be to institute policies and programs that will tap the human resource potential of individuals from groups underrepresented in science and technology.

Simple demographic trends make clear the importance of increasing participation rates of women and minorities in meeting workforce needs of the future.

This is particularly true for attracting individuals to careers in the physical science and engineering. I know some of our witnesses have been engaged in programs that address this issue, and I look forward to learning more about them.

Mr. Chairman, I want to thank you for convening this hearing on this important subject. I appreciate the attendance of our witnesses today and I look forward to our discussion.