



**Dates:** June 17 – 21, 2019

**Location:**

Institute for Social Research, Room 1430  
University of Michigan

**Before you arrive in Ann Arbor...**

Module 1: What is a server (3:45)  
Module 2: Computing Hardware (4:31)  
Module 3: Concepts of Command Line (4:14)  
Module 4: Introduction to R concepts (7:38)

**MONDAY, June 17**

8:30 - 9:00 Light breakfast and coffee served

9:00 - 9:30 *Introduction to the Workshop*  
Jessica Faul & Colter Mitchell

9:30 - 10:15 *Introduction to biology and genetics – understanding genomic data in populations*  
Kelly Bakulski

10:15 - 11:00 *Collecting, extraction, and storing genetic material; cost and coverage of different platforms/chips*  
Jessica Faul

11:00 - 11:15 Break

11:15 - 12:00 *Population stratification and admixture – avoiding the pitfalls and utilizing the strength of ancestry and admixture*  
Jennifer Smith

12:00 - 1:00 Lunch Provided

1:00 - 1:30 *Online genomic resources*  
Jessica Faul

1:30 - 4:30 *Lab:*  
*Linux Mini and Computing*  
*Understanding genetic file types and the content of the files*  
*Viewing and exploring Genome-wide data*  
Erin Ware

5:00            *Social Event at ISR*

**TUESDAY, June 18**

8:00 - 8:30     Light breakfast and coffee served

8:30 - 9:00     Recap of the previous day and questions

9:00 - 9:45     *Quality control – estimating and interpreting minor allele frequency, understanding strands, Hardy-Weinberg equilibrium, heterozygosity, linkage disequilibrium,*  
Jennifer Smith

9:45 - 10:30   *Imputation – basic explanation of genotype imputation, inputs and outputs, using online reference panels HapMap and 1000 Genomes Project*  
Jennifer Smith

10:30 - 10:45   Break

10:45 - 11:15   *GWAS and meta analyses - alleles, effects, models, p-values, SNP-based heritability*  
Jennifer Smith

11:15 - 12:00   *Statistical Power issues - multiple testing and replication*  
Colter Mitchell

12:00 - 1:00     Lunch (on your own)

1:00 - 4:00     *Lab: Understanding and working with different genomic coding schemes*  
*Assessing genomic data quality control*  
Erin Ware

**WEDNESDAY, June 19**

8:00 - 8:30     Light breakfast and coffee served

8:30 - 9:00     Recap of the previous day and questions

9:00 - 9:45     *Structural and rare variants*  
Jennifer Smith

9:45 - 10:30   *Polygenic scores: construction, utility, use in research*  
Colter Mitchell

10:30 - 10:45   Break

10:45 - 11:45   *Genomic SEM*  
Andrew Grotzinger, University of Texas at Austin

11:45 - 12:15   *Telomeres*

Colter Mitchell

12:15 - 1:15 Lunch (in small groups – pay on your own but we'll try to coordinate small groups based on discussion topics or food interests)

1:15 - 4:00 *Lab:*  
*Extracting genetic data for analysis and using extracted data; Constructing Polygenic Scores*  
Erin Ware

#### **THURSDAY, June 20**

8:00 - 8:30 Light breakfast and coffee served

8:30 - 9:00 Recap of the previous day and questions

9:00 - 9:45 *Gene-environment interaction models – from candidate genes to GWAS data-based models, formal testing GxE*  
Colter Mitchell

9:45 – 10:00 Break

10:00 – 11:00 *Examining the Dynamic Gene: Epigenetics*  
Colter Mitchell

11:00 - 12:00 *The Epigenetic Clock*  
Morgan Levine, Yale University

12:00 - 1:00 Lunch (on your own) – Sonic Lunch downtown Ann Arbor

1:00 - 2:15 *Longitudinal Study of SES and Telomeres in Costa Rica*  
David Rehkopf, Stanford

2:15 - 4:30 *Lab:*  
*Genomic SEM*  
Erin Ware and Andrew Grotzinger

5:00 *Social Event at the Pretzel Bell, Captain's Room, Main St Ann Arbor*

#### **FRIDAY, June 21**

8:00 - 8:30 Light breakfast and coffee served

8:30 - 9:00 Recap of the previous day and questions

9:00 - 9:45 *Collaborating – working with labs and consortia and finding a collaborator*  
Jessica Faul

9:45 - 10:15 *Data Sources – HRS/HRS Sister Studies, AddHealth, Fragile Families, UKBiobank,*

*MESA*

- 10:15 - 10:30 Break
- 10:30 - 12:00 *Student Presentations I*  
Students and Faculty Panel
- 12:00 - 1:00 Lunch Provided
- 1:00 - 3:00 *Student Presentations II*  
Students and Faculty Panel
- 3:00 - 3:15 Break
- 3:15 - 3:45 *Pitching your ideas and publishing your work - How to justify your work in a grant application, common review complaints, journals and funding Ethics*  
Faculty Panel
- 3:45 - 4:00 Final Remarks and Evaluation of Course