

## Physics Education Innovation Seminar



### Cheap Lecture Capture

**Duncan Carlsmith, UW Department of Physics**

The Revolabs Xtag wireless lapel microphone permits recording audio over your powerpoint or keynote slideshow while you freely wander the lecture room. I will discuss lecture capture technologies, demonstrate the use of this simple technique, and show you how to 1-click publish your captured lecture to the cloud.



### Enhancing Quantum Mechanics Using Mathematica

**Thad Walker, UW Department of Physics**

I will describe how I have been using Mathematica as a tool for both analytical and numerical work in the 448/9 sequence. There are several ways it enhances the learning experience. It greatly extends the variety of problems that can be reasonably solved. It does tedious algebra simply and correctly. It forces students to concretely implement abstractions such as changes of basis, outer product spaces, and matrix representations. It allows me to give take home exams without concern that the students will find the answer on the internet. Plus, it forces many otherwise computer illiterate students to develop computational skills that they will find useful for whatever scientific or technical career they may eventually end up in. Finally, since it is relatively easy to use I do not have to spend class time teaching how to use it. They build up their skills through a sequence of worked examples from lecture. In 449, I assign a major computational project, done in self-assembled groups, to calculate some of the energy levels of the helium atom from first principles to better than 1% accuracy. This project requires numerical work, implementation of angular momentum algebra (depending on which states I pick) and perturbation theory and impresses upon the students that quantum mechanics really works.



**Wednesday, March 11, 2015**

**11:00 am | 5310 Chamberlin Hall**

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