If you are having trouble reading this email, you may [view the online version](#)

# NISS/SAMSI Affiliate Update
November 2013

## 2014-2015 SAMSI Programs

"[Beyond Bioinformatics, Statistical and Mathematical Challenges](#)," will look at the statistical and mathematical challenges arising in the analysis of genomic and related data with the goal of addressing relevant biological questions. As genomic and related data are growing more complex, novel methods need to be developed to help with data synthesis and analysis to answer previously inconceivable questions about biological processes. This program will focus on: 1) Statistical pre-processing of emerging high throughput data; 2) Dependence in high-dimensional data; in particular, multivariate discrete counts; 3) Integration of multi-omics data; 4) Modeling dynamics of mixtures, such as populations of cells, variants and meta-genomics; and 5) Big data and machine learning for addressing 'omic issues.

The opening workshop will be held September 8-12, 2014.

Program leaders for "Beyond Bioinformatics" include: Alexander Alekseyenko, NYU School of Medicine; Karin Dorman, Iowa State University; Nick Hengartner, Los Alamos National Lab; Susan Holmes, Stanford University; Katerina Kechris, University of Colorado-Denver; Shili Lin, The Ohio State University; Dan Nettleton, Iowa State University and Hongyu Zhao, Yale University.

"[Mathematical and Statistical Ecology](#)." This program brings together three groups of researchers – statisticians, mathematicians and theoretical ecologists – to study and develop the interactions among different approaches that ecological modeling has developed. One approach is that theoretical ecologists have developed mathematical models that are analyzed using traditional tools of applied mathematics, such as partial differential equations (PDEs) and dynamical systems. These models are then used to look at resilience, tipping points or other ecological properties. A second approach, typically used by statisticians and data analysts, involves sophisticated statistical tools such as Bayesian hierarchical models that are applied to large spatio-temporal datasets, but often these models are developed without the detailed consideration of nonlinear dynamics. Some of the topics that will be explored through the year include: 1) Critical thresholds and tipping points; 2) Resilience of ecological systems; leading indicators; 3) Multi-scale and multivariate statistical method; 4) Climate and Biodiversity; 5) Implications for public policy. There is also likely to be a joint working group between the two programs, on the topics of Landscape Genomics.

The opening workshop for this program will be held August 25-29, 2014.

Program leaders for "Mathematical and Statistical Ecology" include: Philip Dixon of Iowa State University, Lou Gross of the University of Tennessee and NIMBioS, Jennifer Hoeting of

### Featured Affiliate - Emory University Department of Bioistatistics and Bioinformatics

The Department of Biostatistics and Bioinformatics in the Rollins School of Public Health at Emory University is committed to high quality graduate education and cutting edge research in biostatistics and statistical bioinformatics. Biostatistics and bioinformatics are exciting challenging disciplines. Emory's graduates find well paid jobs in academics, the private industry and in government.

Emory offers both masters of public health degrees and the doctoral degree with concentrations either in biostatistics or bioinformatics. For more information visit their [website](#).

Colorado State University, Mevin Hooten of Colorado State University, Lea Jenkins of Clemson University, Claire Lunch of the National Ecological Observatory Network, Ron McRoberts of the US Forest Service, Jay Ver Hoef of NOAA, and Linda Young of the National Agricultural Statistics Service.

More information about either of these programs and how to get involved can be found on the SAMSI website: http://www.samsi.info.

# NISS Co-Sponsored Events

**EFaB@ Bayes 250 Workshop**
**When:** December 15-17, 2013
**Where:** Dave Thomas Business Center, Duke University, Durham, NC
**Details here**.

# SAMSI Events

**LDHD: Topological Data Analysis**
**When:** February 3-7, 2014
**Where:** Research Triangle Park, NC
**Deadline to Apply:** January 3, 2014
**Details here**.

*Education and Outreach*
**Undergraduate Workshop**
**When:** February 20-21, 2014
**Where:** Research Triangle Park, NC
**Deadine to Apply:** January 17, 2014
**Details here**.

**LDHD: Statistical Inference in Sparse High-Dimensional Models: Theoretical and Computational Challenges**
**When:** February 24-26, 2014
**Where:** Research Triangle Park, NC
**Deadline to Apply:** January 15, 2014
**Details here**.

**LDHD: SAMSI-CRM Workshop on Geometric Aspects of High-dimensional Inference**
**When:** March 31-April 2, 2014
**Where:** Research Triangle Park, NC
**Deadline to Apply:** February 14, 2014
The workshop is a joint venture between SAMSI and Centre de Recerca Matemàtica (CRM) in Barcelona, Spain.

Topics covered by the workshop may include some of the following:

- low rank matrix estimation;
- sparse recovery and compressed sensing;
- covariance estimation for high-dimensional data;
- model selection and oracle inequalities in high-dimensional statistics;
- statistical inference for log-concave distributions in high dimensions;
- non-asymptotic theory of random matrices;
- concentration inequalities, generic chaining, and empirical processes methods in high-dimensional statistics;
- hypotheses testing for high-dimensional objects.

**Details here**.

**Spring Opportunities for Women**
**When:** April 9-11, 2014
**Where:** Knoxville, TN
**Deadline to Apply:** January 20, 2014
**Details here**.

**NISS and SAMSI**
P.O. Box 14006, Research Triangle Park, NC
www.niss.org and www.samsi.info