

SISG 2020: Module 11

Genetic Epidemiology

Housekeeping

- Introductions of instructors
- Schedule
- Layout of lectures – Zoom poll, breakout rooms
- Slack channel
- Q&A at the end of Thursday/Friday
- Zoom polls (What is genetic epi, what is your current role (student, postdoc, faculty, scientist at research institute, industry), which time zone are you in)



Alison (Alie) Fohner

Pronouns: she, her, hers

Dr. Fohner is a genetic epidemiologist applying innovative big data methods to extensive electronic health record and genomic data to improve precision medicine. She approaches genetic epidemiology through an ELSI (ethical, legal, social implications) lens, and aims to promote equity and justice in the benefit of and access to genetic information in health settings. She teaches in the Institute of Public Health Genetics, an interdisciplinary program in the School of Public Health that explores the application of genomics in public health.



Sara Lindström

Assistant professor

Department of Epidemiology, UW

Public Health Sciences Division, Fred Hutchinson Cancer
Research Center

Pronouns: she, her, hers

Dr. Lindström is a genetic epidemiologist with a special interest in understanding the genetic contribution to common complex diseases, with a primary emphasis on cancer and linked traits. By leveraging long-running large population-based studies, she investigates how our genetics and environment affect our risk of developing disease. She also teaches “Genetic Epidemiology” as part of the UW Public Health Genetics program and the Department of Epidemiology



Hongjie Chen (TA)

PhD Candidate

Department of Epidemiology, UW

Pronouns: he, him, his

Hongjie is a fourth-year PhD candidate at the department of epidemiology, UW. His research interest is in cancer and genetic epidemiology. He studies the genotype-phenotype associations for complex traits and investigates the shared genetic basis across different types of cancers. He is set to complete his PhD study in Fall 2020.

Day	Time	Lead	Topics	Details
Wed	11:45-12.30	Alie/Sara	Class Intro	Intro to class/agenda and topics Technology/logistics Breakout room introductions
BREAK				
	12.45-1.30	Sara	Overview of Genetic Epi	Intro to Epidemiology and Genetic Epidemiology
BREAK				
	1:45-2:30	Alie	Human genetic variation	Types of genetic variation

THURSDAY**8:30 – 9:15**

Alie

HWE/LD

Hardy Weinberg Equilibrium, and Linkage Disequilibrium

BREAK**9:30-10:15**

Alie

Population Structure

Ancestry and Principal Component Analysis

BREAK**10:30-11:15**

Sara

Study Designs

Types of genetic epidemiology studies, imputation

LUNCH BREAK**11:45 – 12:30**

Alie

Association studies

Conducting association studies and calculating odds ratios

BREAK**12:45-1:30**

Sara

GWAS

Genome wide association studies

BREAK**1:45 – 2:30**

Sara/Alie

Office Hours

Stop by to ask questions from the day, or schedule time to discuss your own project.

FRIDAY**8:30 – 9:15**

Alie

Bioethics/
ImplementationBioethical principles in genetic epidemiology,
deciding whether to implement genetic testing**BREAK****9:30-10:15**

Sara

Rare variation

Strategies to analyze rare genetic variants

BREAK**10:30-11:15**

Sara

GxE interactions

Gene x Environment interactions analyses

LUNCH BREAK**11:45 – 12:30**

Alie

Risk prediction

Polygenic risk scores and population screening

BREAK**12:45-1:30**

Sara

Mendelian
Randomization

Mendelian Randomization studies

BREAK**1:45 – 2:30**

Sara/Alie

Office Hours

Stop by to ask questions from the day, or
schedule time to discuss your own project.

SISG website

- We will use the SISG website as the main source of information. Here you can find slide decks from lectures, recorded lectures, recommended readings, exercises etc.

<https://si.biostat.washington.edu/suminst/archives/SISG2020/SM2011>

Office Hours

- We will have Office Hours Thursday and Friday 1.45-2.30pm PT.
- These will provide an opportunity to ask the instructors any questions you might have. These sessions are optional. You can stop by to ask general questions or just listen in on discussion.
- If you want to request a 1-on-1 appointment with one of the instructors during Office Hours, there will be 10-mins slots that you can sign up for via Slack by direct messaging Hongjie, our TA

Recommended Readings

- To get as much as possible out of this Module, we have compiled a set of papers that we recommend that you read for more in-depth information and to see some of our favorite examples of the methods we will discuss.

Break-out sessions.

- We will utilize Zoom break-out sessions with groups of 4-5 throughout the module to enhance the opportunity to conduct practical assignments and discuss relevant topics with your peers.
- We will assign you a break-out room at the beginning of each day and will update the roster every day to give you a chance to meet different peers for networking.
- If you have questions, send a note in slack identifying your group number. Instructors will rotate through the groups.
- One member of each group, please post group results in slack.

We will also use Zoom polling to complete smaller activities.

- Practice zoom poll

Slack

- We have set up a Slack channel that allows for one-to-one direct messaging between participants and instructors, as well as the option to set up a group channel where multiple members can chat, share files etc.
- Information about downloading and using slack (either on your computer and/or phone) can be found at <https://slack.com> ([Links to an external site.](#)).
- You will receive an email invitation to join the *mod11geneticepidemiology* Slack Channel.

Zoom chat

- Please use the chat function to ask questions for quick answers. Hongjie will be monitoring the chat and slack channel throughout the module.

Optional Op-Ed talks

- A series of Op-Ed talks will be held 11:10-11:25 a.m. Pacific Time throughout the Summer Institutes. The schedule and Zoom links are available at <https://si.biostat.washington.edu/suminst/FAQs>.
- These cover a wide range of topics related to applications and consequences of statistical genetics.
- All talks will be recorded.

Breakout groups

1. Each person, please introduce yourself to the other members in your group:

- Your name and pronouns. Your position (student, researcher) and affiliation (what University or institute).
- What are your strengths in your training so far? (i.e., is your background in genetics, biostatistics, law?)
- What prompted you to take this course? What are you hoping to learn?

2. Once everyone is introduced, discuss in your group:

- Why do we study the role of genetics in human disease?

Op-Ed Schedule for this week

TALK 3

11:10-11:25 am, Wednesday, July 22: **Societal Implications of Research on Plant Genetics**

Speaker: **Ed Buckler**, Cornell University and USDA

Zoom Webinar Link: <https://washington.zoom.us/j/98245802202>

Zoom ID: 982 4580 2202

TALK 4

11:10-11:25 am, Thursday, July 23: **Diversity in Genetic Studies**

Speaker: **Rori Rohlf**s, San Francisco State University Department of Biology

Zoom Webinar Link: <https://washington.zoom.us/j/91987604133>

Zoom ID: 919 8760 4133

TALK 5

11:10-11:25 am, Friday, July 24: **Data-driven vs Mechanistic Modeling of SARS-COV-2**

Speaker: **Daniela Witten**, University of Washington Department of Statistics

Zoom Webinar Link: <https://washington.zoom.us/j/95350192701>

Zoom ID: 953 5019 2701