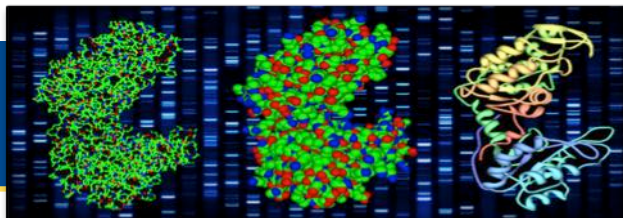# UNO Computer Science
Bioinformatics

Scientific research is rapidly becoming a digital, information-driven field. Bioinformatics strives to adapt the powerful information processing techniques from computer science to yield new and exciting discoveries from biological, medical, and health data. Bioinformaticians use computational techniques such as data modeling, machine learning, data mining, and data visualization to analyze and observe biological processes like never before. They play a pivotal role in modern research within both wet laboratories and digital labs.

Accreditations

Computing Accreditation Commission of ABET
ABET is the recognized U.S. accreditor of college and university programs in applied science, computing, engineering, and technology.
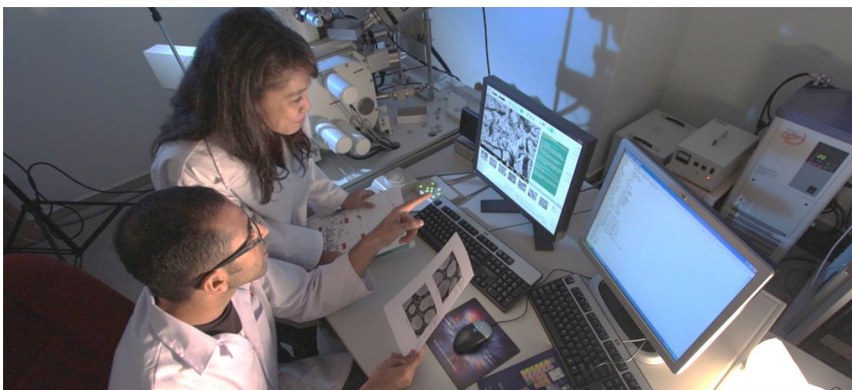
Employment Opportunities and Internships

Bioinformatics is one of the the fastest growing careers involved in scientific research. Employment opportunities are projected to grow by over 20% from 2012-2022. Bioinformaticians are highly sought by pharmaceutical companies, universities, hospitals, clinics, research facilities of companies, educational and medical institutions, and government regulatory agencies to fill jobs paying an average of over $81k/yr. Thanks to the New Orleans Biodistrict initiative, many of these biomedical companies are rapidly moving into the area.

Areas of Research

The CS department researches many subdomains within bioinformatics

Protein Structure Prediction
Predicting the 3D structure of a protein from its amino acid sequence.

Molecular Modeling
Application of theoretical methods and computational techniques used to mimic the behavior of molecules.

Drug Designing
Computer-assisted drug design uses computational chemistry to discover, enhance, or study drugs and related biologically active molecules.

Sequence Analysis
The process of subjecting a DNA, RNA or peptide sequence to any of a wide range of analytical methods to understand its features, function, structure, or evolution.

Mathematical Modeling
Using mathematics to predict the outcome of some complex real time problems which cannot be done in lab or in reality.

Research Opportunities and Assistantships

Bioinformatics &
Machine Learning
Lab

Bioinformatics at UNO is overseen by recognized experts in the field that actively conduct well-funded scientific research backed by industry support. There are many exciting research opportunities for both graduate and undergraduate students. Research facilities include the Bioinformatics and Machine Learning Lab (BMLL). Ongoing research topics at UNO includes machine learning applications, protein structure prediction and design.

Bioinformatics

Concentration in Computer Science

Bioinformatics is a concentration within Computer Science at both the Undergraduate and Graduate levels. This concentration is available to B.S., M.S. and Ph.D. students. In addition toward receiving a general Computer Science degree, students also specialize in the following topics.

Scientific Computing

Scientific Computing provides an introduction to the application of computers to scientific inquiry, focusing on theory and practice in simulation, modeling, and visualization approaches used across scientific disciplines.

Bioinformatics

Bioinformatics surveys the effective implementation and application of computer science algorithms towards biological problems. Students will learn to perform mathematical modeling, computation, data-analysis, structure prediction, and dynamic simulations.

Machine Learning

Machine Learning covers probabilistic techniques used to uncover patterns to predict future data or other outcomes. These concepts have vast applications in bioinformatics, computer vision, robotics, and business intelligence.

Undergraduate Courses

Software Design I & II
Data Structures
Assembly Language
Systems Programming
Biology
Computer Networks
Statistics
Scientific Computing
Bioinformatics I & II
Operating Systems
Computer Organization
Theory of Computation
Analysis of Algorithms
Machine Learning Methods I & II
Databases
Programming Language Structure

Graduate Courses

Advanced Machine Learning I & II
Advanced Topics in Bioinformatics
Molecular Biology
Pattern Recognition
Big Data
Data Visualization

Undergraduate and Graduate Concentrations

The undergraduate courses will heavily improve your core scientific and computing skills. Since the field of biology is considered to be incredibly digital its well suited for applied computer science. Graduate courses will provide you the necessary skills to deal with complex Big Data and modeling problems which are effectively transferable to other domains. Bioinformatics research is very rewarding and interesting - you can extract useful ideas by solving or exercising biological problems - in fact, the algorithms which can do *learning* are mostly imported from biology.
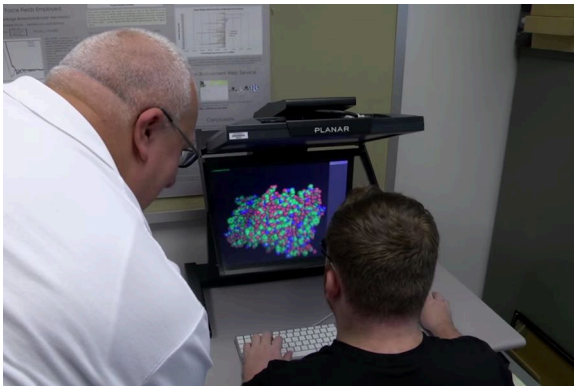
Bioinformatics Concentration Objectives

- Impart upon the student a deep knowledge of biology.

- Encourage students to exercise and develop very efficient algorithms to extract biological knowledge from complex and challenging datasets.

- Train students to manipulate scientific datasets and retrieve and access them through databases.

- Expose students to the standard tools, frameworks, and libraries in preparation for industry.

- Engage students in active research within the field of bioinformatics.

THE UNIVERSITY *of* NEW ORLEANS

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