BIOL 6810, CSCE 6810, MATH 6710
Advanced Topics in Computational Life Sciences

**Topic:** Cancer Bioinformatics

**Course Information & Syllabus (Fall 2017)**

**Instructor:** Rajeev K. Azad
**Days & Times:** Monday 6:30 – 9:20 PM
**Room:** GAB 438
**Office Hours:** Monday 9:30 AM – 12:00 PM at GAB 434 or by appointment
**Office:** A316 LSC and GAB 434
**Phone:** 940-369-5078, 940-565-4694
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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 the new advances in understanding cancer spurred by the rapidly growing field of bioinformatics and computational biology. The goal of this course is to explore the literature on the topics of modeling and analysis of vast amount of molecular data collected from cancer patients (and healthy individuals), including genomic, transcriptomic, proteomic and metabolomic data. Breakthrough in molecular technologies has created data deluge, spawning unprecedented opportunities in understanding cancer biology, identifying cancer biomarkers, developing novel strategies in cancer diagnostics and therapeutics, and integrating the vast amount of diverse information to enable personalized treatment. Analysis and interpretation of “Big Data” in oncology is a significant challenge to cancer researchers, as National Cancer Institute nicely puts it (https://www.cancer.gov/research/nci-role/bioinformatics)—

“Nowhere is this challenge more evident than in oncology. By some estimates, by the end of 2017, just the research performed using next-generation sequencing of patient genomes will produce one exabyte—one quintillion bytes, $10^{18}$ bytes, or a million times a million times a million bytes—of data annually. Much of these data will come from studies of patients with cancer.”

Advances in development and application of mathematical and computational methods for interpreting this scale of data are critically needed. This course will focus on current state-of-the-art in cancer bioinformatics, and will stimulate discussions on advancing the field. Students will present published research, prepare in-class presentations, and will lead discussions of articles during the class.

**Assessment** is primarily based on paper presentations (45%), project work and written reports (30%), and class participation—attendance and discussions (25%).

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

**Americans with Disabilities Act:** We cooperate with the Office of Disability Accommodation to make reasonable accommodations for qualified students (cf. Americans with Disabilities Act and Section 504, Rehabilitation Act) with disabilities. If you have not registered with ODA, we encourage you to do so. If you have a disability for which you require accommodation please discuss your needs with the instructor or submit a written Accommodation Request on or before the fourth class day.