Overview of the Statistics Program

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Current Faculty

- There are 14 members specializing in **Statistics**, 8 in Biostatistics, and 2 in DS
- Associated Editors: JASA, Statistica Sinica, Biometrics, Computational Statistics & Data Analysis, and others
- Statistical societies: 6 ASA Fellows, 4 IMS Fellows, and more
- Grants from NSF, NIH, AOR and others
- Numerous university honors and awards

Stat Program Requirements

- PhD Qualifying Examination

- Coursework

- Essay Examination, Dissertation Defense

Required Courses

- STA 5106, STA 5107: Computational Methods in Statistics I, II

- STA 5166, STA 5167, STA 5168: Statistics in Applications I, II, III

- STA 5326 Distribution Theory
- STA 5327 Statistical Inference

- STA 6346 Advanced Probability and Inference I
- STA 6448 Advanced Probability and Inference II

Other Courses

- Other regular stat classes include *nonparametric* statistics (5507), *multivariate* statistics (5707), machine learning (5635), *high-dimensional* statistics (5721), *robust* statistics (6341), time series (5856), optimization (6721), stochastic processes (5807), *spatial* statistics (6709), and more

- Research oriented: 5906, 5910

- Special topics: 5934, 6468

- STA 5910: faculty research presentation

Research

- In addition to offering a robust and modern curriculum catering to students' needs, many faculty members work in contemporary areas of modern statistics.

  - Theory
  - Methods
  - Computation
  - Applications

New Challenges

- Statistics and probability are critical disciplines that form the foundations of epidemiology, economics, neuroscience..

- The widespread availability and essential role of data present unparalleled challenges and exciting opportunities.

- New-generation students must be equipped with the latest tools and techniques

Examples

- Big data and high-dimensional data

- Machine learning (AI)

- Causal inference and graphs, uncertainty qualification, sequence modeling

Examples (cont'd)

- Methods: decision trees, state-space models, deep learning methods, probabilistic network models

- Computing: nonconvex optimization, sketching, randomized algorithms

- Probabilistic Tools: concentration inequalities, uniform convergence, information theoretical techniques

- Communication

- Collaboration

- Respect, trust and empathy