**COLLOQUIUM**

Clyde Martin

P.W.Horn Professor

**“Control Theory,**

**Numerical Analysis and Statistics:**

**Common Problems and Uncommon Solutions”**

Thursday, November 20, 2008 at 3:30 p.m. in CH 025

Refreshments will be served in Math 238 at 3:00 p.m.

**Abstract**

A central part of mathematics is to use tools and techniques from one part of mathematics to prove results in another. A less common but equally important arena is to show that two different fields can have deep interaction. I first saw this as a graduate student in the theory of topological algebra. There imposing a topology on an algebraic object caused fundamental restrictions on the algebraic properties. I again saw this phenomenon in the relationship between differential and algebraic geometry and control theory. For the last twenty years I have made a hobby of showing connections between control theory and numerical analysis. There are deep connections between such things as observability and quadrature and between controllability and splines. More recently I have seen similar relations between statistics and control theory and consequently with numerical analysis. A set of problems that the three fields have in common is the determination of properties of a curve when there is limited and imprecise information. Each field has its own language and to truly enjoy the interaction one must come to be at least modestly fluent in each. In this talk I will try to show that the effort is worthwhile by discussing problems that arise in such diverse areas as clinical trials, economics, discrete event systems and the numerical solutions of differential equations.