

# **BINF 739 Topics in Bioinformatics: Next-generation Sequencing Fall 2020**

**Meeting time:** Wednesdays 4:30 – 7:10 pm

**Meeting place:** Colgan Hall, Room 304B, SciTech campus

**Credit hours:** 3.0 credits

**Instructor:** Dr. Amy Smith

**Office location:** Colgan Hall, Room 328E

**Office hours:** By appointment

**Email:** [asmi6@gmu.edu](mailto:asmi6@gmu.edu)

## **Course description:**

This course will introduce students to the principles of next-generation sequencing (NGS) techniques and practices. It is designed in three parts to bring the student from active listener to active participant.

- **Part 1** presents a brief overview of NGS technologies and computational algorithms. The R software environment and UNIX command line interface are introduced and/or reviewed.
- **Part 2** explores recent examples of genome, exome, transcriptome, and epigenome studies with appropriate background concepts provided.
- **Part 3** provides a hands-on opportunity for a student to work with publicly available NGS datasets in a small independent project.

## **Prerequisites:**

- **Recommended:** Basic knowledge in molecular biology, probability, and statistics or permission of instructor
- **Preferred:** Familiarity with a programming language.

## **Required Reading:**

Students will be assigned journal articles available through the GMU Libraries.

## **Learning Outcomes:**

1. Students will know how to use bioinformatics resources to access and make sense of the wealth of data provided by NGS technologies to answer biologically relevant questions in their areas of interest.
2. Students will become familiar with a typical NGS analysis pipeline including assessment of raw reads, alignment to a genome, and gene-centric analyses.
3. Students will understand how experimental design, data acquisition, and data analysis are applied to and achieved with NGS studies.