

**BIOL 6810, CSCE 6810, MATH 6710**  
**Advanced Topics in Computational Life Sciences**  
**Topic: Next Generation Sequencing Data Analysis**

**Fall 2021**

**Instructor:** Rajeev K. Azad

**Lectures/Seminars:** Thursday, 6:30 – 9:20 PM at LANG 114

**Office Hours:** Thursday, 5-6:30 PM at GAB 434 or by appointment

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**Required Textbook:** There will be no required textbook. The course will be based on published journal and conference articles.

**Course Objective:** This course focuses on advances in bioinformatics and computational modeling for analysis of next generation sequencing data. The goal of this course is to explore the literature on the topics of modeling and analysis of vast amount of next generation sequencing data available in various databases, including those from DNA and RNA sequencing using next generation technologies. These data have been collected from diverse organisms and environments. Students will present and discuss research papers that describe the latest developments in the field, focusing on the use of models and techniques in sequencing data analysis. These papers will form the basis for investigative research projects using the methodologies presented in these papers to address important problems in biology or medicine. Students will participate in projects (in team or individually) motivated by problems from this field. Both state-of-the-art as well as emerging novel methodologies in next generation sequencing data modeling will be discussed. Students will learn the basic as well as advanced methods used in the analysis of next generation sequencing data and explore their use in addressing important problems in biology or medicine. Students will be encouraged to develop ideas or strategies for more robust analysis of sequencing data and implement in their project works.

**Assessment** is primarily based on 1) paper and project progress presentations (45%), 2) project work, written report, and final presentation (30%), and 3) class participation— attendance and discussions (25%).

**Attendance:** Attendance is essential and thus is expected.