Bioinformatics PhD

COLLEGE OF SCIENCE AND TECHNOLOGY

Learn more about the Doctor of Philosophy in Bioinformatics.

About the Program

Bioinformatics is a field of study that lies primarily at the intersection of the biological and computational sciences and includes significant elements of biochemistry, mathematics and statistics. The shared theme of this broad discipline is the application of sophisticated computing technologies to address questions on typically massive amounts of biological data.

The Bioinformatics PhD program is a joint venture between the Departments of Biology, Chemistry, and Computer and Information Sciences, pulling together the exceptional breadth and depth of teaching and research faculty in the College of Science and Technology. The program offers strong doctoral candidates an alternative to the Biology PhD program for those interested in studying computational genomics in the research labs of faculty in biology, chemistry, and computer science. Students gain rigorous advanced training in this expanding field through broad preparation in coursework related to the major research areas in bioinformatics.

While the program is administered through the Department of Biology, faculty from several departments in the College of Science and Technology teach coursework. Thus, a student's primary advisor may be faculty in a department other than Biology.

Time Limit for Degree Completion: 7 years

Campus Location: Main

Full-Time/Part-Time Status: The degree program can be completed on a full- or part-time basis.

Interdisciplinary Study: The program itself is explicitly interdisciplinary, with students needing to be versatile in a wealth of computational and data-science contexts. Students are expected to develop specialized knowledge in one or more areas of the life sciences, as well as develop expertise in computational approaches to analyzing large amounts of data.

Areas of Specialization: Students focus on one of four main areas of concentration:

- Biological Data Analysis
- Evolutionary Genomics
- Evolutionary Medicine
- Structural Bioinformatics

Job Prospects: This program produces well-trained bioinformaticians who can be employed across a broad range of informatics fields, including the health professions, pharmaceutical and biotechnology, governmental agencies, as well as academia.

Non-Matriculated Student Policy: Non-matriculated students may enroll in a total of three courses (9 credits) with permission of the instructor and the department.

Financing Opportunities: Temple University offers a limited number of fellowships to support outstanding students in the doctoral program. Fellowships typically provide support, including a stipend and tuition, for two years.

Additional support is available in the form of Teaching and Research Assistantships. The principal duties of a Teaching Assistant include assisting faculty in the classroom; offering field and laboratory instruction; preparing materials for demonstration; conducting tutorials and laboratory sessions; and grading labs, quizzes and tests. Attendance at weekly laboratory preparation sessions is required. The duties of a Research Assistant vary depending on the faculty member or principal investigator who is directing a specific research project. The appropriate project(s) are determined by consultation between the student and the student's academic and research advisors. Research Assistants are expected to devote 20 hours per week to research obligations. Both Teaching and Research Assistantships typically provide a nine-month academic-year stipend and full tuition remission (up to 9 credits per term), but are generally awarded on a per term basis. Summer stipends are also available. Assistantships are awarded competitively.

Admission Requirements and Deadlines

Application Deadline:

Fall: January 5

To be considered for a University fellowship, applications must be completed by January 5. Late applications may be considered for admission.

APPLY ONLINE to this graduate program.

Letters of Reference:
Number Required: 3

From Whom: Letters of recommendation should be obtained from college/university faculty whose research and teaching are in relevant areas, and who are familiar with the applicant's academic and/or research or computational abilities.

Coursework Required for Admission Consideration: Applicants should have a solid background in Biology or Biochemistry, and have had significant experience in computer programming. Alternately, a student may have a solid background in computer science and significant exposure to the life sciences, particularly genomics or structural biochemistry. Other backgrounds are considered if the applicant has broad experience across two or more STEM fields.

Master's Degree in Discipline/Related Discipline: A master's degree is not required.

Bachelor's Degree in Discipline/Related Discipline: A baccalaureate degree in a STEM field is required.

Statement of Goals: In approximately 500 to 1,000 words, describe your interest in Temple's program, computational background, research goals, and academic and research achievements.

Standardized Test Scores:
GRE: Required, with combined minimum score of 305 on the quantitative and verbal reasoning sections.

Applicants who earned their baccalaureate degree from an institution where the language of instruction was other than English, with the exception of those who subsequently earned a master's degree at a U.S. institution, must report scores for a standardized test of English that meet these minimums:

- TOEFL iBT: 90
- IELTS Academic: 6.5
- PTE Academic: 61
- Duolingo: 110

Transfer Credit: Graduate credits from an accredited institution may be transferred into the Bioinformatics program. The credits must be equivalent to coursework offered by the College of Science and Technology at Temple University. A grade of "B" or better must have been earned for the credits to transfer. The Bioinformatics Steering Committee makes recommendations to the Biology Department Chair for transferring credits on an individual basis. The maximum number of credits a student may transfer is 6.

Advanced Standing: Students who enter the PhD program with a master's degree may be considered for advanced standing. The Steering Committee recommends the awarding of advanced standing on a case-by-case basis. The credits must be equivalent to coursework offered at Temple, with a grade of "B" or better having been earned in the course(s). The maximum number of advanced standing credits awarded is 15.

Program Requirements

General Program Requirements:
Number of Credits Required Beyond the Baccalaureate: 36

Required Courses:

Code	Title	Credit Hours
Core Courses		
BIOL 5131	Topics in Bioinformatics (Topics in Bioinformatics)	3
Three BIOL or CHEM courses at the 5000-level or above		9
Advanced Study Courses		
Four courses at the 5000-level or above [1]		12
Research Courses		**12**
BIOL 9994	Preliminary Examination Preparation	
BIOL 9998	Pre-Dissertation Research / Elevation to Candidacy	
BIOL 9999	Dissertation Research	
Total Credit Hours		**36**

[1] With the approval of the advisor and Program Coordinator, students select graduate courses in their area of interest within the bioinformatics field. No more than two courses may be taken outside of the College of Science and Technology.

Additional Requirements:

All graduate-level courses must be passed with a "B-" or better.

All PhD candidates must have experience teaching at Temple University. A minimum teaching requirement of one term may be satisfied by serving as a Teaching Assistant in a Bioinformatics-affiliated department.

Attendance at scheduled departmental colloquia is required.

Culminating Events:
Preliminary Examination:
The student independently prepares a written proposal and submits it to the Graduate Committee by April 1 of the student's fourth term. The proposal should follow the general format of a postdoctoral proposal to a federal granting agency (e.g., NIH). It should include background surrounding a particular research problem, including literature related to the problem, and a detailed methodological plan for investigating the problem. The sections of the written proposal should include Title; Abstract (not to exceed 300 words); Specific Aims; Background and Significance; Preliminary Data; Experimental Design (including Rationale, Specific Methods, Interpretation of Possible Results, and Pitfalls and Alternative Strategies); and References. The preliminary exam proposal should be 15 to 20 pages in length. The research advisor is not to make direct contributions.

The Area Committee has two weeks in which to review the written proposal, and the student is allowed only one re-write. If the proposal is not accepted after the first re-write, the student is considered to have failed the exam. If the written proposal is accepted, an oral examination is scheduled through the department and held within two weeks. The oral examination tests the student's understanding of the background and substance of the research proposal and understanding of the area of specialization in which the research is embedded.

The preliminary examination is administered by the Preliminary Examination Committee. The student’s primary research advisor is allowed to attend but must remain silent unless called upon by the Committee for clarification or advice. A minimum of three examiners serve on the Preliminary Examination Committee. The full exam, both written and oral, is graded by the Preliminary Examination Committee, and one of the following grades is assigned: Pass or Fail. The evaluators look for a breadth and depth of understanding of specific research areas, a critical application of that knowledge to specific biological phenomena, and an ability to write a proposal in a manner consistent with scientists in the student's specialization. The student is notified of the grade the day the exam is taken. A passing grade requires a 2/3 majority of the Preliminary Examination Committee. Students who receive a grade of Fail may retake the exam one additional time. Examinations that are to be retaken must be completed before October 1 of the following academic year.

Dissertation:
The doctoral dissertation is an original bioinformatics study that demonstrates the student's knowledge of research methods and mastery of their primary area of research.

The Doctoral Advisory Committee includes a minimum of four members: three from the list of CST faculty affiliated with the Bioinformatics PhD program, including the advisor, and one from outside the College of Science and Technology. Departmental/affiliated faculty members must be Graduate Faculty or equivalent research faculty and are chosen by the student and advisor. The Doctoral Advisory Committee is to be formed within two to three months after successful completion of the preliminary examination, with the exception of the outside member who may be chosen just prior to the dissertation defense. The student may petition the Biology Department Graduate Committee to change an advisor or committee member.

The Doctoral Examination is to consist of a formal departmental colloquium open to the public, but conducted by the Doctoral Advisory Committee. The student then meets with the Dissertation Examining Committee after the colloquium for the dissertation defense. The penultimate version of the dissertation must be approved by the Doctoral Advisory Committee at least two weeks before the Graduate School deadline for submission of final copies.

The scheduling of the dissertation defense is to be arranged by the dissertation advisor. The Graduate School must be notified at least ten working days in advance. Announcements of the dissertation defense are posted around the Biology Department and the host department as well as advertised via e-mail or listserv.

Contacts

Program Web Address:

https://www.temple.edu/academics/degree-programs/bioinformatics-phd-st-binf-phd

Department Information:

Dept. of Biology
255 Biology-Life Sciences Building
1900 N. 12th Street
Philadelphia, PA 19122-6078
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215-204-8877

Submission Address for Application Materials:

https://cst.temple.edu/academics/graduate-programs/apply-now

Department Contacts:

Admissions:
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