AMS 200 – Fall 2015
Introduction: Graduate program overview

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September 28, 2015

Outline

1. Course schedule
2. UCSC, SOE, AMS
3. Graduate program in Statistics and Applied Mathematics

AMS 200 schedule of classes

- September 28: Overview of graduate program and AMS (A. Kottas)
- October 5: Computational resources (N. Brummell)
- October 12: TA and GSR training and information (H. Lee)
- October 19: Q&A with senior grad students
- October 26: LaTex and writing (D. Lee and D. Venturi)
- November 2: LaTex and presentations (J. Lee and T. Xifara)
- November 9: Public speaking I (D. Draper)
- November 16: Public speaking II (D. Draper)
- November 23: Ethics (Q. Gong)
- November 30: Research (A. Kottas)

University of California Santa Cruz

AMS department

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- The other Departments of the School of Engineering:
  - → Biomolecular Engineering
  - → Computational Media
  - → 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; magnetohydrodynamics; 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

AMS faculty (Applied Mathematics)

- **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
- **Daniele Venturi** – uncertainty quantification (UQ); multi-fidelity stochastic modeling and data-driven stochastic multiscale mathematics; high-performance scientific computing; probability density function methods for forward/inverse UQ problems; functional differential equations
- **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)

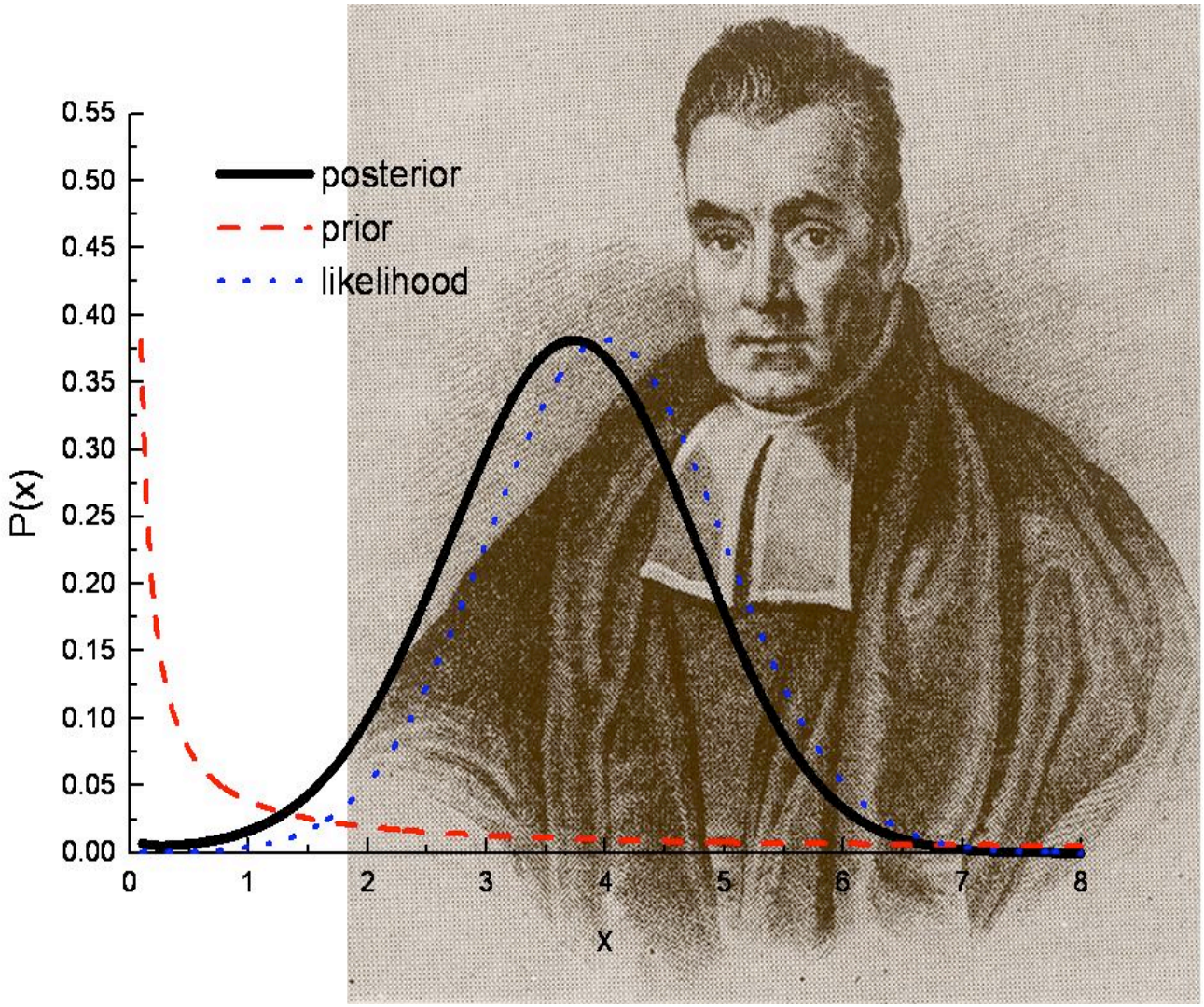
- **Juhee Lee** – Bayesian statistics; Bayesian nonparametrics; modeling in biosciences and clinical trials
- **Raquel Prado** – Bayesian non-stationary time series modeling; multivariate time series; biomedical signal processing and statistical genetics
- **Abel Rodriguez** – Bayesian nonparametrics; 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)

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 213B (spring quarter)

First Year Exam

- FYE *around* the end 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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- The grad director strongly *encourages* you to take AMS 280B **every** quarter!

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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!