Emerging technologies coupled with advances in computing have enabled scientists to collect vast quantities of biological data. Genome sequencing is just one area experiencing a massive influx of information. Bioinformatics enables us to translate huge blocks of data into new, powerful knowledge with the potential to improve the human condition and tackle important environmental challenges. As we enter the era of personalized genomics for medical purposes and delve into human and environmental microbiomes, for example, the amount of data to analyze will be staggering.

At Illinois Tech the bioinformatics major blends courses in biology, chemistry, and physics with courses in programming, statistics, and other methods. Our program produces graduates who are strong in both science and their ability to develop and use tools to process data and usher in new discoveries.

Our program is scientifically rigorous, particularly in the physical sciences, while providing you with in-demand programming and other skills. It features a solid, balanced offering in STEM (science, technology, engineering, and mathematics) courses, while other programs may be more biased in one direction (biology) or the other (computer science). Most bioinformatics positions require an advanced degree. The Illinois Tech major will prepare you for graduate school as well as entry-level technical positions.

### Research on the Edge

Bioinformatics program head Jean-François Pombert, assistant professor of biology, is an expert in computational genomics and a former Louis-Berlinguet/Genome Québec Postdoctoral Fellow with more than 20 years of experience in the field. In the Pombert Lab, research revolves primarily around comparative genomics and the evolution of pathogenicity. The lab uses a mixture of open-source tools from the community or developed in-house to sequence, assemble, annotate, and analyze genomes from all kingdoms of life.

In a current project funded by the National Institutes of Health, Pombert and his undergraduate student researchers are sequencing the DNA of microsporidia, parasites often found in HIV patients, and developing new approaches to investigate the metabolic profiles of these organisms. Through sequencing and computational analysis, they hope to increase an understanding of these parasites, which could lead to techniques for improved treatment.

“When I started, generating genome sequence data required weeks to months of lab work. Now? Massive amounts of data can be generated on any given day. That data must be analyzed, and this is done on computers. Genomics and transcriptomics could not exist without bioinformatics.”

—Assistant Professor of Biology Jean-François Pombert
Be an Innovator—IPRO and Project-Based Learning

In Illinois Tech’s signature Interprofessional Projects (IPRO) Program, you’ll work with students from various majors to solve real-world problems. This hands-on collaborative experience gives our students a big advantage after graduation.

Recent IPROs involving biological sciences, computing, and big data include:

- Using big-data visualization to improve responsiveness to natural disasters
- User interfaces for novel computer-aided drug design tools
- Simulating and visualizing molecules moving through biological nanopore sensors

Experience It:
Bioinformatics at Illinois Tech

Last year Ali Mahmoud (Bioinformatics 4th Year), a research assistant in Assistant Professor of Biology Jean-François Pombert’s lab, studied genetic divergence between species with the support of a College of Science Undergraduate Summer Research Stipend. A Camras Scholar and vice president of the Arab American Association for Engineers, Ali won first place at Arch Hacks Hackathon at Washington University in St. Louis for the health development app he co-created. The app obtains patients’ health data and transmits it to a live website, where it is analyzed and can be accessed by patients’ physicians.

Opportunity Awaits

Although the U.S. Bureau of Labor Statistics does not provide information on the outlook for people in bioinformatics, it forecasts a 16 percent annual growth for computer and information research scientists from 2016–2026, and it reported $111,840 median pay in 2016.

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