

STAT 494*: Statistical Genetics

*this course can be used to satisfy the STAT capstone requirement or an upper-level DS elective

Spring 2025 | TTh 9:40 – 11:10 am | Prof. Kelsey Grinde

Statistical methods for **analyzing genetic data** and **understanding the genetic basis of human diseases and traits** are at the heart of government-sponsored precision medicine initiatives, genetic testing routinely conducted at health clinics, and direct-to-consumer genetic and ancestry testing offered by companies like 23andMe and AncestryDNA. Statistical geneticists work to answer these important scientific questions while navigating the **unique statistical challenges posed by genetic data**:

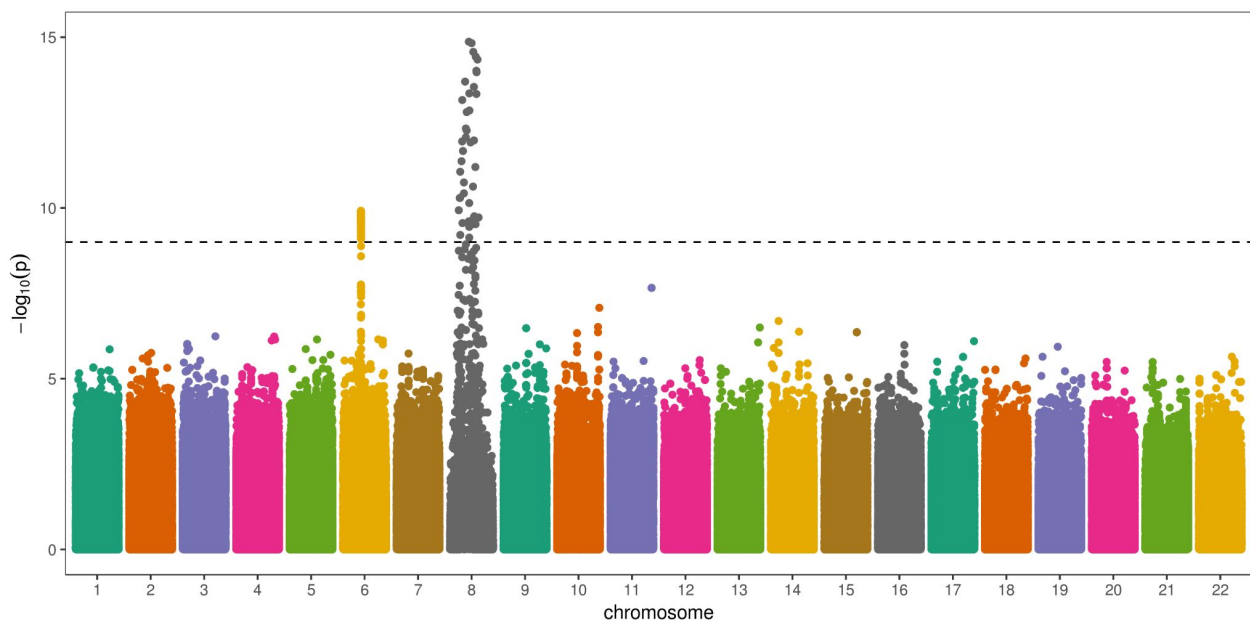
BIG ($p \gg n$)

Correlated

Observational

Sparse

In this course, we will explore the statistical methods that have been proposed to address these challenges, **applying ideas from other statistics courses** (e.g., linear models, hypothesis testing, principal component analysis) **in the context of genetic data**. Throughout, we will place a particular emphasis on scientific communication and computing.



Prerequisites: STAT 155, MATH 236, and MATH/STAT 354, or permission of instructor. Prior knowledge of genetics and statistical machine learning will be helpful, but are not formally required. Get in touch with Prof. Grinde (kgrinde@macalester.edu) with any questions!