Bioinformatics

EIT, Room 303
(501) 569-8501

The University of Arkansas at Little Rock (UALR) and the University of Arkansas for Medical Sciences (UAMS) jointly offer master's and doctorate degrees in bioinformatics. Combining the academic, clinical, and research resources of UAMS with the computational, scientific, academic, and research capabilities of UALR, this program prepares students to function in an interdisciplinary research environment. For more information, visit the Bioinformatics graduate program's website at bioinformatics.ualr.edu/grad.

Admission Requirements for both MS and Ph.D.

Applicants are expected to have a minimum of a four-year undergraduate degree (BS or BA) in the life sciences, statistics, or information/computer sciences. Students with an undergraduate degree in another field may be considered for admission if they have either relevant work experience in one of these three areas or complete sufficient remedial course work as defined below. Students who have not satisfactorily completed the following courses, or their equivalent, as part of their academic studies will be required to complete them on a remedial basis:

Genetics

A junior-level, life science course equivalent to UALR's BIOL 3300 Genetics

Statistics

A junior-level, calculus-based course equivalent to UALR's STAT 3352 Applied Statistics I

Programming

Some programming experience; a sophomore-level introduction to Java programming equivalent to UALR's *IFSC 2300 Object-Oriented Technology* course is preferred

Databases

A junior-level course equivalent to UALR's *IFSC 3320 Database Concepts* is recommended

Students will have to meet the minimum admission requirement of a GPA of 3.0 or a GPA of 3.3 or greater on their last 60 credit hours as an undergraduate. GRE scores, a letter of intent, a résumé and letters of reference are considered in the admission process; TOEFL scores are required of international students who have not matriculated from a university in a country where the primary language is English. (Please see the UALR Graduate School's requirement for English proficiency exams.)

Master of Science in Bioinformatics

Requirements for the Master of Science Degree

The MS program is built around four cores: bioinformatics, biostatistics / modeling / simulation, information / computer science, and the life sciences. Students must complete thirty eight (38) credit hours consisting of a minimum of two, approved, graduate-level courses in each of the biostatistics/modeling/simulation, information/computer science, and life science cores. Additionally, students are required to participate in four lab rotations for two credits and to complete the following bioinformatics courses:

- BINF 7193 Biosciences and Bioinformatics Seminar (for every semester enrolled and a minimum of four semesters).
- BINF 5445 Bioinformatics Theory and Applications.
- BINF 7295 Practical Topics in Science Management.
- BINF 8445 Bioinformatics Master's Capstone Project.

Master's Advising

Master's students are advised by the Bioinformatics Program Director.

MS Graduation Requirements

Successful completion of an approved program of study with a minimum GPA of 3.0 with no more than one grade below a B and successful completion of the writing requirement.

Doctor of Philosophy in Bioinformatics

Requirements for the Doctor of Philosophy Degree

The Ph.D. requires completion of the MS degree in bioinformatics with a grade of A on the student's Bioinformatics Master's Capstone Project. Enrolling in the BINF 7193 Bioinformatics Seminar every semester (minimum of four credits required) and a minimum of 32 credit hours of research complete the Ph.D. program culminating in the successful defense of the student's dissertation research. Students completing the MS degree in bioinformatics at another institution may be admitted directly in the Ph.D. program, but may need to complete additional coursework to cover all four cores of the UALR/UAMS MS degree program.

Within the first six months of entering the Ph.D. program, students must have an approved advisory committee and defend their dissertation proposals as part of their Candidacy Examination. The dissertation proposal should be written according to standard grant format as would be used for submitting a proposal to NIH or NSF.

Important Program Information

Transfer of Credit and Advanced Placement

Transferability of credit is determined by the Program Director, based upon the applicability of the courses to the student's educational goals and research project. Transfer of credit may not be granted when courses have been used to meet other degree requirements. Additionally, students with relevant graduate degrees in related fields may petition the Program Director for an Advanced Placement which reduces the total credits required for a Master's degree to thirty-two (32).

Graduate Assistantships

Graduate assistantships that support research opportunities are available to qualified full-time students on a highly competitive basis. Tuition is paid, and a stipend is provided for living expenses. Students must pay registration fees, buy textbooks, and purchase any necessary support materials. For more information about graduate assistantships, the application process, and other financial assistance opportunities, visit the website at bioinformatics.ualr.edu/grad.

A student supported by a graduate assistantship may not take less than nine credit hours during the Fall and Spring semesters and is prohibited from any other employment.

Entrance Exams

In the week prior to the start of classes, incoming students may be asked to undergo a series of entrance exams or placement interviews in which the student must demonstrate proficiency in the core areas. The student's first semester of study will be based on the results of these exams/interviews and his/her interests. A student may be required to take additional undergraduate courses, which will not count toward his/her degree program, to remedy any deficiencies. Courses numbered at the 4000-level or below do not count for graduation credit and may not be covered under the assistantship tuition waver.

Writing Requirement

An English Writing Proficiency: Exam (WPE) will be offered early each Spring term. This exam will assess the student's ability to communicate in a written format. Each student must pass this exam to fulfill graduation requirements. A student who does not pass the WPE is required to take the English Writing Proficiency Laboratory (EWPL) which is offered each Spring term. The student must take the EWPL each Spring term until he/she passes.

International Student Requirements

International students whose native language is not English must take the English proficiency exam and have an official score that meets the minimum standards established by the UALR Graduate School. (Please see the UALR Graduate School's website for information on approved exams and minimum required score.) Only students who have studied full-time for two or more years at a college or university where English is the language of instruction located in a country where English is the native language are exempt from this English proficiency exam. Exceptions to this policy must be approved by the UALR Graduate School.

Dissertation Defense

Students will orally defend their research before their Doctoral Advisory Committee. Printed copies of the penultimate draft of the dissertation must be delivered to the Advisory Committee members at least two weeks prior to the defense. The defense will be open to the public and must be announced at least two weeks in advance by the Program Director. Following the open presentation session (including the typical question-and-answer period) will be a closed examination of the candidate by the Doctoral Advisory Committee. The examination can be wide-ranging but will usually utilize the student's research as a starting point. At the completion of the examination, the student will be temporarily excused and the Doctoral Advisor and Advisory Committee will vote to either pass or fail the student.

Doctoral Graduation Requirements

- Successful completion of an approved program of study (including completion of the Master of Science in Bioinformatics degree) with a minimum GPA of 3.0 with no more than one grade below a B;
- Successful completion of the candidacy examination and dissertation proposal defense; proposal should be written using a grant proposal format;
- Successful completion of a grant proposal and its oral presentation;
- Successful completion of the dissertation and oral defense; and
- Successful completion of the writing requirement.

Doctoral Advisory Committee

The student's Doctoral Advisory Committee will be composed of a minimum of five members, including the student's doctoral advisor who will serve as the Committee chair. Four of the Committee members, including the chair, must hold bioinformatics graduate faculty status. The fifth member must be an external member who is not affiliated with the program, UALR, or UAMS. The Bioinformatics Graduate in conjunction with the Bioinformatics Steering Committee must approve the Committee constituency.

The dissertation subject is selected by the student and Doctoral Advisory Committee at least two years prior to the oral defense of the research. It must be a scholarly contribution to a major field of bioinformatics and involve all four cores of the program. The written dissertation format must follow the UALR Graduate School Dissertation and Thesis Guide found on the Graduate School website. Changes may not be made to the student's Doctoral Advisory Committee within six months of the dissertation defense. In event of extenuating circumstances, an appeal may be made to the Bioinformatics Program Director to change this requirement.

Candidacy Examination

At least eighteen (18) months prior to the dissertation defense, the candidate must present a proposal for his/her dissertation work to his/her Doctoral Advisory Committee. At this time, the Committee will evaluate the dissertation proposal, the student's ability to undertake the research program successfully, and whether the applicant possesses the attributes of a doctoral candidate as part of a comprehensive oral candidacy examination. Only after completing this requirement are student eligible to participate in the UAMS Research Induction Ceremony.

Courses in Bioinformatics

BINF 5445 Bioinformatics Theory and Applications

Prerequisites: Course Director's permission plus the following: BIOL 3300: Genetics or equivalent, IFSC 3320: Database Concepts or equivalent, IFSC 2300: Object-oriented Technology (Java Programming) or experience with another programming language such as "C" or "C++", STAT 3352: Applied Statistics I or equivalent, MATH 1304: Calculus I or equivalent recommended, BINF 2345: Introduction to Bioinformatics recommended, some exposure to molecular biology recommended. An overview of concepts central to the study and application of bioinformatics drawing upon the fields of biostatistics, computer and information science, and the life sciences. Three hours of lecture plus two hours of laboratory per week. Four credit hours.

BINF 7145, 7245 Introduction to Bioinformatics Research

Prerequisite: permission of instructor. Rotations through the bioinformatics, biostatistics, information science, and/or life sciences research laboratories of faculty participating in the bioinformatics graduate program.

BINF 7193 Bioinformatics Seminar

Prerequisites: bioinformatics graduate student status or instructor's consent. A survey of scientific and technical topics relevant to bioinformaticists. The seminar has two components: attending seminars hosted primarily by BINF Ph.D. students and participating in a presentation workshop where students present seminars on their research interests. A passing grade is required in both components for a passing grade in the course. One credit hour.

BINF 7199, 7299, 7399, 7499 Special Topics in Bioinformatics

Prerequisites: instructor's consent. Detailed study in bioinformatics and related areas; may be lecture or lecture and laboratory, depending on specific topics. Variable credit of one to four hours. Offered on demand.

BINF 7295 Practical Topics in Science Management

A survey of practical topics relevant to practicing scientists and engineers such as ethics, project management, and grant writing. While an emphasis is placed on bioinformatics, topics will be if interest to all participating in science and engineering projects. Two credit hours. Cross-listed with ASCI 7295.

BINF 8445 Bioinformatics Master's Capstone Project

Prerequisites: Course Director's permission and completion of at least one graduate-level course in each of the four core areas of the UALR/UAMS Joint Graduate Program in Bioinformatics (must include BINF 5445: Bioinformatics Theory and Applications). This course provides a structured context in which the student completes an individual capstone project for the Masters Degree in Bioinformatics. The project draws upon all four core areas of the graduate program and is done under the direction of a project mentor who is a member of the graduate faculty of the UALR/UAMS Joint Graduate Program in Bioinformatics. Four credit hours.

BINF 9100-9900 Doctoral Research/Dissertation

Prerequisite: Consent of advisor. Bioinformatics doctoral research leading to Ph.D. dissertation.