Statistical and Applied Mathematical Sciences Institute

**Funding:** NSF – as a national mathematical sciences institute, Duke, NCSU, UNC, Kenan Foundation; about $4M/year

**Vision:** To focus on the *synthesis* of the statistical sciences and applied mathematics with disciplinary sciences to confront difficult data- and model-driven scientific challenges.

**Implementation:** Primarily *year-long* research programs

**Location:** Research Triangle Park, North Carolina, USA

**Information:** www.samsi.info
2007-08 SAMSI summary-by-numbers

• Activities
  – 2 year-long research programs, 1 semester-long research program, 2 short summer research programs
  – 12 (long-program) research working groups (5 to 16 people each), consisting of senior scientists, postdocs, grad students
  – 15 scientific workshops
  – 5 educational and outreach workshops
  – 4 courses

• People
  – 12 postdoctoral fellows and associates
  – over 100 core research participants
  – 1000+ workshop participants
  – 97 researchers participated remotely in the research working groups
Past SAMSI Programs

- 2002-03
  • Inverse Problem Methodology in Complex Stochastic Models
  • Large Scale Computer Models for Environmental Systems
  • Challenges in Stochastic Computation

- 2003-04
  • Network Modeling for the Internet
  • Multiscale Model Development and Control Design
  • Data Mining and Machine Learning

- 2004-05
  • Latent Variable Models in the Social Sciences
  • Data Assimilation in Geophysical Systems
  • Computational Modeling of Infectious Disease
— 2005-06
  • National Security and Homeland Defense
  • Financial Mathematics, Statistics and Econometrics
  • Astrostatistics
  • Multiplicity and Reproducibility in Scientific Studies
— 2006-07
  • *Development, Assessment and Utilization of Complex Computer Models*
  • High Dimensional Inference and Random Matrices
  • Dynamic Treatment Regimes & Multistage Decision-Making
  • Geometry and Statistics of Shape Spaces
— 2007-08
  • Risk Analysis, Extreme Events and Decision Theory
  • Random Media
  • Environmental Sensor Networks
  • Meta-analysis
A working group: predict risk from pyroclastic flows

• **Applied Mathematicians:** computer model of pyroclastic flow
• **Geophysicists:** background and data on actual flows
• **Probabilists:** probabilistic modeling of data on flows
• **Statistics:** combining all this in risk prediction
Current and Future Programs

• **2008-09**
  – Sequential Monte Carlo Methods
  – Algebraic Techniques in Systems Biology and Statistics
  – Summer program 2009: likely to be Psychometrics

• **Being Developed for 2009-10**
  – Space-time Analysis in Environmental Mapping, Epidemiology and Climate Change
  – Stochastic Dynamics

• **Under (serious) consideration for 2010-11**
  – Analysis of Object-Oriented Data
  – Complex Networks
Education, Outreach, and Diversity

• K-12  SAMSI/Kenan Fellows Program
• Undergraduate
  – 1-week summer workshop: May 18-22, 2009
  – 2-day outreach workshops at SAMSI
    • October 31 – November 1, 2008
    • February 27-28, 2009
• Graduate
  – Graduate Student Probability Workshop: May 1-3 2009
• Blackwell-Tapia conference: November 14-15, 2008
Possible Interactions of SAMSI and CTMS

• Involve CTMS in the development of SAMSI programs
  – with an appropriate national/local dance
• Have joint workshops
  – if they fit with a SAMSI program (during, before, or after)
  – and if they can be held at SAMSI; our Triangle dance
• Embed CTMS collaborations in SAMSI programs as research working groups for a year.
• Joint funding of postdocs and visitors