Course Information
STAT 6289: Topics in Statistics–Model Selection and Related Topics

- **Time and Location:** W 06:10PM - 8:40PM, Tompkins 301, **Instructor:** Dr. Hua Liang
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- **Office Hours:** Wed 4:00pm-5:00pm or by appointment

- **Course Description:** This course is meant to give students who are pursuing (or plan to pursue) Ph.D. degree in Statistics. Focus is on introduction of several cutting-edge topics with the emphasis on model selection and model average, starting with the traditional criterion such as AIC, BIC, $C_p$ for fixed dimension, and penalization-based methods. Course topics and class format (lecture, panel discussion, etc.) will vary from week to week, as described below.

- **Exams:** There will be no examination. Each student will be assigned to read one/two papers (or a chapter) in a specific topic, and to present in the class. The final grade will totally depend on how a student completes all assignments on time, attends class regularly, and participates actively in class discussions.

- **Tentative Coursework:** Students will be required to complete several assignments focused on aspects of selecting literature. Specifically speaking, we will touch the following items:

  1. Literature review on traditional variable selection;
  2. Penalization based variable selection;
  3. Least absolute shrinkage and selection operator (LASSO), smoothly clipped absolute deviation (SCAD), and minimax concave penalty (MCP) methods;
  4. Model selection for high-dimensional linear models;
  5. High-dimensional semiparametric regression models
  6. Variable selection for longitudinal data
  7. Model selection for ultra high-dimensional linear models
  8. Model average

- **Prerequisite:** Audience should have taken most basic courses, particularly like Methods of Statistical Computing II (Stat6208); Linear models (Stat6218), Large sample theory; Advanced Statistical Theory (8263, 8264).

- **Learning outcomes:** After completing this course, students will be able to know the forefront of model selection and variable selection areas; Use software either R or SAS to conduct model building and variable selection for real data projects; Read literature on variable selection and model selection; do research in these areas if they want.