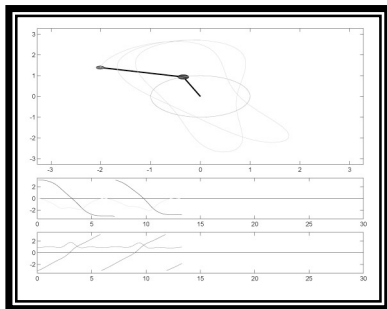


# Physics Department Seminar

Friday April 14<sup>th</sup>, 2006

11:00am in PhSc 105

## “Chaotic Motion of a Pendulum”



Mr. Jeremiah Ruesch

Department of Physics  
California State University, Chico

### Abstract:

As many undergraduates are aware, the first nonlinear system often encountered is the simple plane pendulum when the small angle approximation in the equations of motion is not assumed. The difficulty in attempting to solve such systems often results in complicated mathematics, or is left to numerical methods, to extract a solution. With the advent of a branch of mathematics known as chaos theory, the solution of such problems is based on a geometric approach—leaving the reader with a much more intuitive feel for the details of how the motion of the system should be have. As an example, I will explore the details of a classic problem: the double pendulum, in which we will explore the equations of motion and the details of motion under the lens of chaos theory. In particular, we will not only demonstrate the geometric approach yields the familiar equations, but also extends to systems that do not yield to analytical solutions.

