WHAT IS SAMSI?

• One of 8 NSF funded Math institutes
• A NSF grant awarded to Duke, NCState, and UNC
WHAT IS SAMSI?

Established in 2002

Current NSF funding period: 2012-2017
SAMSI’S MISSION

• Forge a *synthesis* of the *statistical* sciences and the applied *mathematical* sciences

• with *disciplinary* science

• to confront the very hardest and most important *data*-* and model-driven* scientific challenges
NEWS

• NSF has recommended renewal of SAMSI for funding period 2017-2020

• Searching for new Director and Deputy Director

• Moving to new (nearby) building in July
WHAT CAN SAMSİ DO FOR YOU?

• Research
  Year-long programs
  Summer programs (1-3 weeks)
  Topical workshops

• Education and Outreach
  Graduate student modeling workshop
  Undergraduate workshops
RESEARCH PROGRAMS

Year-long collection of focused research activities

• Working groups (remote access)
• Research workshops
• Summer schools
• Participants
  Visitors (few days – a year)
  SAMSI Postdocs & Graduate Fellows
  National and international participants
Current SAMSI Programs
2016 - 2017
Optimization

SAMS 2016 - 2017
Program on Optimization

This year-long research program aims to produce a synergy between Mathematics and Statistics to produce ground breaking advances in:

- Optimization for large-scale statistical analysis
- Statistical approaches for the numerical solution of large-scale optimization problems
- Applications of optimization

Opening Workshop: 22-26 August 2016
2-year postdoctoral fellowships
1-2 semester research fellowships

SAMSI Directorate Liaison
Ilse Ipsen (NCSU)

National Advisory Committee Liaisons
Michael Mahoney (UC-Berkeley)
Habib Najm (Sandia National Labs)

Go to www.samsi.info/OPT for details.
Send questions to: opt@samsi.info
The Statistical, Mathematical and Computational Methods for Astronomy Program focuses on the vast range of statistical and mathematical problems arising in modern astronomical and space sciences research, particularly due to the flood of data produced by both ground-based and space-based astronomical surveys at many wave-bands. To cope with the current and future needs of astronomy missions requires concerted efforts by cross-disciplinary collaborations involving astronomers, computer scientists, mathematicians and statisticians.

The research areas that form the main ingredients of the program include:

- Astronomical Simulations and Big data issues
- Exoplanets
- Functional Data Analysis
- Gravitational Wave Astrophysics
- High-performance computing for Bayesian inference and machine learning
- Lightcurve analysis/Time Domain Astronomy

For more details, visit www.samsi.info/ASTRO

Program Chair:
G. Jogesh Babu
(Penn State U.)

SAMSI Directorate Liaison:
Sujit Ghosh, ghosh@samsi.info
(SAMSI/NCSU)

National Advisory Committee Liaison:
Michael Stein
(U. Chicago)
Future SAMSI Programs
2017 - 2018
Quasi-Monte Carlo & High Dimensional Sampling Methods for Applied Mathematics

SAMSI 2017 - 2018 Program on Quasi-Monte Carlo and High-Dimensional Sampling Methods for Applied Mathematics

The goal of the SAMSI program is to explore the potential of QMC and other deterministic, randomized and hybrid sampling methods for a wide range of applications.

Opening Workshop: August 28 - September 1, 2017
2-year postdoctoral fellowships
Research Fellowships
Visit: www.samsi.info/qmc or email: qmc@samsi.info

Program Leaders:
Art Owen (Stanford University)
Fred Hickernell (Illinois Institute of Technology)
Frances Kuo (University of New South Wales, Australia)
Pierre L’Ecuyer (Université de Montréal, Canada)

SAMSI Directorate Liaison:
Ilse Ipsen (N.C. State University)
Mathematical and Statistical Methods for Climate & Earth Systems

SAMSI 2017 - 2018 Program on Mathematical and Statistical Methods for Climate and Earth

This year-long research program will study the interrelations among climate data, climate models and impacts with a view towards projecting future climate change and its impact on earth systems and the human population. Specific topics for working groups are expected to include:

- Remote sensing and climate databases
- Parameter estimation in climate models
- Climate Informatics
- Climate Extremes
- Climate and Health

AND MORE…

Opening Workshop: **August 21-25, 2017**
2-year postdoctoral fellowships
Research fellowship opportunities

Steering Commitee:
Chris Jones (UNC-Chapel Hill)
Doug Nychka (National Center for Atmospheric Research)
Brian Reich (NCSU)

SAMSI Directorate Liaison:
Richard Smith (UNC-Chapel Hill)

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FUTURE RESEARCH PROGRAMS

2018-19:
• Model Uncertainty: Mathematical & Statistical (confirmed)
• Precision Medicine (confirmed)

2019-20:
• Causal Inference (under consideration)
EDUCATION & OUTREACH

Three undergraduate workshops per year, one graduate

27-28 February 2017
   Undergraduate Workshop (Optimization)

14-19 May 2017
   Undergraduate Workshop (Interdisciplinary)

16-26 July 2017
   Graduate Student IMSM Workshop
2017 Industrial Mathematical & Statistical Modeling Workshop (IMSM)

- Graduate students work on exciting real-world projects from government + industry
- They experience the team approach to problem solving

Application deadline: April 15, 2017
Organizer: Mansoor Haider
IMSM@samsi.info
Proposing a SAMSI Program

https://www.samsi.info
SAMSİ SPONSORS PROGRAM

- Academic departments
- Research laboratories
- Businesses

Sponsorship funds help SAMSİ to provide services not covered by NSF grant:
- Child care
- Field trips for undergraduate workshops
- Hardware + software for postdocs
- Social events (poster receptions)

Web page: SAMSİ.info//Support SAMSİ
SAMSI 2016 - 2017
Program on Optimization

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Habib Najm (Sandia National Labs)

Go to www.samsi.info/OPT for details.
Send questions to: opt@samsi.info
OPTIMIZATION PERSONNEL

- Program leaders: Ekkehard Sachs, Hua Zhou, Sven Leyffer, Jean-Paul Watson
  Bart van Bloemen Waanders
- SAMSI Governing Board: Mihai Anitescu
- SAMSI National Advisory Committee: Michael Mahoney, Habib Najm
- Local Faculty: Alen Alexanderian, Arvind Saibaba, Pierre Gremaud, Dávid Papp
  Shu Lu, Mike West

Postdocs: Ahmed Attia, Peter Diao, Sercan Yildiz

WISO organizers:

Xiaoming Huo, Dirk Lorenz, Ekkehard Sachs, Hua Zhou
OPTIMIZATION WORKSHOPS

- November 2015: Planning workshop
- August 2016: Summer school
- August 2016: Opening workshop

- 26-27 January: Statistical Inverse Problems

- 8-10 February: Interface of Statistics & Optimization

- 29-31 March: Mixed-Integer PDE-Constrained Optimization

- 1-4 May 2017: Transition
OPTIMIZATION WORKING GROUPS

Statistical Inverse Problems
E/M and M/M algorithms
Sums-of-Squares Optimization & Semidefinite Programming
Bayesian Optimization & Decision Analysis
Mixed-Integer PDE-Constrained Optimization
Modeling & Computation of Equilibrium Problems
Applications to Energy & Environment
Probabilistic Numerics
Small Area Estimation
Radiotherapy Optimization
Faster Statistics
Electronic Structure Models
Minimum Action Principle for Multi-Physics Problems
Karem Jackson  
Workshop Specialist

Sue McDonald  
Workshop Coordinator

Rita Fortune  
Financial Analyst

Rick Scoggins  
Communications Director

Thomas Gehrmann  
NCSU Program Assistant
THE IMPORTANT THINGS

- Coffee supplied: early morning + lunch
- Nearby coffee places:
  - Joe Van Gogh
  - Au Bon Pain (Dining Hall)
- Lunch served here every day
  - Vegan meals (for those who requested it)

- Wifi password: screen saver, on this screen

- All lectures videotaped + archived on WISO webpage
POSTER RECEPTION TODAY

• 4:00pm  Set up posters
• 5:00pm  Reception
• 6:45pm  Dismantle posters
• 7:00pm  Shuttle pick up, back to hotel
AND NOW A WORD FROM

Rick Scoggins
SAMSI Communications Director
Communications & Marketing Minute!

- **We NEED** you to help tell the SAMSI Story!
- **SAMSI Social Media Platforms:**
  - https://twitter.com/SAMSI_Info
  - https://www.facebook.com/SAMSI.Info
- **SAMSI Blog:** https://samsiatrtp.wordpress.com/
- Take plenty of pictures and enjoy this event!
- **DON’T FORGET TO USE #WISO when talking about this WISO Workshop on Social Media!**
- Communications questions: communications@samsi.info

#SAMSI Does