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*“The Link to Improved Physics Instruction through Research on Student Learning”*

I will outline the goals and methods of physics education research, and sketch a simple illustration of the process linking research findings to curricular reform. I will then describe in some detail a recent investigation carried out by our group regarding student understanding of concepts in thermodynamics. We used diverse means to probe students' thinking, eventually uncovering a variety of learning difficulties related to the first law of thermodynamics and the properties of systems undergoing cyclic processes. On a separate (though related) theme, I will outline our curriculum development work related to active-learning instructional methods for physics lecture classes, and also describe some of our findings regarding methodological issues in the measurement of learning gains. I will close with a sketch of our ongoing projects and plans for future work.

(Coffee at 2:00 PM in Room 242)