

# Introduction

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# Welcome!

The primary goal of the course is to provide theory and practice of computational genomics, and empower to conduct independent genomic analyses.

- We will study the leading computational and quantitative approaches for comparing and analyzing genomes starting from raw sequencing data.
- The course will focus on human genomics and human medical applications, but the techniques will be broadly applicable across the tree of life.
- The topics will include genome assembly, variant identification and analysis, gene- and miRNA expression, methylation and epigenomic analysis, copy number variant analysis, metagenomics, single-cell analysis, 3D genomics, and cancer genomics.

# Logistics

- Course Webpage: <https://mdozmorov.github.io/BIOS668.2018/>
  - Lecture notes in PDF, exercises R code, references will be posted there
- Course Discussions: <https://blackboard.vcu.edu>
  - Announcements, assignments, homework submission and grading
- Class Hours: Monday/Wednesday, 9:00 am to 10:20 am
- Office Hours: Monday/Wednesday 10:30 am to 12:00 pm at Biostatistics Office 730.
  - Any other time - by appointment

# Prerequisites

- BIOS 567 (Statistical Methods for High-throughput Genomic Data I), BIOS 692 (Reproducible Research Tools)
- Access to an Mac or Linux machine, or, for Windows machines, install VirtualBox
- Familiarity with the Unix command line for exercises
- Familiarity with R programming environment
- Knowledge of Git and GitHub for homework submission

# Resources

- Primary Texts: We will be studying primary research papers
- Lecture notes will contain many footnotes with links. Make a good use of them, explore the references on your own!
- Other Resources: Google, SEQanswers, Biostars, StackOverflow

# Grading Policies

- Homework assignments practicing methods and tools learned in class: 50% of the total grade. Due at 9:00am ~two weeks after assignment
- Paper reading is important. Paper notes will be graded
- Final Project developing a fully reproducible genomics analysis: 30%. Pre-proposal due in the middle of the semester, the final project due at the end
- Class attendance and participation: 20%.
- Deadlines are mandatory
- Discuss homework with your peers, work together, but provide your own solution

# Course evaluation

- At the end of the course, you will be asked to evaluate it
- Assess what you learned during the course
- Take notes on what you like in the course, what you want to be improved
- Your evaluation is anonymous