Statistics 8625 (Autumn 2015)
Statistical Methods for Analyzing Genetic Data

Instructor
Prof. Shili Lin, 440A Cockins Hall, 2-7404, shili@stat.osu.edu

Lectures
MWF 1:50 PM - 2:45 PM; Scott Lab E103.
No classes on September 7, October 16, November 11, 25, and 27

Office Hours
MW 10:00 AM - 11:00 AM, or by prior appointment

Grader
Han Zhang, MA 450, 292-9238, zhang.1125@osu.edu

Website
http://carmen.osu.edu

Course
You are responsible for: material covered in class, assigned readings, homework assignments, and project. Class attendance is required.

Requirements
No classes on September 7, October 16, November 11, 25, and 27

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MW 10:00 AM - 11:00 AM, or by prior appointment

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Topics
Overview and history - statistical genetics, omics and bioinformatics
Basic principles of population genetics
Gene/haplotype frequency estimation
Likelihood computation on pedigrees (exact and Monte Carlo methods)
Linkage analysis; lod score and identity-by-descent methods
Association study; population and family based
More advance topics (e.g. imprinting and maternal effects; rare variants)
Topics in Bioinformatics (e.g. microarray/sequencing, methylation, data integration)

Homework
There are a total of 4-5 assignments. They are based on the materials covered in the lecture. No late homework will be accepted.

Midterm
TBA.

Project
The project is to read, summarize, and present a journal article. Novel ideas on extending statistical methodologies or improving computational algorithms will be awarded extra points. It is being structured into three parts: Part I: guided summary of paper; Part II: slide preparation; Part III: Presentation.

Grades
The final numerical grade will be determined as follows:
- Homework assignments 20%
- Midterm exam 30%
- Reading and participation in discussion 10%
- Project (including summary, slides, and presentation) 40%

References
Thompson EA (2000) Statistical inference from genetic data on pedigrees
Weir BS (2007) Genetic Data Analysis 3

Special Accommodations
If you need any accommodations based on the impact of a documented disability, contact the instructor privately to discuss your specific needs. You should also contact the Office of Disability Services to coordinate special accommodations.

Academic Misconduct
Academic misconduct will not be tolerated and will be dealt with in accordance with university policy.
Other Helpful Information

**Full credit policy.** Full credit for each homework or exam problem can only be earned through showing your justification for or work on each problem. Answers without work will not receive full credit.

**Calculators.** calculator (with statistical functions) may be used for homework and exams. No calculator functions of cell phones or other communication devices will be allowed during exams.

**Communication devices.** Cell phones and other communication devices must be either turned off or put on vibrate during class, as these devices ringing during class disrupt the learning process. Additionally, no cell phones or other communication device will be allowed on any exams in the course.