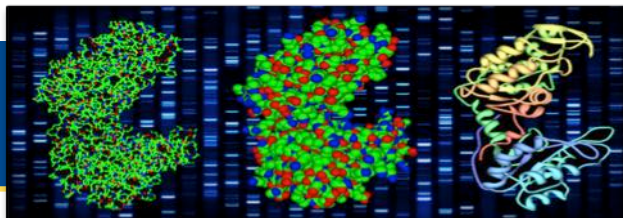


# UNO Computer Science Bioinformatics

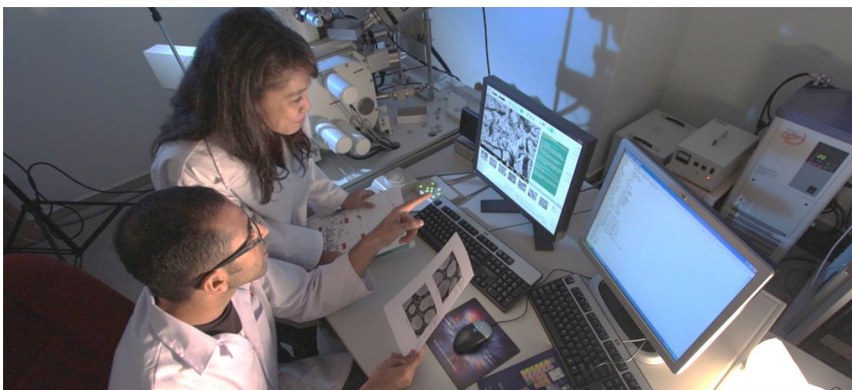


Scientific research is rapidly becoming a digital, information-driven field. Bioinformatics strives to adapt the powerful information processing techniques from computer science to yield new and exciting discoveries from biological, medical, and health data. Bioinformaticians use computational techniques 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.

COMPUTER SCIENCE DEPARTMENT

504-280-6594 | [cs.uno.edu](http://cs.uno.edu) | [csci@uno.edu](mailto:csci@uno.edu)  
308 Math Building | 2000 Lakeshore Dr.  
New Orleans, LA 70148



THE UNIVERSITY of  
NEW ORLEANS

# 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

BIOINFORMATICS COORDINATOR

Professor Chris Summa Ph.D. | 504-280-6594 | [csumma@uno.edu](mailto:csumma@uno.edu)  
Mathematics Building | Room 312  
2000 Lakeshore Dr. | New Orleans, LA 70148

Learn more  
[bioinfo.cs.uno.edu](http://bioinfo.cs.uno.edu)