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Abstract for an Invited Paper
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Session Overview

CHERRILL SPENCER, Stanford University

High-school teachers are amongst the most important contributors to the development of the science and technology workforce of the future. Many of the more than 23,000 US high-school physics teachers are not adequately prepared to teach the subject. Only one-third of them, for example, majored in physics or physics education. Can inadequate teacher preparation be a factor in the poor performance of US students on international assessments of their achievements in science and physics? Since 1995 the Trends in International Mathematics and Science Study (TIMSS) has been administered four times to many hundreds of thousands of students in over 60 countries. TIMSS is used to measure trends in the mathematics and science knowledge and skills of fourth- and eighth-graders. The Program for International Student Assessment (PISA) has been administered three times since 2000, it focuses on 15-year-olds' capabilities in reading literacy, mathematics literacy, and science literacy. TIMSS Advanced (1995) assessed school-leaving students who have had special preparation in advanced mathematics and physics. In all these studies the US students, including the Advanced Placement physics students, scored below the international average, sometimes in the bottom third of countries! Three speakers have been invited to talk about the physics K-12 education systems in other countries, one that consistently scores at the top of the PISA (Finland) or score much higher than the USA on TIMSS (various Northern European countries) and significantly better on recent bi-lateral comparisons (China). What can we learn from the physics teaching systems in these high-scoring countries that might be applied in the USA? There will be a panel discussion following the 3 invited talks, audience participation will be encouraged.