Statistical Genomics

A Course to be Experts in GWAS and Genomic Prediction
ANIM SCI 545 / BIOLOGY 545 / CROP_SCI 545 / HORT 545 / PL_P 545
Spring 2025, Lecture: MF, 3:10-4:00PM, Lab: W, 3:10-5:40PM

Benefit of taking the course
- Obtain knowledge and skills for increasing demand of analytical workforce;
- Enhance the quality of data analyses for genomic research;
- Gain 3 credits for Graduate Certificate in Bioinformatics (9 elective required).

Major Topics:
Advanced programming skills in R, genome wide association study (GWAS), marker assisted selection, genomic selection (GS), computer simulation, Bayesian theory, general linear model, mixed linear model, best linear unbiased prediction, kinship, type I error, false discovery rate. Typical graphs include following:
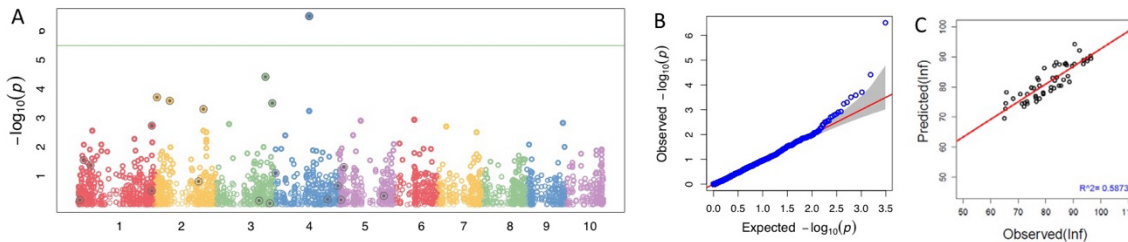
Teaching philosophy:
Active learning through critical thinking, team work, hand-on activities, and RE-inventions.

Instructor:
Dr. Zhiwu Zhang is the inventor, developer and reviewer of many of the methods and software covered in the course. His stories beyond the published descriptions are beneficial to know where the ideas came from and deeply understand how they work. Dr. Zhang is an Associate Professor in Department of Crop and Soil Sciences receiving Early Career Excellence Award. His research is to develop innovative, cutting-edge statistical methods and computing tools to advance genomic research toward the sustainability of food production and healthcare management. He published over 120 papers over last 15 years resulting over 27,000 citations. This is the 8th round he teaches the course. The teaching documents and previous student evaluations are available online (http://zzlab.net).