What is Bioinformatics?

Bioinformatics is the use of computers to extract meaning from DNA sequences. Genome sequencing is becoming much cheaper and faster, but from a billion As, Gs, Cs and Ts, how do we link genetic variations with medically relevant traits, and how do we predict gene function or regulation? Knowledge in these areas is essential for biomedical researchers, whether in academia, government, or the private sector. These tools are being introduced into the practice of medicine, and into general biology in areas such as ecology, bioremediation, and agriculture. This knowledge is also valuable for careers in business, law, and computer science.

Contact Information
The Program Office is located in the CCE Bldg. on The University of Toledo Health Science Campus. Please contact us for more information about our program.

Master of Science
For those who already have a BS or BA; combines bioinformatics courses with a research project

Professional Science Masters
Combines bioinformatics, biomarkers and business courses with an internship

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Dual-degree pipeline programs
BS in Biology/MS in Bioinformatics ~ 5 1/2 y

UT - UT
Dr. John Gray, Associate Professor
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FINDLAY - UT
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Program in Bioinformatics and Proteomics/Genomics

The Program in Bioinformatics and Proteomics/Genomics (BIPG) at The University of Toledo provides students with the advanced analytical tools and approaches needed for life at the interface between computer science and molecular biology – great preparation for careers in genomic medicine, intellectual property law, biotechnology, and more.

“The increasing application of genomics in biotech and pharmaceutical research and development has created a huge commercial market for bioinformatics worldwide. As per our latest research report's estimation, the global bioinformatics market, which reached the mark of around US$ 3 Billion in 2010, will expand at a CAGR of around 25% during 2012-2015 as the declining cost of human genome sequencing and increasing public and private sector investment will give a significant boost to the industry.”

http://www.bizjournals.com/prnewswire/press_releases/2012/03/15/SP70895

Masters Degree in Bioinformatics
BS/MS pipeline
Professional Science Masters
The University of Toledo
College of Medicine & Life Sciences
http://www.utoledo.edu/med/depts/bioinfo/
Core Courses In Bioinformatics Will Prepare You Well

1. Fundamentals of Bioinformatics
   Introduction to the full scope of bioinformatics, along with proteomic and genomic approaches.

2. Statistical Methods in Bioinformatics
   Training in statistical methods used in BPG (such as hidden Markov models).

3. Introduction to Bioinformatic Computation
   Handling and manipulation of databases, and introduction to computer programming skills needed to manipulate large quantities of nucleic acid and protein sequence data.

4. EITHER: Applications of BPG
   Faculty members using these methods discuss and demonstrate how these approaches are used to solve real-world research problems.
   OR: Biomarker Discovery, Validation and Implementation
   Overview of the biomarker discovery process and validation techniques, followed by development of individual (patient-specific) genomic or immunological medical interventions.

The program also includes a variety of other bioinformatics or elective courses, selected by you in partnership with your advisory committee to fit your goals. Electives may include courses in molecular biology, computer science, business, and statistics.

Our Degree Programs

Master of Science
The MS degree in Biomedical Sciences, with a concentration in Bioinformatics, is for those who want a research and development (R&D) career in the computational or biological sciences. A key part of the training is a research project, so you have real experience in the application and design of bioinformatic tools. The program usually takes just two years to complete.

Professional Science Masters (PSM)
The PSM in Biomarkers & Diagnostics is for those who want a career in industry. PSM programs in general are described here: http://www.sciencemasters.com/ An internship with a commercial partner is scheduled for the summer term. The program usually takes one year to complete.

Two Dual-degree pipeline programs
UT has established two dual-degree programs, so that students can earn both a bachelors degree in biological sciences and a masters degree in bioinformatics. Students are formally admitted to the pipeline after their 2nd year as biological sciences majors at either The University of Toledo or The University of Findlay. Graduate courses are taken at UT.

FULL TUITION SCHOLARSHIPS
If you are an Ohio resident, you may qualify for Choose Ohio First full tuition funding:
MSBS: This would cover full tuition for the required graduate terms.
Pipeline program: This would cover full tuition for your junior, senior and graduate years.
PSM program: This would cover full tuition for the required graduate terms.

Application Requirements

• Pipeline applicants make a standard undergraduate application, and contact us with questions. Pipeline admission occurs during the sophomore year.
• MS/PSM applicants:
  ✓ Should have earned a bachelor’s or graduate degree from an accredited college or university by the start of the program.
  ✓ GPA of 3.0 or above. [GPA of 2.5 or above may apply for provisional one-term acceptance, which would change to regular status if first term yields a GPA of 3.0 or above.]
  ✓ Official transcripts for earlier undergraduate/graduate education.
  ✓ Minimum GRE combined verbal + quantitative of 300 (1050 on old scale) and 3.5 (analytical). The GRE is not required if you have recent MCAT scores as an alternative.
  ✓ Three letters of recommendation from college faculty or research supervisors.
  ✓ Completed application form (online) and accompanying application fee (or waiver).
  ✓ TOEFL (if applicable): 550 or higher (paper version), 213 or higher (computer), and 80 or higher (internet).
Students can begin in either fall or spring, but fall entry is recommended. Admissions are made on a rolling basis until the class is filled; there is no fixed deadline.
• Online applications: https://apply.utoledo.edu/