

## Statistics 8810 (Autumn 2018)

### BioData Mining Statistical and Learning Methods for High Throughput Genomic Data

<b>Instructor</b>	Prof. Shili Lin, 440A Cockins Hall, 2-7404
<b>Lectures</b>	TR 11:30 am – 12:25 pm, Baker Systems 272
<b>Office Hours</b>	Tuesdays 4-5, Thursdays 2-3, and by prior appointments
<b>Website</b>	<a href="http://carmen.osu.edu">http://carmen.osu.edu</a>
<b>Prerequisites</b>	Statistics 6801 and 6802 or equivalent
<b>Course Description</b>	This class will discuss a number of statistical methods and case studies in genomics (e.g. genetic and epigenetic studies).
<b>Learning Objectives</b>	Develop technical skills for working with high throughput genomic data; understand the theory and applications of high-dimensional statistical and learning methods pertinent for analyzing high-dimensional genomic data.
<b>Tentative Topics</b>	Clustering and classification; Feature selection and shrinkage estimation for differential analysis; High-dimensional mixture models for quantitative and survival traits; Lasso, Bayesian Lasso, graphical Lasso, and other methods for sparse features; Kernel machine regression; Non-parametric and Bayesian methods for rank aggregation; Zero inflation modeling.
<b>Homework</b>	Homework assignments are due approximately every three lectures. Journal articles will be made available during the semester and you are expected to write a one-page summaries (double spaced) of 8-9 papers on various topics.
<b>Class Participation</b>	Students are expected to actively participate in class discussions. The number and quality of questions during peer presentations will be recorded and used for deciding final grades. Class attendance will also be taken into consideration in assigning grades.
<b>Project</b>	The final project is to read and present a journal article, and write a final report. Novel ideas on extending statistical methodologies or improving statistical analyses or computational algorithms are expected in the final report. The project will be structured into three parts. Part I: slide preparation; Part II: presentation (at least 25 minutes with 5 minutes for Q/A, and can be given at any time during the semester); and Part III: final report (you will be given extra time to work on it).
<b>Grading</b>	The final numerical grade will be determined as follows: Homework, class participation, and attendance 60% Project 40%
<b>Special Accommodations</b>	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.
<b>Academic Misconduct</b>	Academic misconduct will not be tolerated and will be dealt with procedurally in accordance with university policy.