

Association Mapping: GWAS and Sequencing Data

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Summer Institute in Statistical Genetics (SISG)

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Introduction: Course Aims

This is a course on statistical methods and software for genetic association studies of complex traits. We aim to cover:

- ▶ Case-Control Association Testing
- ▶ Genetic Association Testing with Quantitative Traits
- ▶ Gene and Pathway Level Analysis
- ▶ Population Structure/Ancestry Inference
- ▶ Genetic Association Testing in Samples with Structure
- ▶ Interaction Analysis
- ▶ Collapsing Tests for Rare Variant Analysis
- ▶ Kernel Tests and Omnibus Tests for Rare Variants
- ▶ Power and Sample Size, Design Considerations, Emerging Issues

Introduction: Resources

Importantly, the class site is:

<http://faculty.washington.edu/tathornt/SISG2019.html>

Contains (or will contain);

- ▶ PDF copies of slides (in color)
- ▶ Datasets needed for exercises
- ▶ Exercises for you to try
- ▶ Our solutions to exercises (later!)
- ▶ Links to software packages

Introduction: About Mike



- ▶ Associate Member,
FHCRC Public Health Sciences Division
- ▶ Affiliate Associate Professor,
UW Boistatistics
- ▶ Research in:
High dimensional data
Kernel machine methods
Variable selection and regularization
Pathway and network based analysis
Translational research
Statistical genomics/genetics

Introduction: About Tim



... and you?

- ▶ Associate Professor, UW Biostatistics
- ▶ Affiliate Investigator, Fred Hutchinson Cancer Research Center
- ▶ Research in:
 - Genetic Association Studies
 - Correlated Genetic Data
 - Inferring Genetic Ancestry
 - Relatedness Estimation
 - Pharmacogenomics

Introduction: Course Structure

- ▶ 10 sessions over 2.5 days
- ▶ What to expect in a typical session;
 - ▶ 45 mins teaching/lecture
 - ▶ 30 mins hands-on exercises
 - ▶ 15 mins summary, discussion