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**Excellence in Physics Education Award Talk: Curriculum Development for Active Learning using
Real Time Graphing and Data Collection Tools**

PRISCILLA LAWS, Department of Physics and Astronomy, Dickinson College

In June 1986 Ronald Thornton (at the Tufts University Center for Science and Mathematics Teaching) and Priscilla Laws (at Dickinson College) applied independently for grants to develop curricular materials based on both the outcomes of Physics Education Research and the use of Microcomputer Based Laboratory Tools (MBL) developed by Robert Tinker, Ron Thornton and others at Technical Education Research Centers (TERC). Thornton proposed to develop a series of *Tools for Scientific Thinking* (TST) laboratory exercises to address known learning difficulties using carefully sequenced MBL observations. These TST laboratories were to be beta tested at several types of institutions. Laws proposed to develop a *Workshop Physics Activity Guide* for a 2 semester calculus-based introductory course sequence centering on MBL-based guided inquiry. Workshop Physics was to be designed to replace traditional lectures and separate labs in relatively small classes and was to be tested at Dickinson College. In September 1986 a project officer at the Fund for Post-Secondary Education (FIPSE) awarded grants to Laws and Thornton provided that they would collaborate. David Sokoloff (at the University of Oregon) joined Thornton to develop and test the TST laboratories. This talk will describe the 23 year collaboration between Thornton, Laws, and Sokoloff that led to the development of a suite of Activity Based Physics curricular materials, new apparatus and enhanced computer tools for real time graphing, data collection and mathematical modeling. The Suite includes TST Labs, the Workshop Physics Activity Guide, RealTime Physics Laboratory Modules, and a series of Interactive Lecture Demonstrations. A textbook and a guide to using the Suite were also developed. The vital importance of obtaining continued grant support, doing continuous research on student learning, collaborating with instructors at other institutions, and forging relationships with vendors and publishers will be described.