Bioinformatics and Computational Biology
+ College of Arts and Sciences

Saint Louis University is a Catholic, Jesuit institution that values academic excellence, life-changing research, compassionate health care, and a strong commitment to faith and service.

Founded in 1818, the University fosters the intellectual and character development of nearly 14,000 students on two campuses in St. Louis, Missouri, and Madrid, Spain. Building on a legacy of nearly 200 years, Saint Louis University continues to move forward with an unwavering commitment to a higher purpose, a greater good.

OVERVIEW

The Master of Science in bioinformatics and computational biology degree is a new interdisciplinary program that combines the expertise of Saint Louis University’s departments of biology, chemistry, computer science, and mathematics and statistics.

The use of computational techniques and information systems has revolutionized research in the biological sciences — from the analysis of DNA sequences and the understanding of gene expression and regulation to the structural modeling of proteins and RNA and the evolutionary relationship between species. The incorporation of “big data” into medical decision making, drug discovery, plant breeding and bioengineering has made the fields of bioinformatics and computational biology essential for the progress of the biotechnology sector.

The bioinformatics and computational biology master’s program teaches students the fundamentals of computation and analysis of big data sets within the context of complex biological systems. Ultimately, students are able to use the computational methods to identify and solve relevant problems faced by academic researchers and biotechnological firms.

Curriculum

The 30-credit-hour program is designed for students with academic backgrounds from fields such as life sciences, computer science, mathematics, statistics, and health sciences.

Courses include:
• Introduction to Bioinformatics I and II
• Algorithms in Computational Biology
• Genomics
• Bioinformatics Colloquium
• Biology electives: cellular and molecular genetics, advanced molecular biology, molecular phylogenetic analysis
• Computer science electives: machine learning, high performance computing, databases
• Additional electives in biology, biochemistry, chemistry, computer science and mathematics

Required Internship

All students are required to complete an internship with a local company, a faculty member at SLU or a member of an external research organization. The internship should be a minimum of 10 weeks of full-time work.

Accelerated Bachelor's/Master's Program

The program offers an accelerated option that allows undergraduates at SLU to earn a bachelor’s degree in biology, biochemistry, chemistry, computer science or mathematics and a M.S. in bioinformatics and computational biology, typically within five years for full-time students.

For more information about the program, visit us online at bioinformatics.slu.edu.
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FACULTY ///

Department of Biochemistry and Molecular Biology
Maureen Donlin, Ph.D.: Anti-fungal drug discovery

Department of Biology
Gerado Camilo, Ph.D.: Ecology and biostatistics
Brian Downes, Ph.D.: Plant molecular biology
Jack Kennell, Ph.D.: Mitochondrial-nuclear interactions and retroplasmids
Zhenguo Lin, Ph.D.: Evolution of genomes and gene regulation
Dapeng Zhang, Ph.D.: Protein domain analysis in comparative genomics, structural analysis, modeling and phylogenetic inference.

Department of Chemistry
Brent Znosko, Ph.D.: Biochemistry, thermodynamics and NMR of nucleic acids

Department of Computer Science
Tae-Hyuk (Ted) Ahn, Ph.D.: Bioinformatics, high-performance computing, big data analytics, computational science
Erin Chambers, Ph.D.: Computer algorithms, geometric and topological algorithms
Michael Goldwasser, Ph.D.: Computer algorithms and data structures
David Letscher, Ph.D.: Geometric and topological algorithms, high-performance computing

Department of Mathematics and Statistics
Haijung Gong, Ph.D.: Biostatistics and cancer models

PROGRAM HIGHLIGHTS ///

• Internships with local biotech companies.
• One-on-one instruction with faculty from diverse departments.
• University- and NSF-funded graduate stipends.

Career Options
Computing has become integral to fields such as genetics, pharmacology, ecology, genomics, structural biology, disease genetics, biochemistry, medical imaging and systems biology. There are many employment opportunities for graduates in the biotechnology, pharmaceutical, health care and software industries, as well as academic, private and governmental research labs. In particular, St. Louis is home to a cluster of 700 bioscience enterprises with 17,000 employees, including a vibrant community in the midtown location that is home to Saint Louis University.

FINANCIAL SUPPORT ///

Graduate assistantships are awarded to highly qualified candidates, providing full tuition, a $22,000 stipend and health insurance. Separate from the assistantships, the University administers an NSF S-STEM scholarship program, providing up to $10,000 per year for academically talented students with unmet financial need.