

*“99 percent of bioinformatics is new . . . It’s an enormous frontier.” \**

*\* David Haussler quoted in Chicurel 2002, Nature 419: 751-757*

## PROGRAM IN BIOINFORMATICS and PROTEOMICS/GENOMICS

The Program in Bioinformatics and Proteomics/Genomics (BPG) at The University of Toledo provides students and researchers with the advanced analytical tools and approaches needed for state-of-the-art biomedical research at the interface between computer science and molecular biology. The BPG Program is associated with an independent, but cooperating, program at Bowling Green State University (BioInfOhio Consortium).

### WHAT IS ... ?

**Bioinformatics** is the use of computers to extract useful information from DNA sequences. From a billion As, Gs, Cs and Ts, how do we predict gene function or regulation, and how do we link genetic variations with medically relevant traits?

**Proteomics** is looking at the entire complement of proteins produced by a given cell or tissue under defined conditions. All cells in an organism have the same genes, but different cell types express different subsets. The protein profile can reveal much about the cell’s function and status and can provide important diagnostic information.

**Genomics** has varied definitions. It often refers to comparisons of the entire gene sets between species. At UT, the focus is on which genes are being transcribed in different cells, using microarrays.

The complementary fields of bioinformatics, proteomics and genomics are aggressively expanding. Knowledge in these areas is increasingly expected of all biomedical researchers, whether in academia, government, or the private sector. These analytical tools are being introduced into the practice of medicine and into general biology in areas such as ecology, bioremediation, agriculture, etc. In addition, this knowledge is valuable for careers in certain areas of business, law, computer science, and mathematics.

### Contact and Location Information

The BPG office is located in the CCE Building on The University of Toledo Health Science Campus. Please contact us for more information about our program. Please copy Joanne Gray on all inquiries.

#### UT Health Science Campus

3000 Arlington Avenue  
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#### UT Main Campus

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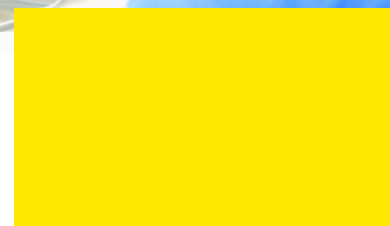
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## Program in Bioinformatics & Proteomics/Genomics

**Certification or Masters Degree**



THE UNIVERSITY OF  
**TOLEDO**  
1872



## CERTIFICATE IN BIOINFORMATICS AND BIOMARKERS

The BPG Certificate Program introduces students to the evolving fields of bioinformatics, proteomics and genomics and provides the basic knowledge of methods used in these fields. The curriculum is designed to complement course work and research of students enrolled in the UT PhD in Biomedical Sciences Program, but also is open to other qualified students.

### Certificate Program Curriculum:

Students enrolled in the Certificate Program take the following four courses:

#### FALL

##### 1. Fundamentals of Bioinformatics

(BIPG 510/710)

Introduction to the scope of bioinformatics, proteomics and genomics.

##### 2. Statistical Methods in Bioinformatics

(BIPG 520/720)

Training in statistical methods used in BPG.

#### SPRING

##### 3. Introduction to Bioinformatic Computation

(BIPG 610/810)

Handling and manipulation of databases and introduction to computer programming skills needed to manipulate large quantities of nucleic acid and protein sequences data.

##### 4. EITHER: Applications of BPG (BIPG640/840)

in which faculty members using these methods will discuss and demonstrate how these techniques are utilized to solve research problems.

##### OR: Biomarker Discovery, Validation and Implementation (BRIM620/820)

In which faculty will provide an overview of biomedical discovery and validation techniques followed by application in selected aspects of individualized medicine.

## SUMMER COURSES

The following courses have been added to our curriculum, but are not required to receive a BPG Certificate:

- 1) Introduction to Modern Biomedical Databases
- 2) Microarray Data Analysis
- 3) Practical Bioinformatics

## MASTERS PROGRAM IN BPG

The BPG Program offers an MS degree in Biomedical Sciences with a concentration in Bioinformatics, Proteomics and Genomics. The curriculum usually takes two years to complete. It involves the same core courses as the Certificate program, with some additional courses and a thesis/scholarly project.

## DUAL-DEGREE PIPELINE PROGRAM

UT has established a 5.5-year dual-degree program in biology and bioinformatics. Students earn a bachelors degree in biological sciences and a masters degree in bioinformatics. Applicants must be biological sciences majors at UT, who are considered after their 2<sup>nd</sup> year.

## SCHOLARSHIP OPPORTUNITIES

Masters Program: Choose Ohio First Scholarship in Bioinformatics.

The UT Bioinformatics Program has been awarded funding by the Choose Ohio First Program, and is awarded eight, two-year, tuition scholarships per year for students who are accepted into the Program.

Dual-Degree "Pipeline: Program: Choose Ohio First Scholarship in Biological Sciences/Bioinformatics.

Our new dual-degree program has been awarded COF tuition funding for students who have been accepted into the BS/MS Program beginning Fall 2012.

COF Applicants must be residents of Ohio

If you are interested in applying, please contact the Program secretary, Jo Anne Gray, at 419-383-6883 or Joanne.Gray@utoledo.edu.

## APPLYING TO THE MASTERS PROGRAM

Applicants must meet the following requirements:

1. Earned a bachelor's degree or graduate degree from an accredited college or university. Applicants with a degree in progress will be considered.
2. GPA of 3.0 or above. GPA of 2.5 or above, may apply for provisional acceptance, which would change to Regular status if first term coursework has a GPA of 3.0 or above.
3. Minimum GRE of 1050 (combined verbal/quantitative) and 3.5 (analytical). The GRE is not required if you have an MCAT scores as an alternative (taken by medical science and MD/PhD Program applicants as national equivalent).
4. Official transcripts for undergraduate and any graduate education.
5. Three letters of recommendation from college faculty or research supervisors.
6. Completed application form (online) and accompanying application fee (or waiver).
7. TOEFL (if applicable): 550 or higher (paper version), 213 or higher (computer), and 80 or higher (Internet).

Previous research experience is considered, but not required. Students can begin in either fall or spring, although fall entry is recommended. Admissions are made on a rolling basis until the class is filled; there is no fixed deadline.

For additional details on BPG degrees please see our Web site:

[utoledo.edu/med/depts/bioinfo/degrees.html](http://utoledo.edu/med/depts/bioinfo/degrees.html)

To access the online application, visit the UT College of Graduate Studies Web site at: [apply.utoledo.edu](http://apply.utoledo.edu)

