MAR11-2010-020142

Abstract for an Invited Paper
for the MAR11 Meeting of
the American Physical Society

Computational (Physics Education) vs. (Computational Physics) Education: Many Body for Anybody

ROBERT PANOFF, Shodor Education Foundation

The substantial role of computational approaches to physics research is not currently reflected proportionately in how we prepare future physicists. We can do better in using computation to teach the concepts of physics –Computational (Physics Education) – and to prepare students to be computational physicists – (Computational Physics) Education. We have the opportunity to demonstrate that effective use of computing in physics really matters. A computational approach in physics education is essential because quantitative reasoning, computational thinking, and multiscale modeling are the intellectual "heart and soul" of 21st Century physics and therefore are the essential skills of the 21st Century physicist. Computing matters because we can apply the power of interactive computing to reach a deeper understanding of physics and the mathematics underlying the theory and their role in understanding the world. We will explore a transformation in physics education, supported by interactive computing resources, promoting a dynamic encounter with the world through guided discovery. We will explore a variety of free and low-cost sources for modeling tools from Shodor and its Computational Science Education Reference Desk, a pathway project of the National Science Digital Library.