Statistics 8625 (Autumn 2013)
Statistical Methods for Analyzing Genetic Data

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

Lectures  
MWF 11:30 AM - 12:25 PM; Denney Hall 0262. No classes on Sep 2, Nov 11, 27, 29

Office Hours  
MF 4:00 - 5:00 PM, or by prior appointment

Grader  
Jingjing Yan, 2-4956, Yan.384@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.

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.
You may discuss with other students about the homework, but please work out your solutions independently. Do not simply copy any part of another student’s homework or solutions from any other sources.

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:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Homework assignments</td>
<td>20%</td>
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<tr>
<td>Midterm exam</td>
<td>30%</td>
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<tr>
<td>Reading and participation in discussion</td>
<td>10%</td>
</tr>
<tr>
<td>Project (including summary, slides, and presentation)</td>
<td>40%</td>
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</tbody>
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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.

Homework grading. All homework must be stapled with your name written legibly on the first page. If you have a question about the grading of your homework, first ask the grader about it. If you are not able to resolve the grading issue with the grader, please talk to me within 7 days from the date the graded work was returned to students.

Calculators. A 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.

E-mail correspondence. In order to protect your privacy, all course e-mail correspondence must be done through a valid OSU name.nn account.