Association Mapping: GWAS and Sequencing Data

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Summer Institute in Statistical Genetics (SISG)

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Introduction: Course Goals

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

▶ Genetic Association Testing with Case-Control & Quantitative Traits

▶ Population Structure/Ancestry Inference

▶ Genetic Association Testing in Samples with Structure

▶ Conditional analyses, Colocalization, Fine-mapping & Polygenic Risk Scores

▶ Gene and Pathway Level Analysis

▶ Association Testing for Rare Variant Analysis

▶ Interaction Analysis, GWAX, Time-to-event & Multi-trait Analysis

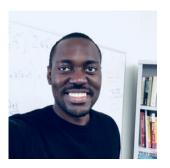▶ Power and Sample Size, Design Considerations and Emerging Issues

Introduction: Resources

Importantly, the class site is:
https://joellembatchou.github.io/SISG2022_
Association_Mapping/

Contains (or will contain):
- ▶ Link to PDF copies of slides
- ▶ Practical exercises for you to try
- ▶ Link to datasets used in exercises
- ▶ Our solutions to exercises (later!)
- ▶ Links to software packages

Introduction: About Loic

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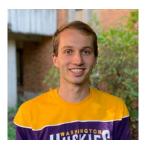- B
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Introduction: About Joelle

- ▶ Statistical Geneticist,
  Regeneron Genetics Center
- ▶ Research in:
  - ▶ Genetic Association Studies
  - ▶ Genetic Data with Structure
  - ▶ Mixed Models methods
  - ▶ Association methods for large-scale datasets

UW department's finest – here to help you!

Amarise Little   Anya Mikhaylova   Seth Temple

Slack Channel

Expect to 'see' them on Zoom chat, and our Slack channel:
https: //uwbiostatisticssisg.slack.com/archives/C03KLGA4HE3

Contains (or will contain);

- ▶ Key annoucements
- ▶ Link to the class website
- ▶ PDF copies of slides
- ▶ Link to practical exercises

Cloud server

We will use a cloud server to do the practical exercises. For more info on getting set up on the server:
https://joellembatchou.github.io/SISG2022_Association_Mapping/using_server.html

Things to note:

▶ **Let us know if you cannot access the server**
▶ We will run command line exercises on the server
▶ Check the course website for details on where the datasets are for each session

Introduction: Course Structure

- ▶ 10 sessions, 60-90 minutes each, over 2.5 days
- ▶ What to expect in a typical session;
  - ▶ 45 mins teaching/lecture
  - ▶ 30 mins hands-on exercises
  - ▶ 15 mins summary/discussion