# MATH 350 (Section 011)
# Probability Theory and Simulation Methods

Vu Dinh

Departments of Mathematical Sciences
University of Delaware

Feb 5th, 2018

# General information

- Classes: MWF 12:20-1:10 pm, Alison Hall 228
- Office hours:
  Tuesday-Wednesday 1:30pm-3pm, Ewing Hall 312, or by appointment.
- Website: `http://vucdinh.github.io/m350s18`
- Textbook:
  *Fundamentals of Probability with Stochastic processes, 3rd edition.*
  S. Gharahmani.
  search booksee.org

PURDUE
UNIVERSITY

FRED HUTCH
CURES START HERE

UNIVERSITY OF
DELAWARE.

mathematical finance
uncertainty quantification
experimental design
computational biology
statistics
evolutionary biology
machine learning

## Evaluation

- Overall scores will be computed as follows:
  25% homework, 10% quizzes, 25% midterm, 40% final
- No letter grades will be given for homework, midterm, or final. Your letter grade for the course will be based on your overall score.
- The lowest homework score and the lowest quiz score will be dropped.
- Here are the letter grades you can achieve according to your overall score.
    - $\geq 90\%$: At least A
    - $\geq 75\%$: At least B
    - $\geq 60\%$: At least C
    - $\geq 50\%$: At least D

- Assignments will be posted on the website every other Wednesday (starting from the first week) and will be due on Friday of *the following week*, *at the beginning of* lecture.
- No late homework will be accepted.
- Lowest homework score will be dropped in the calculation of your overall homework grade.

## Quizzes and exams

- At the end of some chapters, there will be a short quiz during class.
- The quiz dates will be announced at least one class in advance.
- The lowest quiz score will be dropped.

**There will be a midterm on 03/21 and a final exam during exams week.**

**(Tentative) Class schedule:**

| Week | Chapter | Note |
|------|---------|------|
| 1 | 1 | |
| 2 | 1, 3 | HW1 (due 02/16) |
| 3 | 3, 4 | |
| 4 | 4, 5 | HW2 (due 03/02) |
| 5 | 5, 6 | |
| 6 | 6, 7 | HW3 (due 03/16) |
| 7 | Review + Exam | Midterm exam (03/21) |
| 8 | Spring Break | |
| 9 | 7, 8 | HW4 (due 04/06) |
| 10 | 9 | |
| 11 | 10 | HW5 (due 04/20) |
| 12 | 11 | |
| 13 | 12 | HW6 (due 05/04) |
| 14 | 13 + Review | |

Open source statistical system R

http://cran.r-project.org/

## Topics

— It is difficult to make predictions, especially about the future.
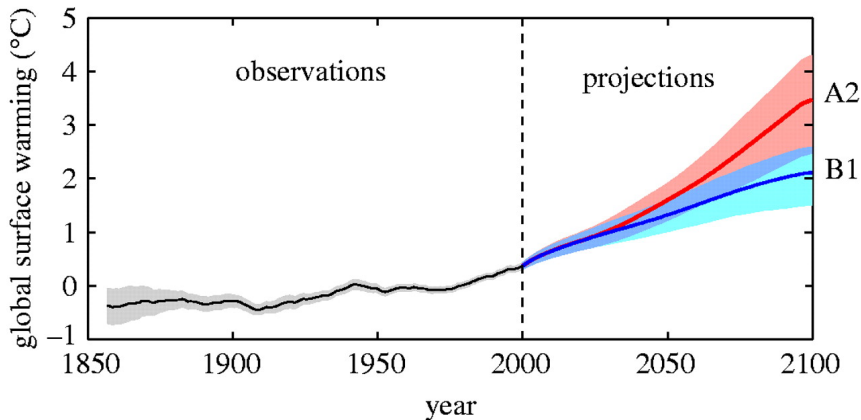
- probability $\rightarrow$ random variables
- numerical analysis $\rightarrow$ uncertainty quantification
- electrical engineer $\rightarrow$ fuzzy logic
- theory of evidence, possibility theory
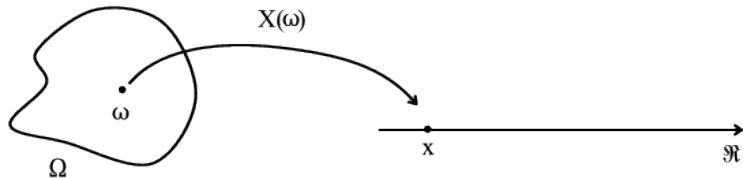
| $x$ | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|------|-----|-----|-----|-----|-----|-----|-----|
| $p(x)$ | .01 | .03 | .13 | .25 | .39 | .17 | .02 |

## Random variables

- Chapter 4, 5: Discrete random variables; special discrete distributions
  $\rightarrow$ basic knowledge of the counting principles in permutation and combination (MATH 210 or MATH 230).
- Chapter 6, 7: Continuous random variables, special continuous distributions
  $\rightarrow$ Calculus (MATH 243)

# Topics