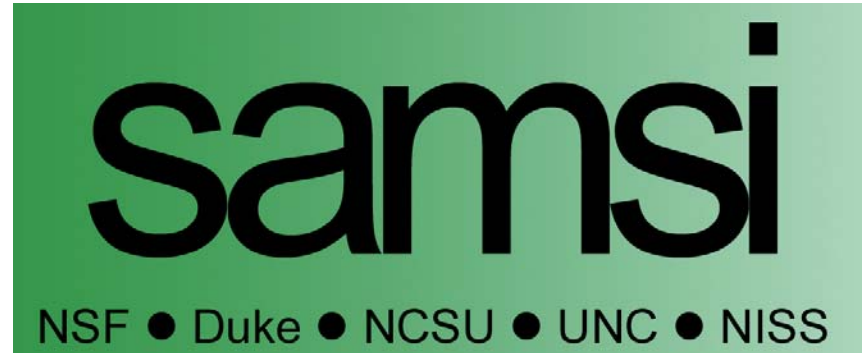


NISS



NISS Affiliates
NISS/SAMSI University Affiliates
JSM Meeting

Toronto
August 8, 2004

Agenda

- Welcome and Introductions
- Current Program Status and NISS Update
- Lunch
- SAMSI: Programs for 2004-05 and Beyond
- 2005: The Year of the Affiliate
- Items Raised by Affiliates
- Adjourn

NISS Affiliates

- **Corporations:** Avaya Labs, Aventis, General Motors, GlaxoSmithKline, *Golden Helix*, *Icagen*, Merck & Company, MetaMetrics, Pfizer, RTI International, SAS Institute, SPSS, Telcordia Technologies
- **Federal Agencies:** Bureau of Labor Statistics, Census Bureau, Environmental Protection Agency, National Agricultural Statistics Service, National Center for Education Statistics, National Center for Health Statistics, National Institute of Standards and Technology, National Security Agency
- **National Labs:** Los Alamos National Laboratory, Pacific Northwest National Laboratory

NISS/SAMSI University Affiliates

- Carnegie Mellon (Statistics), Duke (Mathematics + Institute of Statistics and Decision Sciences), Emory (Biostatistics), Florida State (Statistics), Georgia (Statistics), Illinois (Statistics), Iowa (Statistics), Iowa State (Statistics), Johns Hopkins (Applied Mathematics & Statistics), Maryland (Mathematics), Maryland Baltimore County (Mathematics and Statistics), Michigan (Statistics + Biostatistics), Missouri-Columbia (Statistics), North Carolina State (Mathematics; Statistics), North Carolina at Chapel Hill (Biostatistics; Mathematics; Statistics & Operations Research), Oakland (Mathematics & Statistics), Ohio State (Statistics), Pennsylvania State (Statistics), Rice (Statistics), Rutgers (Statistics), Southern Methodist (Statistical Sciences), Stanford (Statistics), Texas A&M (Statistics), *UCLA* (Statistics + Statistical Consulting Center)

NISS Highlights

- Strategic vision adopted by the Board of Trustees to guide development over the next 3-5 years. Key components:
 - Broader community participation in NISS research
 - Full realization of the NISS-SAMSI relationship
 - Solidifying value provided to the affiliates
 - Defining additional ways in which NISS can serve the community
- Associate Director Search: announcement likely in fall
- Leadership Changes
 - Vijay Nair (Michigan) replaces Jon Kettenring as Chair of the Board of Trustees
 - Leland Wilkinson (SPSS, Inc.) becomes Vice-Chair

Highlights—2

- New Research Activities
 - Studies for NCES addressing
 - High school dropout rates
 - US participation in international assessments
 - Instruments used to assess Title IX compliance
 - NSF-funded projects
 - *Statistical Disclosure Limitation for Longitudinal Geospatial Image Data*
 - *Dynamics for Social Network Processes: Comparing Statistical Models with Intelligent Agents*
 - National Defense and Homeland Security
 - Hot Topics Workshop held in April 2004
 - SAMSI program planned for 2005-06

Highlights—3

- Affiliates Proposal Development Fund makes two initial awards in 2003
- 2003 Sacks Award presented to Raymond Carroll (Texas A&M University)
- Financial Strength
 - Significant financial reserves
 - Stable income from the affiliates program and SAMSI
 - In-place research funding for the next two years
 - Funds invested in a bond portfolio that increases income substantially but protects against rising interest rates

Challenges

- Moving aggressively to implement the strategic vision
- Strengthening the affiliates program
- Space for NISS and SAMSI
- Outreach to statistical community
- Having people identify with NISS as *their* institute

Program Components

- Information Dissemination (all ARA eligible)
 - Technology Days
 - Workshops
 - Short Courses
 - SAMSI events
- Human Resources
 - Job Listings (AJL)
 - Federal agency postdocs
 - Access to current and ex NISS postdocs seeking employment
 - SAMSI

Program Components—2

- Formation of Research Relationships
 - Annual Problem Day, to catalyze collaborative research
 - Proposal Development Fund
- Networking
 - March Planning Meeting
 - JSM Lunch

Upcoming Events

- Pharmacogenomics Technology Day
 - Dates and Locations TBD, Fall 2004
- Workshop on Statistical Risk and Counterterrorism (co-sponsored)
 - November 19-20, 2004, New York University
- Workshop on Total Survey Error
 - January 13-14, 2005, Research Triangle Park
- Workshop on Overarching Issues in Risk Analysis
 - April 29-30, 2005, Iowa State University

NISS/SAMSI JSM Events

- SAMSI Invited Session: Scalability in Statistics and Science,
 - Sunday, 4:00-5:50 PM, Ballroom A, Intercontinental
- NISS/SAMSI Topic-contributed Session on Data Mining
 - Sunday, 4:00-5:50 PM, Room 715A, TCC
- NISS/SAMSI Reception
 - Monday, 5:00-7:00 PM, Ontario Room, Fairmont Royal York
- Topic Contributed Session: Statistical Partnerships between Academia and Industry/Government
 - Wednesday, 2:00-3:50 PM, Room 706, TCC
 - 2:25 PM: The NISS Affiliates Program: Furthering Collaboration between Academe and Industry/Government
- NISS Invited Session: Risk-Utility Approaches to Statistical Disclosure Limitation
 - Thursday, 10:30 AM – 12:20 PM, Room 707, TCC

Some Other Initiatives

- BSCSSI
 - Members: Australian Mathematical Sciences Institute; Center for Mathematical Physics and Stochastics, Aarhus; Erwin Schrodinger International Institute for Mathematical Physics, Vienna; EURANDOM, Eindhoven; Institut Henri Poincare, Paris; IMA; Institute for Mathematical Sciences, Singapore; NISS; Pacific Institute for the Mathematical Sciences, Vancouver; SAMSI; Stochastic Centre, Gothenburg; Weierstrass Institute for Applied Analysis and Stochastics, Berlin
 - Possible activities
 - Leveraged events
 - Program partnerships
 - Networking
 - Support for funding requests

Other Initiatives—2

- Space
 - NISS needs more space
 - SAMSI needs better space
 - Building committee being formed

The Longer Term

- 2005: Year of the Affiliate
- 2006-07: Focus on Outreach
 - Develop model that allows NISS simultaneously to build on its Research Triangle Park base and identity, but still penetrate deeply the entire community
 - Expand the research program by identifying opportunities and mechanisms to engage the community and broaden the base of collaborators and PIs
 - Create “quasi-endowment” to support long-term visitors
- 2007-08: Facilities
 - Open new facilities

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2003-04 Highlights

- Three programs
 - Network Modeling for the Internet
 - Data Mining and Machine Learning
 - Multiscale Model Development and Control Design
- 8 program workshops; numerous special ‘workdays’ for working groups.
- Outreach: 3 undergrad workshops, IMSMW’03
- 4 SAMSI Distinguished Lectures
- 4 courses associated with programs
- 3 planning/hot topics workshops

2003-04 Highlights—2

- Full complement of people
 - 7 postdocs
 - 4 SAMSI-University Fellows
 - 36 research visitors
 - 700+ workshop participants
- Collaborations with
 - AIM: planning workshop
 - NPCDS: 3 workshops
- Personnel changes
 - Steve Marron replaced by Young Truong on the directorate
 - A new staff specialist for planning

Affiliate Participation

- Approached one-half of attendees at some workshops
- Expenditures from ARA accounts to attend SAMSI events exceeded \$20,000
- University affiliates were strongly represented at virtually every SAMSI event.
- Planning/Hot Topics Workshops
 - Planning workshop on Mathematical Sciences Research to Meet National Security Needs included participants from the *NCHS*, *NSA*, *Telcordia*
 - Planning workshop on Complex Computer Models included participants from *LANL* and *GM*

Affiliate Participation—2

- DMML
 - *GM* provided testbed databases and ongoing advice and assistance from more than a dozen researchers and managers
 - *BLS* provided data and advice to the DMML program to support text mining to infer BLS occupational categories for Census long-form answers
 - Researchers from *SAS Institute* participated throughout the year in the Bioinformatics working group of the DMML program
- Internet
 - Personnel from *Avaya Labs* were major participants in the internet tomography thrust

SAMSI Research Programs

- 3 per year
- At interfaces: ideally, involving statistics and applied math and probability (and CS and OR), as well as disciplinary sciences
- Framed and guided by disciplinary needs
- “Catalytic rather than conclusional”

SAMSI Programs for 2004-2005

Computational Modeling of Infectious Disease (full year)

- Emphases include:
 - Population dynamics
 - Epidemiology, social network theory, immune-response modeling
 - Microbial ecology, host-pathogen co-evolution, drug resistance, evolution
 - Genomic dynamics
 - Comparative genomics, molecular evolution, proteomics
 - Gene expression modeling and microarray data analysis
 - Drug target identification and vaccine design

Computational Modeling of Infectious Disease

- Schedule
 - Opening Tutorials and Workshop: 9/18/04 - 9/22/04
 - Mid-Program Focused Workshop: TBA
 - Transition Workshop and Symposium: 5/22/05 - 5/24/05
 - Working groups meet throughout the year
- *Program leaders*: Lindsay Cowell, Thomas B. Kepler (Chair), Denise Kirschner
- *Long-term visitors*: Sujay Datta, Byron Goldstein, Elizabeth Halloran,, Katja Ickstadt
- *Other local participants*: Tim Elston, Alun Lloyd Andrew Nobel, Scott Schmidler

Latent Variable Modeling in the Social Sciences (full year)

- Emphases include:
 - Potential of causality
 - Multilevel models
 - Longitudinal data
 - Relationships between hierarchical models and structural equation models
 - Categorical variables in LHV models
 - Dynamics for social network processes

Latent Variable Modeling in the Social Sciences

- Schedule
 - Tutorials and Opening Workshop: September 11-15, 2004
 - Sampling Workshop: TBD
 - Closing Workshop: May 19-21, 2005
- *Program leaders:* Kenneth A. Bollen (Chair), James Heckman, Alan F. Karr, Susan Murphy
- *Long-term visitors:* Susie Bayarri, Michael Browne, Bertrand Clarke, Aki Kamata, Anders Skrondal
- *Other local participants:* David Banks, Paul Biemer, Lloyd Edwards, Subhashis Ghosal, Negash Medhin, Jerry Reiter

Data Assimilation in Geophysical Systems (Spring 2005)

- Emphases include
 - How to manage large data-sets
 - Improving models, i.e. can models learn?
 - Assimilation of non-prognostic variables
 - Optimal design of experiments based on the results of data assimilation
 - Assimilation of data corresponding to subsidiary variables in coupled models, such as atmospheric data in coupled atmosphere-ocean models, or Lagrangian data in ocean models

Data Assimilation in Geophysical Systems

- Schedule
 - Kickoff Workshop: January 23-26, 2005
 - Workshop on Mathematical Challenges in Geophysical Data Assimilation: February 22-26, 2005 at IPAM, UCLA
 - Closing Workshop: late Spring, 2005
- *Program leaders:* Kayo Ide, Chris Jones (Chair), Robert N. Miller, Douglas Nychka, Francisco Werner
- *Long-term visitors:* Roy Choudhury, Byron Goldstein, Nils Hjort, Marianna Pensky, Juan Restrepo, Lenny Smith, Monica Stephens
- *Other local participants:* Sujit Ghosh, Susan Lozier

Likely SAMSI Programs for 2005-2006

High Dimensional Inference and Random Matrices (Fall 2005)

- Potential emphases
 - Extreme sample eigenvalues
 - Properties of sample eigenvectors
 - Empirical distribution of eigenvalues
 - Design of snapshots for computer model approximation
 - Nonlinear / topological approaches to dimensional reduction
 - Bayesian utilizations of random matrices
 - Stochastic evolution of random matrices
 - Statistical issues involving EOFs in climatology
- *Program leaders:* Iain M. Johnstone (Chair), Ken McLaughlin, Craig A. Tracy

Mathematical and Statistical Finance (Fall 2005)

- Focus on bringing together Applied Mathematics, Economics/Finance, and Statistics/Econometrics – to address the three essential tasks of modeling, handling data, and computing – in domains ranging from financial and energy derivatives to real options
- *Program leaders:* Marco Avellaneda, Jean-Pierre Fouque (Chair), Eric Ghysels, Ronnie Sircar, Ruey Tsay

Astrostatistics (Spring 2006)

- Potential emphases
 - Modeling highly preprocessed data
 - Handling selection bias
 - Signal identification in massive data sets
 - Mixture model analysis
 - Imaging
 - Spatial processes
 - Time series analysis of periodic phenomena
- *Program leaders:* Jogesh Babu (Chair), Alanna Connors, Eric Feigelson, Donald Richards, Larry Wasserman

Mathematical and Statistical Research for National Security (full year)

- Possible emphases include:
 - Anomaly detection
 - Decisions, modeling and simulation
 - Real time inference
- Possible application domains
 - CDC
- *Potential program leaders:* Larry Cox, Alan Karr, Sallie Keller-McNulty, Jon Kettenring, Nell Sedransk

Opportunities at SAMSI

Established Researchers

- Program proposals and leadership
- Research visits (short- and long-term)
 - SAMSI provides expenses, space, support
- Workshops
 - SAMSI or ARA provides expenses
- SAMSI-University fellowships (one semester or full year)
 - SAMSI and university provide partial salary

New Researchers

- Postdoctoral fellowships
 - Typically 2 years—one at SAMSI and one at NISS, CRSC, university, ..., in conjunction with a program
 - SAMSI provides salary, space, support, travel
- New researcher fellowships
 - One per program; \$20,000 in salary support.
- Research visits (short- and long-term)
 - Some positions with partial salary support
 - Numerous positions with expense support
- Workshops
 - SAMSI or ARA provides expenses

Graduate Students

- Research programs
 - Visit with advisor: SAMSI provides expenses, space, support
- Program workshops
 - SAMSI or ARA provides expenses
- NCAR/SAMSI summer school (June 12-23, 2005): “Fusing numerical models and data: Practice to theory to practice”
- IMSMW
 - 9 days: end of July
 - 6 teams work on “industrial” projects presented by experienced scientists and engineers: 6 students, 1 problem owner, 1-2 faculty mentors
 - SAMSI provides expenses

Undergraduates

- Two-day Undergraduate Workshops on weekends during the academic year
 - For juniors and seniors
 - Description of SAMSI programs
 - In-depth exposure to one program
 - SAMSI provides expenses
- SAMSI/CRSC Undergraduate Workshop for one week in early June
 - For juniors and seniors
 - Description of SAMSI programs
 - Intensive hands-on experience in use of statistical and mathematical models to analyze experimental data collected in the CRSC/Math Instructional Research Lab

SAMSI Proposal Process

- For year n programs,
 - Pre-proposals due September 15 of year n-2;
 - Full proposals due March of year n-1;
 - Decisions ideally made by April of year n-1;
 - Urgent programs can be fast-tracked.
- Ideas and informal discussions welcome at any time.

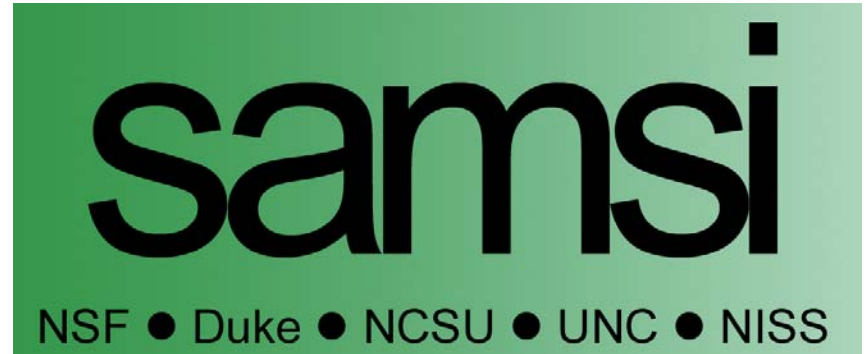
Contact

- Directorate (Jim Berger, Tom Banks, Alan Karr, Young Truong)
- National Advisory Council (Co-chairs: Peter Bickel, Margaret Wright)

Proposal Evaluation Criteria

- Impact on statistical and mathematical sciences and their interface
- Qualifications and commitment of program leaders
- Breadth of development of human resources, including the extent of diversity
- Impact on cross-disciplinary research
 - Span of the scientific problems covered
 - Likelihood of significant technology transfer
- Effects on education
- Timeliness
- Availability of leveraging funds

NISS



2005: The Year of the Affiliate

Key Goals

- Visits to as many affiliates as possible
- Increase number and diversity of affiliates
- NISS-Affiliates “compact” articulating
 - Value provided by NISS to the affiliates
 - Expectations of the affiliates
 - Ways in which NISS and the affiliates will work together to make the program a long-term success
 - How the program is “governed”

Potential Initiatives

- Annual Affiliates Survey
 - Follow-up to March planning meeting
- Events at affiliates' sites
- Quarterly updates on NISS research
- Increased affiliate contact with postdocs
- Expand AJL to include graduate students and postdocs
- Wider range of summer activities at SAMSI

The NISS-Affiliates Compact

- Benefits to Affiliates
 - Attention to problems in the “industry/government academe” gap
 - Recruiting
 - Access to NISS and SAMSI leadership
 - Engagement with each other
 - Resources used on behalf of the community
- Benefits to NISS and SAMSI
 - Input from affiliates that informs scientific directions
 - Financial diversity and stability
 - Visibility
 - Community service

The Affiliates Programs in the Long Run

- Program structure
 - 20 Corporate, with 3-4 “clusters” defined by shared interests
 - 12 Federal agency and national laboratory
 - 50 University departments
- Impact on NISS
 - 50% of research brought to NISS by affiliates or others
- Impact on SAMSI
 - 1+ SAMSI program every 2 years that arises from and reflects affiliates’ interests and engagement

Some Questions

- How much role do the affiliates wish to play in
 - Formulation of program initiatives?
 - Governance of the program?
- Should the program offer (and charge) more?
 - Example: Some level of advice/consulting
- How can NISS best stimulate affiliate-affiliate interactions?
- What is the right degree of geographical distribution?

A Parting Thought

“The NISS affiliates program is like National Public Radio: you belong because you *should* belong.”