

Spring 2019 Colloquium

Department of Physics & Astronomy, TAMU-Commerce

Mar 14, Thursday, 4-5 PM in Science Building 127

(coffee and cookies will be served at 3:50 PM)

Physics Education

Computational Models and Conceptual Understanding in Introductory Physics

Dr. Ruth Chabay

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Dr. Ruth Chabay earned a BA in Chemistry at the University of Chicago, and MS and Ph.D. in Physical Chemistry at the University of Illinois Urbana-Champaign. Her background is diverse – she did a postdoc in Theoretical Biology at NIH, worked as a Research Associate in Psychology at Stanford, developed educational software, and taught Physics at Carnegie-Mellon University. In 2002 she became Professor of Physics at North Carolina State University. In 2018 she moved to the University of North Texas, where she is Professor of Physics and Chemistry. Her current research in Physics Education focuses on how to integrate computational modeling into the undergraduate physics curriculum. She is coauthor (with Bruce Sherwood) of the contemporary introductory physics textbook Matter & Interactions (4th Edition, Wiley,

2015). More information can be found at <https://ruthchabay.net>

Abstract

The process of constructing and exploring computational models can offer significant support for the development of conceptual understanding of key ideas in physics. However, most students who take introductory physics courses in college have had no prior exposure to programming. By selecting a minimal set of computational concepts to teach, and by introducing these concepts in the context of physics activities, we have been able to engage beginning students in constructing and refining computational models of interesting physical systems. The use of VPython allows students to produce navigable real-time 3-D animations as a side effect of their physics calculations. Research on how students engage with such models has helped refine instructional strategies. I will show examples from mechanics and from an introductory level course on soft condensed matter.