AMS 200 – Fall 2014
Introduction

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1 UCSC, SOE, AMS

2 Graduate program in Statistics and Applied Mathematics
AMS department

- The Department of Applied Mathematics and Statistics (AMS) is part of the Baskin School of Engineering
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- The other Departments of the School of Engineering:
  - Biomolecular Engineering
  - Computer Engineering
  - Computer Science
  - Electrical Engineering
  - Technology Management
AMS faculty (Applied Mathematics)

- **Nicholas Brummell** – fluid dynamics; magnetohydrodynamics; numerical simulations of geophysical and astrophysical dynamics; supercomputing

- **Pascale Garaud** – astrophysical and geophysical fluid dynamics; magneto-hydrodynamics; analytical and numerical solutions of PDEs related to these phenomena

- **Qi Gong** – computational optimal control for nonlinear systems; trajectory optimization and motion planning; optimal search, state and output feedback control of nonlinear systems; aerospace control applications

- **Dongwook Lee** – computational magnetohydrodynamics and gas dynamics; high-order shock capturing numerical methods; high-performance computing; numerical modeling of astrophysics and high-energy-density physics

- **Hongyun Wang** – single molecule studies and biophysics; statistical physics; stochastic differential equations
AMS faculty (Statistics)

- **David Draper** – Bayesian nonparametric methods; model specification and model uncertainty; risk assessment; applications in the environmental, medical, and social sciences

- **Rajarshi Guhaniyogi** – compressive methods for high dimensional regression; manifold regression; nonparametric Bayes; online learning with massive streaming data; spatial Bayes modeling for massive geostatistical datasets; applications in epidemiology, forestry, genomics, and neuroscience

- **Athanasios Kottas** – Bayesian nonparametrics; mixture models; modeling and inference for point processes; nonparametric regression; survival analysis; applications in biometrics, ecology, and the environmental sciences

- **Herbert Lee** – Bayesian statistics; computer simulation experiments; spatial statistics; optimization; inverse problems; nonparametric regression, classification and clustering
AMS faculty (Statistics)

- **Juhee Lee** – Bayesian statistics; Bayesian nonparametrics; modeling in biosciences and clinical trials

- **Raquel Prado** – Bayesian non-stationary time series modeling; multivariate time series; biomedical signal processing and statistical genetics

- **Abel Rodriguez** – Bayesian nonparametrics; Bayesian time series and spatial models; public health; financial econometrics; structural proteomics

- **Bruno Sansó** – Bayesian spatio-temporal modeling; environmental and geostatistical applications; modeling of extreme values; statistical assessment of climate variability
AMS faculty

- **Marc Mangel** (Distinguished Research Professor) – mathematical modeling of biological phenomena; statistical methods in fisheries management; mathematical and computational aspects of aging and disease; impact of technology on biological systems

- **Robin Morris** (Associate Adjunct Professor) – Bayesian analysis of scientific data, with applications in: Earth remote sensing; particle and astroparticle physics; signal processing and engineering

- **Tatiana Xifara** (Visiting Assistant Professor) – Bayesian statistics; computational statistics; hidden Markov models; diffusion processes; adaptive MCMC algorithms; point processes; applications in epidemiology and ecology

- **Yonatan Katznelson** (Lecturer)

- **Bruno Mendes** (Lecturer)

- **Valerie Poynor** (Lecturer)
On the stats side, Bayes rules in AMS!
Timeline for the MS degree

- **Academic Year 1**
  - 6 core courses + AMS 200 + AMS 280B
  - possible independent study courses (AMS 297) to explore research topics for the capstone project
  - first year qualifying examination

- **Academic Year 2**
  - a minimum of 2 additional 5-unit elective courses
  - capstone project to be read and approved by a committee consisting of the faculty advisor and one reader (at least one of the committee members must be from AMS)
Timeline for the PhD degree

**Academic Year 1**

→ 6 core courses + AMS 200 + AMS 280B
→ independent study courses (AMS 297/299) to explore possible PhD dissertation topics
→ first year qualifying examination

**Academic Year 2**

→ elective courses: in principle, 4 additional 5-unit courses required for the PhD degree; in practice, PhD students expected to take all electives
→ select PhD dissertation topic and advisor

**Academic Year 3, Year 4, ...**

→ elective courses
→ advancement to candidacy (by the end of spring AY 3 at the latest)
→ PhD dissertation defense
Core courses

- Six courses for each track all in the first year of the program

- **Statistics track:** AMS 203, AMS 211 (fall quarter); AMS 205B, AMS 206B (winter quarter); AMS 207, AMS 256 (spring quarter)

- **Applied Mathematics track:** AMS 203, AMS 211 (fall quarter); AMS 212A, AMS 214 (winter quarter); AMS 212B, AMS 213 (spring quarter)
First Year Exam

- FYE during or right after the final exams week of the spring quarter
  - in-class part: closed-notes, closed-book 4-hour exam based on 6 questions, one from each of the 6 core courses
  - take-home part: a problem that involves synthesis and application of methods and computing (submitted 48 hours after the in-class part)

- Detailed information for this year will be made available later
Further comments

- Students completing the MS program can request to transfer to the PhD program (must pass the FYE at the PhD level)
- Students in the PhD program may receive the MS degree upon completion of the MS degree requirements, including the capstone project
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- Department seminars: Mondays at 4pm in E2-180
- AMS 280B (attending the department seminars) must be taken for at least one quarter per year
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The grad director strongly encourages you to take AMS 280B every quarter!
Financial support

- Teaching and research assistantships are the main sources of financial support.
- PhD students are required to serve as TAs for at least two quarters during their grad studies (certain exceptions apply).
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- Domestic students (non CA residents): make sure to work as early as possible on establishing CA residency!
For questions

- First year advisor
- Graduate director
- Graduate Advisor: Tracie Tucker
- Your fellow grad students!