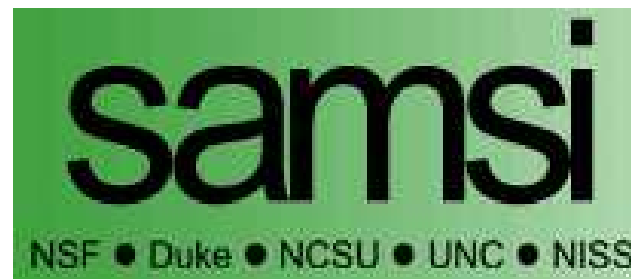


SAMSI Summer Program on Challenges in Dynamic Treatment Regimes and Multistage Decision-Making

June 18–29, 2007

Statistical and Applied Mathematical Sciences Institute



What is SAMSI?

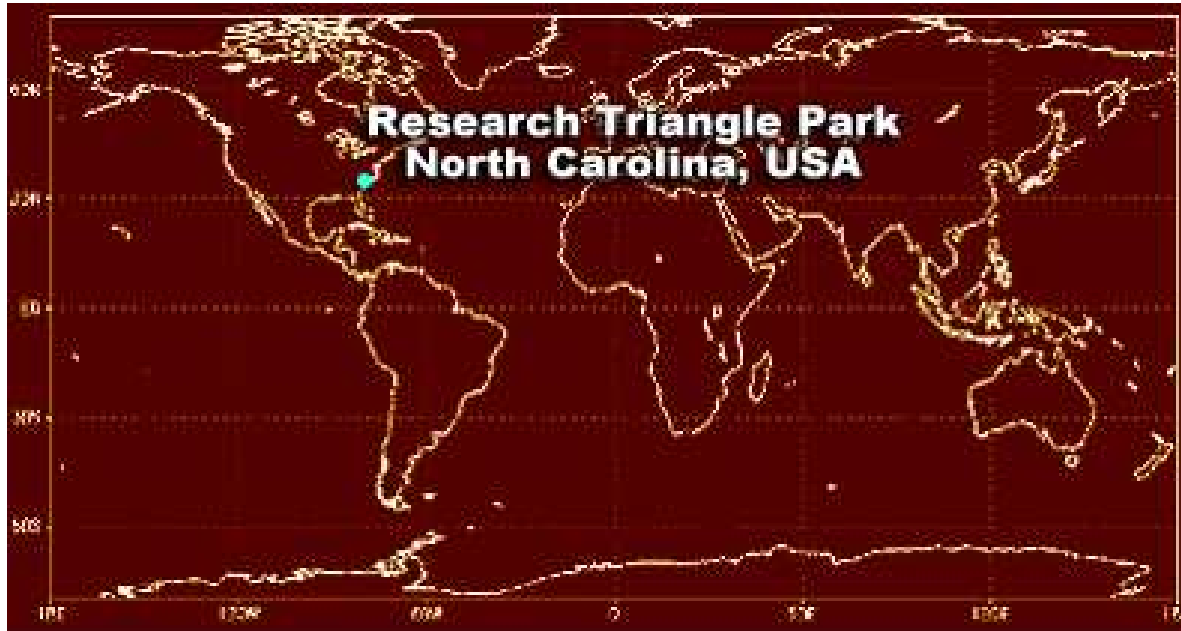
Statistical and Applied Mathematical Sciences Institute

“The Statistical and Applied Mathematical Sciences Institute (SAMSI) is a national institute that is forging a new synthesis of the statistical and applied mathematical sciences with disciplinary science to confront important data- and model-driven scientific challenges.”

SAMSI is a partnership of

- The *National Science Foundation*
- A *consortium* of *Duke University*, *North Carolina State University*, the *University of North Carolina at Chapel Hill*, and the *National Institute of Statistical Sciences (NISS)*

Where are we?



Home to:

- Raleigh, Durham, Chapel Hill
- Duke, UNC-CH, NCSU, NCCU, ...
- US EPA, NIEHS
- GlaxoSmithKline, IBM, Lenovo, RTI International, ...

Why are we here?

- Management of chronic disorders involves making *decisions about treatment sequentially over time*
- Each of these decisions may be made *on the basis of information observed on the patient up to that point*
- The *goal* of such multi-stage decision-making is to *improve patient outcomes* by “*tailoring*” treatment decisions to patients
- *Dynamic treatment regimes* are formal sets of sequential *decision rules* that specify how treatment should be given over time, where each rule takes as *input information on the patient* and *outputs the next step of treatment*

Why are we here?

- *Developing and analyzing* dynamic treatment regimes poses *inferential and computational challenges*
- *Methodology* for addressing these challenges has been and is being developed by researchers in *diverse disciplines*, e.g., statisticians, computer scientists, applied mathematicians, engineers, ...
- *Interaction and collaboration* between these disciplines can lead to *advances*
- *Goal of this SAMSI program*: Bring researchers from these areas together to jump-start these critical collaborations

What will we be doing?

Week 1: June 18 – 22

- Monday–Wednesday: *Tutorials*
- Thursday–Friday: *Opening Workshop*

Week 2: June 25–29

- Monday–Wednesday: *Working Groups*
- Thursday–Friday: *Transition Workshop*

Tutorials (Week 1)

Start at 9:00 am each day

1. *Introduction to Causal Inference* – Miguel Hernán, Harvard School of Public Health (Monday)
2. *Introduction to Dynamic Treatment Regimes* – Butch Tsiatis, NCSU (Monday)
3. *Reinforcement Learning with Connections to Classification* – Ron Parr, Duke University (Tuesday)
4. *Computational Challenges with High-Dimensional Data* – Joelle Pineau, McGill University (Tuesday)
5. *Introduction to Mechanistic Models and Control Theory* – Daniel Rivera, Arizona State University (Wednesday)
6. *Introduction to Nonstandard Statistical Inference* – Susan Murphy, University of Michigan (Wednesday)

Poster Session and Reception (Week 1)

Wednesday, June 20, 5:30–7:30 pm

- Poster presentations by Program participants
- Chance to *meet and socialize* with fellow participants

Poster presenters: Please see *me* between now and Wednesday am for important information

Opening Workshop (Week 1)

Thursday, June 21, 9:00 am – 5:15 pm

- Overview by Susan Murphy
- Seven *research presentations* followed by ample time for *discussion*

Friday, June 22, 9:00 am – 3:00 pm

- Extended talk/tutorial by Jamie Robins on *Inference for Dynamic Treatment Regimes*
- Discussion of Working Groups and activities for Week 2

Working Groups (Week 2)

Monday – Wednesday, June 25–27

Tentative themes:

1. Difficulties in statistical inference
2. Bayesian statistical approaches
3. Mechanistic modeling approaches
4. Practical challenges and applications

Transition Workshop (Week 2)

Thursday–Friday, June 28–29

- Reports of Working Groups
- Discussion (lots)
- Lay groundwork for a *white paper*

Next steps?

Your Program Organizers

Marie Davidian, Department of Statistics, North Carolina State University

Susan Murphy, Department of Statistics and Institute for Social Research, University of Michigan

Butch Tsiatis, Department of Statistics, North Carolina State University

Welcome to North Carolina and SAMSI