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**Using physics education research to set the goals of physics courses and
design and study the outcomes of interventions**

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Sažetak

Physics education research (PER) is an interdisciplinary field that studies how people learn physics with the goal of improving this learning process for all students. In order to achieve this goal we need to define operationally what it means to learn physics, devise assessment instruments to evaluate this learning and develop curriculum materials that will lead to desired learning outcomes.

For decades PER was focused on student learning of the final outcomes of physics as a science - concepts and mathematical representations without paying much attention to the *process* through which physicists develop these concepts and representations.

However, this missing part of learning physics and evaluating physics education is crucial if we wish to grow independent thinkers and prepare them to be successful in the 21st century. In my talk I will describe several non-traditional PER studies that show how to integrate this “missing” part of physics learning into our regular physics instruction and how to assess this different aspect of student learning.

Životopis predavača: Eugenia Etkina (Rutgers University, Graduate School of Education--GSE) was born and educated in Russia, where she was awarded her PhD in Physics Education from Moscow State Pedagogical University. She has over 30 years of physics teaching experience (this includes middle school, high school and university physics). Professor Etkina designed and now coordinates one of the largest programs in physics teacher preparation in the U.S., she conducts professional development for high school and university physics instructors, and participates in reforms to the undergraduate physics courses. In 1993 she developed an approach to learning physics in which students learn physics using the processes that mirror scientific practice. The approach was enriched when she began collaborating with Alan Van Heuvelen in 2000 and now is known as Investigative Science Learning Environment (ISLE). Since 2000 she has developed curricula based on ISLE, conducted over 100 workshops for physics instructors, and co-authored College Physics - a textbook in which ISLE is implemented. Eugenia is an active researcher who published over 50 peer-refereed journal articles and a dedicated teacher, who in 2010 received the highest teaching award at Rutgers University, 2012 New Jersey Distinguished Faculty award, and Millikan Medal in 2014.