

# BIOF 544: Getting the Message: High Resolution Analysis of Transcriptomes

The human genome reference sequence took decades and vast resources to complete. The human transcriptome reflects how the genome is deployed, and is vastly more complex and elusive, but great strides in characterizing transcriptomes have been enabled by sequencing technology in the last decade. The objective of this course is to gain an understanding of the ways transcriptomes are analyzed with modern sequencing methods. In this course, students will move beyond thinking of gene expression as getting lists of up and down genes, and gain an appreciation for the multiple interacting mechanisms at play that determine protein levels from transcripts - including splicing, RNA modifications, and translational control. Starting from a biological question about gene regulation, the student will learn to design the experiment to assay that question, as well as choose the appropriate tools and perform the analysis. The student will also gain an understanding of current and cutting edge sequencing technology to know what assays are possible.

## Learning Objectives

- Understand complex mechanisms of transcriptional and post-transcriptional gene regulation
- Describe and identify the major sequencing experiment data types and tools
- Plan a data analysis strategy for a sequencing experiment
- Execute a data analysis strategy for a transcriptomic dataset

**Credits:** 2

**Class Type:** Graduate Course

**Prerequisites:**

BIOF 339

BIOF 501

The above course(s) or familiarity with R and basic command line usage or Unix/Linux.

**Program:** Bioinformatics and Data Science

**Availability:** Spring 2022

**Session:** Session B