

SISG Module 13: Statistical Genetics

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Overview

This module consists of a series of pre-recorded lectures that will introduce you to the basic concepts of statistical genetics. The slides and video presentations of the lectures with audio transcripts are available for you to watch on your own and will be followed by live Zoom sessions in which we will go over any questions that you have. There will then be data analysis sessions where you will work in groups to get hands-on experience applying these concepts to the analysis of data using various software packages. You should download and install these packages.

Link to lectures, Zoom sessions, software and data was emailed to participants (“Welcome to SISG Module 13”) and posted on Slack.

Wednesday, July 22 (US Pacific Time)

11:30-12:20	Section 1	Genetic data. Probability and sampling. Mendel and Fisher.
12:20-12:35	Break	
12:35-1:25	Practical 1	1000Genomes data. Importing data into R, Plink, Gaston. Simulating data.
1:25-1:40	Break	
1:40-2:30	Section 2	Binomial distribution. Allele frequency sampling. Within-population inbreeding.

Thursday, July 23 (US Pacific Time)

8:00-8:50	Practical 2	Allele frequencies, variances, confidence intervals. Site Frequency Spectrum for 1000G AFR.
8:50-9:05	Break	
9:05-9:55	Section 3	Hardy-Weinberg Equilibrium. Normal and exact tests. Separate sexes. Linkage disequilibrium.
9:55-10:10	Break	
10:10-11:00	Practical 3	HWE chi-square, exact, multiple tests. F_{IS} . 1000G MHC data.
11:00-11:30	Break	

Thursday, July 23 (US Pacific Time)

11:30-12:20	Review	Review sections 1,2,3 together. Preview section 5 on your own.
12:20-12:35	Break	
12:35-1:25	Section 4a	Population structure parameter prediction and estimation.
1:25-1:40	Break	
1:40-2:30	Practical 4	Allele frequencies and F_{ST} over time; Effects of migration and population structure.

Friday, July 24 (US Pacific Time)

8:00-8:50	Section 4b	Inbreeding and kinship parameter prediction and estimation.
8:50-9:05	Break	
9:05-9:55	Practical 5	Inbreeding and Kinship estimation.
9:55-10:10	Break	
10:10-11:00	Review	Review section 4 together. Preview section 5 on your own.
11:00-11:30	Break	
11:30-12:20	Section 5	Quantitative trait models. Heritability estimation.
12:20-12:35	Break	
12:35-1:25	Practical 6	GWAS and Heritability with Gaston.
1:25-1:40	Break	
1:40-2:30	Review	Sections 1-6 together.