Association Mapping: GWAS and Sequencing Data

Instructors: Joelle Mbatchou and Loic Yengo

Summer Institute in Statistical Genetics (SISG)

July 2022

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

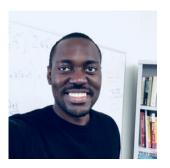
Introduction: Resources

```
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 (later!)
- Our solutions to exercises (later!)
- Links to software packages

Introduction: About Loic



- A
- B
- **C**

Introduction: About Joelle

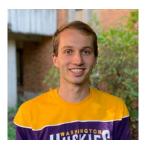


- Statistical Geneticist,
 Regeneron Genetics Center
- Research in:
 - Genetic Association Studies
 - Genetic Data with Structure
 - Mixed Models methods
 - Association methods for large-scale datasets

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/CO3KLGA4HE3

Contains (or will contain);

- Link to class website
- PDF copies of slides
- Practical exercises for you to try
- Our solutions to exercises (later!)

Cloud server

We will use a cloud server to do the practical exercises. To access ssh -XY <username>@si2022-m15.biostat.washington.edu

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