

# Distinguished Lecture Series on Network Science and Research

In light of the growing interest and importance of network science and network research to the Penn State Research community, the Office of the Senior Vice President for Research is sponsoring this series. Prominent national experts are scheduled to present talks on campus throughout the academic year. The goal is to clarify the underlying principles in this intrinsically interdisciplinary research area and to bring the diverse community of Penn State researchers together around common themes to explore how their research might benefit from intellectual cross-fertilization.



## **“Inference in Complex Social Systems: Insights and Applications from the Behavior of the Aggregate”**

**Nathan Eagle**, Massachusetts Institute of  
Technology and the Santa Fe Institute

**Wednesday, November 5, 2008**

9:30 a.m. – 10:30 a.m.

Chambers Building, Room 102

### **Abstract:**

Dr. Eagle has used mobile phones to continuously gather information including proximity, location, and communication from human subjects. Systematic measurements from these people over the course of nine months has generated one of the largest dataset of continuous human behavior ever collected, representing over 300,000 hours of daily activity. Additionally, in collaboration with several European and African telecommunication companies, he is currently analyzing the call logs of entire countries - dynamic social networks consisting of up to 250 million nodes and 12 billion temporal edges.

In his talk he describes how this type of data can be used to uncover the structure in behavior of both individuals and organizations, infer relationships, and study social network dynamics. By combining theoretical models with rich and systematic measurements, they show it is possible to gain insight into the underlying behavior of complex social systems. While results such as uncovering scaling laws from the communication patterns of hundreds of millions of people will certainly be one emphasis in his talk, of equal importance is how this data can enable applications that improve our society. Dr. Eagle will demonstrate a variety ways these insights into our own behaviors can be used to develop applications that better support the individual, organization, and society.

### **Biography:**

Nathan Eagle is a Research Scientist at the Massachusetts Institute of Technology and a Postdoctoral Fellow at the Santa Fe Institute. His research involves applying machine learning and network analysis techniques to large human behavioral datasets generated by mobile phones. As a Fulbright Scholar in 2006, he launched MIT's EPROM initiative while teaching in universities in Kenya and Ethiopia, developing a mobile phone programming curriculum that has been adopted by twelve Computer Science departments across Africa. He holds a BS and two MS degrees from Stanford University; his PhD from the MIT Media Laboratory on Reality Mining was declared one of the '10 technologies most likely to change the way we live' by the MIT Technology Review magazine. Nokia recently named him one of the top mobile phone developers in the world.