

Opening Workshop

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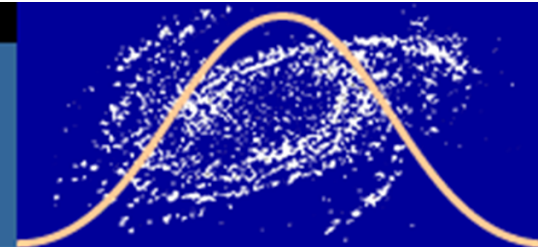
2016-2017 SAMS I ASTRO



PennState

Eberly College of Science

Center for Astrostatistics



Why astrostatistics?

Astronomers encounter a surprising variety of statistical problems in their research:

- The sky has vast numbers of stars & galaxies and gas on all scales. Most stars have orbiting planets, most galaxies have a massive black hole
- Astronomers acquire huge datasets of images, spectra & time series of planets, stars, galaxies, quasars, supernovae, etc.
- Various properties of cosmic populations observed and empirically studied with all kinds of telescopes ($n \gg p$)
- Properties are measured repeatedly but with irregular spacing Parametric modeling of data using nonlinear astrophysical models
- Spatial distributions in sky (2D), space (3D), and parameter space (pD) is complex (MVN assumption usually inapplicable)

Next few days you will hear details of statistical issues encountered in astronomy.

Eric Feigelson and I started collaborating in late 1980s and the term 'Astrostatistics' was coined in mid 1990s, when we published the book by the same name.

Astrostatistics at SAMSI

- Astrostatistics Program at SAMSI January 2006
 - Opening workshop January 18-20, 2006 ([Bayesian astrostatistics](#), [Nonparametric inference](#), and [Astronomy for Statisticians](#))
 - Working groups ([Exoplanets](#), [Surveys & Population studies](#), [Gravitational Lensing](#), [Source detection & feature detection](#), and [Particle Physics](#))
 - Concluded with SCMA IV at Penn State in June 2006
- Astrostatistics sub Program Fall 2012 - as part of Statistical and Computational Methodology for Massive Datasets program.
 - Working groups ([Discovery & Classification in Synoptic Surveys](#), [Inference & Simulation in Complex Models](#), [Stochastic Processes & Astrophysical Inference](#), and [Graphical Models & Graphics Processors](#))
- Summer 2013: Modern Statistical and Computational Methods for Analysis of Kepler Data: June 10-28, 2013

- SCMA (once in 5 years since 1991)
 - Starting from SCMA III (2001), the interaction grew stronger.
 - SCMA IV (2006 Stronger), SCMA V (2011 Excellent)
 - SCMA VI (2016 Excellent)
- ISI creates Intl Astrostatistics Assn (2010)
- IAU, AAS, ASA, IEEE → ASAIP (2012-5)
- Funding for astrostatistics research collaborations is very low and inadequate for the needs

The SAMSI ASTRO program will help invigorate
the field of *astrostatistics*