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School of Arts and Sciences

Department of
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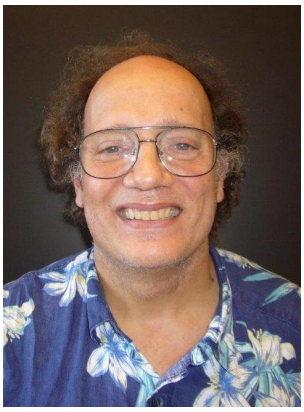
DEPARTMENT OF STATISTICS AND BIOSTATISTICS



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Chaotic regression: A simple tool suggested by complex physical theory

September 27, 2017
3:20 – 4:20pm
Light refreshments will be served
110 Frelinghuysen Road
Hill Center, Room 552

Abstract: Data science is sometimes characterized as a combination of computer science and statistics. My view is that this misses one other leg of the system that is the subject matter knowledge one can apply. In the case of certain systems we think of as highly complex, the stock market, climate, earthquakes, eco systems, deep learning networks, and social systems there is an underlying notion that each represents systems were very small changes in initial conditions can evolve into massively different scenarios. Made precise this is the definition of chaotic systems. These systems are also typically believed to have very high dimension (Certainly the phase space describing them has high dimension) and they are open to influences outside what typically goes into computer models of them.

I will argue, and state a conjecture, that in fact the high dimension and openness of the system provide a path to a simplified form of prediction. I will provide examples of applications of this path from climate, and stock market prediction.

Bio: I studied mathematical statistics at UC Davis under PK Bhattacharya, (including meeting Kesar Singh at a 2nd order asymptotics meeting in Oregon). I taught at Kansas State for one year, then was called by Bell Labs with an offer to come to the east coast. My planned 5 year stay in industry lasted for 32 years, during which I studied the use of computational tools to integrate statistical and physical modeling, enabling design and analysis for explicitly physical models. The majority of that time was spent on developing experiment design and data analysis tools for implicit physical chemistry. In 2008 a field reliability problem refocused my work on prediction of open, high dimensional chaotic systems (like climate), and I spent increasing time on that. I came to Rutgers in fall 2016.