

Statistics 6625 (Autumn 2018)
Statistical Analysis of Genetic Epidemiology Data

Instructor	Prof. Shili Lin, 440A Cockins Hall, 2-7404										
Lectures	T R 9:10-10:30 am, Enarson Classroom Building 212. No classes on Oct 11 and Nov 22										
Office Hours	Tuesdays 4-5, Thursdays 2-3, and by prior appointments										
Grader	Mr. Xiaofei Zhou										
Website	http://carmen.osu.edu										
Required Textbook	Zigler A and Konig IR (2010) <i>A statistical approach to genetic epidemiology: concepts and applications</i> , 2nd Edition. John Wiley & Sons.										
Recommended Textbooks	Thomas D (2004) <i>Statistical Methods in Genetic Epidemiology</i> . Lin S and Zhao H (2010) <i>Handbook on Analyzing Human Genetic Data: Computational Approaches and Software</i> .										
Course Description	Introduction to genetic epidemiology; molecular genetics and Mendelian principles; genetic markers and distances; model-based and model-free population and family based (genome wide) association studies; association analysis using haplotypes; analysis of DNA methylation data; other current topics.										
Learning Objectives	Develop familiarity with problems addressed in genetic epidemiology; Learn statistical approaches used in solving such problems; Conduct data analysis using software										
Homework & Project	There are approximately 6 homework assignments and 2 data analysis projects that require the use of computing software.										
Exam 1	Thursday, October 4 (in class). One 8.5" X 11" sheet of notes may be used for the exam. No make-up exam will be given.										
Exam 2	Thursday, November 15 (in class). One 8.5" X 11" sheet of notes may be used for the exam. No make-up exam will be given.										
Final Project	In class presentation.										
Grading	The final numerical grade will be determined as follows. Attendance may be taken into account. <table><tr><td>Homework and attendance</td><td>20%</td></tr><tr><td>Projects</td><td>15%</td></tr><tr><td>Exam 1</td><td>20%</td></tr><tr><td>Exam 2</td><td>20%</td></tr><tr><td>Final Project</td><td>25%</td></tr></table>	Homework and attendance	20%	Projects	15%	Exam 1	20%	Exam 2	20%	Final Project	25%
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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 procedurally in accordance with university policy.										

Tentative Schedule

Week	Dates	Topics	Assigned Readings
1	Aug 21, 23	Molecular Genetics, Mendelian Principles, Genetic Traits, Hardy-Weinberg Equilibrium	Chapters 1 and 2
2	Aug 28, 30	HWE, Genetic Markers, Map Distances	Chapters 3 and 5
3	Sep 4, 6	Linkage Disequilibrium	Chapter 10
4	Sep 11, 13	Population-Based Association Analyses	Chapters 11
5	Sep 18, 20	Pop. and Family-Based Association Analyses	Chapters 11 and 12
6	Sep 25, 27	Family-Based Association Analyses	Chapter 12
7	Oct 2	Haplotype Analysis	Chapter 13
7	Oct 4	Midterm 1	
8	Oct 9	Genome-Wide Association Studies (GWAS)	Chapter 14
9	Oct 16, 18	Pop-Based Assoc Analyses for Rare Variants	Research papers
10	Oct 23, 25	Family-Based Assoc Analyses for Rare Variants	Research Papers
11	Oct 30, Nov 1	DNA Methylation and EpigenomeWAS (EWAS)	Research Papers
12	Nov 6, 8	Differentially Methylated Regions	Research Papers
13	Nov 13	Hi-C Data and Chromatin Interactions	Research Papers
13	Nov 15	Midterm 2	
14	Nov 20	Hi-C Data and Chromatin Interactions	Research Papers
15	Nov 27	ChIA-PET and Long-Range Regulation	Research Papers
15	Nov 29	Presentations	
16	Dec 4, 6	Presentations	