

# **UA LITTLE ROCK/UAMS Joint Graduate Program in Bioinformatics**

## **Graduate Student Handbook**

**Fall 2021**

**UNIVERSITY OF ARKANSAS AT LITTLE ROCK**  
**UNIVERSITY OF ARKANSAS FOR MEDICAL SCIENCES**

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# **UA LITTLE ROCK/UAMS Graduate Program in Bioinformatics Graduate Student Handbook**

## **Introduction**

The Graduate Program in Bioinformatics is jointly and equally offered by the University of Arkansas at Little Rock (UA Little Rock) and the University of Arkansas for Medical Sciences (UAMS). UA Little Rock functions as the host institution and is responsible for enrolling students, maintaining their student records, and providing administrative support for the program. The program officially is managed through the Graduate Schools at both institutions with the UA Little Rock Donaghey College of Science, Technology, Engineering and Mathematics (CSTEM) – and in particular it's Department of Information Science (IFSC) along with the UA Little Rock College of Arts, Letters, and Sciences – and the UAMS College of Medicine providing valuable financial and administrative support to the program. Specifically, UA Little Rock provides significant administrative support by underwriting part of a Technical Director and Administrative Assistance and both Colleges provide several graduate assistantships. Most financial support, however, is provided through a U.S. National Institutes of Health grant, the Arkansas IDeA Networks of Biomedical Research Excellence (INBRE; see <https://inbre.uams.edu/>).

The Joint UA Little Rock/UAMS Bioinformatics Steering Committee is responsible for the Bioinformatics Graduate Program; this committee is chaired by the Bioinformatics Program Director and has equal representation of faculty from both UA Little Rock and UAMS. The Steering Committee reports through a UA Little Rock/UAMS Joint Graduate Council to the Graduate Deans of both UA Little Rock and UAMS. Other bioinformatics faculty committees – the Student Admissions Committee– assume specific responsibilities with accountability to the Bioinformatics Program Director and the Steering Committee. More about the governance structure of the program is described in a separate Memorandum of Understanding document. Over sixty faculty members at both universities – including a number of affiliated faculty from the US FDA's National Center for Toxicological Research – actively participate in the Joint UA Little Rock/UAMS Bioinformatics Graduate Program. Collectively, these faculty represent the two universities, six colleges, and over two dozen academic departments.

The Program offers two degrees: the Doctor of Philosophy and the Master of Science. Students applying to the program designate whether they are applying to the MS-only (Master's) track or the PhD (Doctoral) track. While the Master's Degree is breadth- and course-oriented, the Doctorate Degree is primarily research-oriented; initiation of the PhD Program requires completion of a Master's Degree in Bioinformatics or closely related degree. There is a significant research orientation that permeates the entire program, starting with the first semester of the MS Program via the Laboratory Rotations through the Master's Capstone Project and into the PhD Dissertation.

The Joint UA Little Rock/UAMS Bioinformatics Graduate Program is an interdisciplinary program built around four cores:

- Bioinformatics,
- Biostatistics, Modeling and Simulation,
- Information and Computer Science, and
- The Life Sciences

Graduate-level coursework in all four cores is required of all students, making this a challenging but rewarding area of study. Aspects of all four cores should be reflected in the Master's Capstone Project and the PhD Dissertation.

Graduate education is an opportunity to increase a student's knowledge, to broaden his/her understanding, and to develop his/her independent thinking and research capabilities. Consequently, the academic program of study and achievement should reflect a personal commitment from the student to the many

disciplines within the program and to exceptional scholarly standards. While graduate faculty and staff members serve as counselors and assistants, the accomplishments of a graduate student are primarily a result of each student's own personal ambition and dedication. The success of the student's graduate education depends on his/her ability to define goals and to organize and execute a program of study and research needed to meet those goals. Merely meeting or satisfying degree requirements should not be the only aim of a quality graduate experience. Students are therefore expected to participate in the multitude of extracurricular activities sponsored by the bioinformatics – and other – programs.

This handbook is intended as a guideline for most of the rules governing the Graduate Program in Bioinformatics. Graduate students and faculty should familiarize themselves with its content, paying particular attention to university deadlines at both UA Little Rock and UAMS; UA Little Rock and UAMS frequently have different academic calendars (affecting class start dates and breaks). Additional and timelier information is available at <http://ualr.edu/bioinformatics>. This handbook (the most recent "official" version is available at <http://ualr.edu/bioinformatics/student-resources/forms/>) is intended to be in conformance with the *UA Little Rock Graduate Student Handbook*, and the *UAMS Graduate Student Handbook*, all of which supersede the information contained within this document.

## **What is Bioinformatics?**

Bioinformaticists research, develop, and apply computational tools and approaches for analyzing, and thus expanding, the use of biological, medical, behavioral, and health data.

- As a discipline that builds upon the fields of computer and information science, bioinformatics relies heavily upon strategies to acquire, store, organize, archive, analyze, and visualize data.
- As a discipline that builds upon computational biology, bioinformatics encompasses the development and application of data-analytical and theoretical methods, mathematical modeling and computational simulation techniques to the study of biological, behavioral, and social systems.
- As a discipline that builds upon the life, health, and medical sciences, bioinformatics supports medical informatics; gene mapping in pedigrees and population studies; functional-, structural-, and pharmacogenomics; proteomics, and dozens of other evolving "-omics."
- As a discipline that builds upon the basic sciences, bioinformatics depends on a strong foundation of chemistry, biochemistry, biophysics, biology, genetics, and molecular biology which allows interpretation of biological data in a meaningful context.
- As a discipline whose core is mathematics and statistics, bioinformatics applies these fields in ways that provide insight to make the vast, diverse, and complex life sciences data more understandable and useful, to uncover new biological insights, and to provide new perspectives to discern unifying principles.

In short, bioinformaticists bring a multidisciplinary perspective to many of the critical problems facing the health and bio-science professions today.

## General Program Information

### MS Admission Requirements

Applicants must possess a baccalaureate degree in an appropriate scientific discipline, such as information or computer science, mathematics or statistics, biology, or chemistry; or if their baccalaureate degree is in another area, they must have significant and relevant work experience in one or more of these fields. Students are also required to have a basic background at the undergraduate level in information science, statistics *and* biology, though conditional admission may be made for students who are able to complete all remedial requirements in these areas during their first year. Basic background requirements include:

- **Computer and Information Science:** a database course (such as UA Little Rock's *IFSC 3320 Database Concepts*) and some object-oriented programming experience (such as UA Little Rock's *IFSC 2300 Object-Oriented Technology*). While any programming experience is welcome, python is especially useful for today's bioinformatics students.
- **Statistics:** a statistics course (such as UA Little Rock's *STAT 3352 Applied Statistics I* or UA Little Rock *STAT 2350 Introduction to Statistics Methods*)
- **Biology:** a genetics course (such as UA Little Rock's *BIOL 3300 Genetics*); it is also recommended that students also have some exposure to organic/biochemistry and molecular biology)

Students not meeting these requirements may be admitted on a conditional basis with specific timeline and grade requirements for these undergraduate remedial courses.

### PhD Admission Requirements

Applicants must possess a MS in Bioinformatics or other appropriate scientific discipline, such as information or computer science, mathematics or statistics, biology, or chemistry; or if their MS degree is in another area, they must have significant and relevant work experience in one or more of these fields. Basic background requirements include:

- **Bioinformatics:** Knowledge and skills similar to the topics covered in BINF 5445 Bioinformatics Theory and Apps.
- **Bio-Statistics:** Knowledge and skills similar to the topics covered in BIOL 5415 Biometry (UA Little Rock) or BIOM 5013 Biometrical Analysis I (UAMS)
- **Molecular/Cell Biology:** Knowledge and skills similar to the topics covered in BIOL 5417 Molecular Biology (good knowledge of genetics is also needed).
- **Computational Skills:** Knowledge and skills similar to the topics covered in one of the following: CPSC 7375 Machine Learning (or other Data Mining Course), CPSC 7373 Artificial Intelligence, or CPSC 7385 Analysis of Algorithms.

Doctoral students not meeting these requirements may be admitted on a conditional basis with specific timeline and grade requirements for completing these graduate core courses.

### Applying

Recent GRE (general test only) and TOEFL (for international students only) test scores are required for the application process as well as transcripts, three letters of reference, a curriculum vitae, and a Statement of Intent. Students interested in being admitted for the Fall semester should plan to have their materials submitted by April 1<sup>st</sup>. Students interested in being admitted for the Spring semester should plan to have their materials submitted by October 15<sup>st</sup>.

The Statement of Intent must include:

- An indication of whether you are applying for the "MS" or "PhD" track.
- An indication of whether you are applying for a Graduate Assistantship.
- Why you want to enter the bioinformatics graduate program.
- What you expect to achieve in the program.
- Your long term career goals.

The statement should be one to two pages in length and submitted to the graduate school

Applicants officially apply to the UA Little Rock Graduate School for admission to the UA Little Rock/UAMS Bioinformatics Graduate Program (please see <http://ualr.edu/gradschool/graduate-application/>). The UA Little Rock Graduate School may require additional documents, such as proof of immunization and financial statements for international students. Additionally, the UA Little Rock Graduate School has specific requirements regarding original copies of transcripts and test scores, including how recently these test scores must be.

Only when the student's application packet is complete will the UA Little Rock Graduate School forward the application on to the Bioinformatics Program Director for consideration. Questions regarding the submission of an application should be directed to the UA Little Rock Graduate School. The Bioinformatics Program Director will review the application materials and submit them as a packet to the Bioinformatics Student Admissions Committee. After the Bioinformatics Student Admissions Committee makes its recommendations, the Bioinformatics Steering Committee will review the recommendations and make a final decision. The Bioinformatics Program Director will communicate the Steering Committee's recommendation to the UA Little Rock Graduate School. The UA Little Rock Graduate School then makes a final determination as to whether a student should be admitted (this may depend upon other factors such as health records and financial standing). If the student is ultimately approved for admission, the Program Director's letter will be signed by the Graduate Dean and forwarded on to the student by the UA Little Rock Graduate School. Any questions regarding the admissions decision may be directed to the Bioinformatics Program Director.

### **Financial Assistance**

A limited number of graduate assistantships are available on a competitive basis to qualified students admitted into either the MS or PhD track. Assistantships may become available at any time throughout the year, but normally assistantships are assigned for the Fall semester early during the prior Spring. It is important for students seeking an Assistantship to apply early (April 1<sup>st</sup> for Fall Admissions, Oct 15<sup>th</sup> for Spring admissions). MS-track students and PhD students who do not receive an assistantship offer are encouraged to contact the Bioinformatics Program Director for assistance in finding other funding opportunities.

### **Transfer of Credit**

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 by two courses (six credits) to twenty-nine (29).

Consistent with UA Little Rock Graduate Council policy, transfer requests from schools other than UAMS and UA Little Rock should be made within the first semester of enrollment in the bioinformatics graduate program. Students may request course transfers by submitting a written request to the Program Director. A well-documented petition to transfer courses would include, but would not be limited to: a course description preferably including a copy of the course syllabus, institution and date the course was taken, a letter from the course instructor if possible, grade received, a description of general areas covered, and a list of textbooks used in the course. Transfer decisions will be made after consultation with the UA Little Rock Graduate School.

## Course Transfer between UA Little Rock and UAMS

Students in the Joint UA Little Rock/UAMS Graduate Program in Bioinformatics are considered joint students and thus have privileges at both institutions ***provided they are jointly enrolled in credit hours at both institutions***. Bioinformatics graduate students are able to take courses at both institutions as long as the courses meet the program requirements and the course transfer guidelines of the UA Little Rock and UAMS Graduate Schools.

Because UA Little Rock is the primary institution in this joint relationship, bioinformatics graduate students must be enrolled in at least 1 credit hour each Fall and Spring semester at UA Little Rock to maintain their active status (e.g., email, library privileges, registration, building access, etc.). ***In addition, bioinformatics graduate students interested in student privileges at UAMS such as registering for classes, access to UAMS email, building access, id badge, working with UAMS mentors in their labs, access to the UAMS library, parking, housing, emergency health services, etc. must be enrolled in at least 1 credit hour at UAMS.***

These credit hours can be taken in the form of courses, seminars, or project/dissertation hours. Bioinformatics graduate students taking less than 5 credits per semester at UAMS will pay UAMS tuition only (no fees). In addition, students taking classes or working with mentors on the UAMS campus must meet all UAMS student requirements such as obtaining the necessary vaccinations (flu shot, TB skin test, proof of health insurance, etc.) each year.

***Note: Because they are not paying UAMS fees, bioinformatics graduate students must use the UA Little Rock Health Services for their vaccinations and primary health needs.***

Example of UAMS Courses Include (but are not limited to):

- Any UAMS course recommended by the student's adviser.
- BMIG 5010 Project Rotations (2 credits) would be equivalent to our BINF 7245 Introduction to Bioinformatics Research (lab rotation) course.
- BMIG 5190 Biomedical Informatics R & A Seminar (1 credit) would be equivalent to our BINF 7193 Bioinformatics Seminar.
- BIOM 5108 Special Topics (3 credits) would be equivalent to our BINF 7399 Special Topics in Bioinformatics.
- BMIG 5801 Capstone Course (3 credits) would be equivalent to our BINF 7356 Capstone Project Course. This course is being discontinued so student could use BMIG 5180 Special Topics instead.
- BMIG 5800 Thesis (MS) equivalent to our BINF 7X55 courses and BMIG 6800 Dissertation (PhD) equivalent to our BINF 9X00 courses can be taken in varying credit hours. These courses should only be used if the students are working on their MS thesis or doctoral dissertation over at UAMS. These are graded research hours. Students will need to work with their UAMS Research Mentors to have the appropriate section added to the UAMS schedule.
- IBSD 5101 Master's Thesis – Hours can vary.
- IBSD 6201 Doctoral Dissertation – Hours can vary.

Instructions for Bioinformatics students interested in working with research mentors at UAMS on how to register for classes at UAMS.

1. The first step in the process is to get admitted to UAMS as a Bioinformatics Non-Degree Seeking Student (since UALR is the primary institution for managing the degree). Check out these [instructions for using the UAMS Online Application System](#) to be entered as a student at UAMS. Once students are admitted to UAMS, the UAMS Graduate School will be able to lift your advising flag so you can register for classes at UAMS
2. The next step in the process to take courses at UAMS as a Bioinformatics Non-Degree Seeking Student is to sign up for classes. UAMS uses the GUS Registration system and you can click on this link to see [instructions for how to use GUS to sign up for classes at UAMS](#). For additional information about the UAMS-GUS, go to <https://gradschool.uams.edu/students/17734-2/>.

3. The third step of the process is to arrange for payment. Self-funded students will need to pay UAMS directly. Students on graduate assistantships can work with Dana Ball in the CSTEM Dean's Office to have their UAMS tuition paid from their assistantship funds.

To facilitate the management of dual institution enrolled students, the UA Little Rock and UAMS Program Coordinators will help to facilitate the exchange of the following information between the two Graduate Schools.

### **Beginning of each Fall and Spring Semester**

- The UA Little Rock Bioinformatics Program Director will send the UAMS Graduate School a list of new and continuing Bioinformatics Graduate students that will need their advising flags lifted. This list should contain the following information: Student Name, Gender, Race, US Citizenship Status, Country, Address, Phone, E-mail, and their Residency Status (In-State, Out-Of-State, UA System, International) along with their Rate Status (i.e., non-resident waiver). These bioinformatics graduate students will be enrolled at UAMS as Bioinformatics (BINFO) Non-Degree seeking students.
- The UAMS Graduate School will send to the UA Little Rock Bioinformatics Program Director a list of bioinformatics students who have registered for a given semester at UAMS. This list should contain the following information: Student ID, Student Name, Residency Status, and Course Registration Information. The UA Little Rock Bioinformatics Program Director will share this information with the UA Little Rock Office of International Student Services, Donaghey College of CSTEM Associate Dean, and also with the Finance Manager in the UA Little Rock Graduate School so that graduate assistantships and international student enrollment verifications can be processed.

### **End of each Fall and Spring Semester**

- The UAMS Graduate School will send to the UA Little Rock Bioinformatics Program Director the transcripts along with a summary report documenting the grades for the bioinformatics graduate students registered at UAMS in a given semester who have completed their UAMS courses. This report should list the students and include the following information: Student ID, Student Name, Residency Status, Course Registration Information, Final Grades Received in each course. The UA Little Rock Bioinformatics Program Director will use the report and the transcripts to process the transfer approval requests so that the UA Little Rock Graduate School has a complete record of coursework completed. The transfer approval request and a copy of the list will be submitted to the UA Little Rock Graduate School for transfer processing. All credits earned at either UA Little Rock or UAMS with a passing, satisfactory, credit or acceptable letter grade are eligible to be counted towards the student's degree plan. There is no maximum limit on the number of transfer hours that students in the Joint UA Little Rock/UAMS Graduate Program in Bioinformatics can take at either UA Little Rock or UAMS.

### **Writing and Oral Communications Skills**

Good writing and oral communication skills are critically important to both academic and professional success. Although UA Little Rock no longer offers an English Writing Proficiency Exam (WPE), all graduate students are encourage to use the services of the UA Little Rock Writing Center ([ualr.edu/writingcenter/](http://ualr.edu/writingcenter/)) and the UA Little Rock Communication Skill Center (<http://ualr.edu/appliedcomm/communication-skill-center-csc/>) to improve their writing and oral communication skills.

### **Advising**

All Master's students are advised by the Bioinformatics Program Director and they will need to obtain his/her written approval before registering for classes each semester. Students enrolled in the PhD Program – while still advised by the Program Director – should form their individual PhD Advisory Committee as soon



as possible. If the student has selected a research advisor, the advisor will assist the Program Director and the student in choosing appropriate coursework in support of the student's research project and at the same time in meeting the breadth requirement of the Master's Program.

## **Master of Science**

The Master of Science in Bioinformatics degree is an interdisciplinary degree designed to advance a student's knowledge beyond the baccalaureate degree and to meet the *breadth* requirement of the Bioinformatics Graduate Program. Completion of the MS Degree in Bioinformatics is a requirement for initiation of the PhD Program. The Master of Science requires approximately 35 graduate-credit hours beyond the baccalaureate degree. The student's plan of study must be developed in conjunction with the Bioinformatics Program Director and should be done in a manner that supports the research component of the degree and provides a consistent theme running throughout the degree plan. Students should be able to complete the MS Degree within two years provided all the following conditions are met:

- The student enters the Graduate Program with no remedial coursework requirements.
- The student takes a full course load each Fall and Spring semester (9 credit hours) and makes acceptable progress each semester.
- The student makes significant progress during the Summer semester(s); e.g., on his/her lab rotations and/or individual research leading to the Master's Capstone Project.

In rare instances in which the student comes well prepared in one or more of the core areas, an *advancement placement* may be granted. Advanced Placement can reduce the total credits required for a master's degree by two courses (six credits) to twenty-nine (29). This is at the discretion of the Program Director and is dependent upon whether the prior graduate-level coursework is applicable to the bioinformatics graduate program.

### **Program Requirements for the Master of Science**

	BINF-MS (35 credits)
Recommended Prerequisites	Students coming from either a life science, computing or computational background who have basic competencies in the following areas are well prepared to start our program <ul style="list-style-type: none"> <li>• Biology/Chemistry/Genetics (e.g., BIOL 3300)</li> <li>• Statistics (e.g., STAT 3352)</li> <li>• Programming (e.g., IFSC 2300)</li> <li>• Database (e.g., IFSC 3320)</li> </ul>
Core Courses (4 classes, 15 credits)	The degree program is built around four cores: bioinformatics, biostatistics/modeling/simulation, information/computer science, and the life sciences; Students should have completed graduate-level coursework in all four cores. <ul style="list-style-type: none"> <li>• BINF 5445 BINF Theory and Apps (UA Little Rock - Fall)</li> <li>• BIOL 5415 Biometry (UA Little Rock-Fall) or BIOM 5013 Biometrical Analysis I (UAMS)</li> <li>• BIOL 5417 Molecular Biology (UA Little Rock-Spring)</li> <li>• One of the following: CPSC 7375 Machine Learning (Fall), CPSC 7373 Artificial Intelligence (Spring) or CPSC 7385 Analysis of Algorithms (Fall)</li> </ul>
Electives (3 to 4 classes, minimum 12 credits)	Students will choose their courses in consultation with their faculty adviser. Electives are meant to further enhance a student's ability to engage in research in one of 4 key areas: Drug Design, Integrated Bioinformatics & Genomics, Computational Biology, or Biomedical Informatics.
Other Requirements (6 credits)	Four credits of either: <ul style="list-style-type: none"> <li>• BINF 7156-7456 – Capstone Project (May be completed in varying credits per semester)</li> <li>• BINF 7155-7455 – Thesis (May be completed in varying credits per semester)</li> </ul> Two credits of BINF 7193 Seminar (2 semesters)
Lab Rotations of Research Experience (2 credits)	Two credits of BINF 7145 Lab Rotation (2 semesters). Lab Rotations are used to: <ul style="list-style-type: none"> <li>• Familiarize students with research activities and learning techniques that will be useful in the course of the student's research.</li> </ul>

	<ul style="list-style-type: none"> <li>• Enable the student to identify a suitable laboratory for their project/dissertation research.</li> <li>• Introduce students to faculty who could function as a Master's Capstone Project mentor and/or a PhD Doctoral Advisor.</li> <li>• Introduce students to faculty who can assist them in their research projects (e.g., by serving on their individual MS Project Committees or PhD Advisory Committees).</li> <li>• Introduce students to research labs where funding might be available to support the student as a research graduate assistant.</li> </ul> <p>Once students have found their mentor they can complete their remaining lab research requirement with their Mentor. Lab rotations are graded. Students must produce a lab report (minimum 4 pages) by the end of the semester as part of their grade.</p>
Note: Additional Requirements for Completing the PhD	<ol style="list-style-type: none"> <li>1. Identification of Research Mentor (See Lab Rotation Guidelines above)</li> <li>2. 2 additional semesters of BINF 7193 Seminar (2 credits)</li> <li>3. 32+ Minimum Dissertation Hours.</li> <li>4. Successful defense of Dissertation</li> <li>5. A minimum of 72 graduate hours beyond the BS. Students can fulfill the 72 credit minimum hours using either graduate course credit or additional dissertation hours.</li> </ol>

Students should consult the UA Little Rock (<http://ualr.edu/catalog1718/>) and UAMS Graduate Catalogs ([http://medicine.uams.edu/wp-content/uploads/sites/7/2012/05/2017\\_18-COM-catalog-.pdf](http://medicine.uams.edu/wp-content/uploads/sites/7/2012/05/2017_18-COM-catalog-.pdf)) as well as talk with the Bioinformatics Program Director for course offerings and information on course substitutions. Students or faculty who become aware of new courses that they feel might be appropriate to the Bioinformatics Graduate Program are encouraged to bring them to the attention of the Bioinformatics Program Director for possible inclusion. Students are advised that all courses approved by the Program Director for their degree plan should be consistent with a theme that supports their research and career plans. Therefore not all courses that are included within the bioinformatics program may be appropriate for a specific student's plan of study – some courses presume certain student backgrounds, some are too narrow in content for a student not planning research in that area, and some just don't fit into the theme. On the other hand, a very specialized course not typically included might be highly appropriate for an individual student.

Individual departments at UA Little Rock and UAMS are ultimately responsible for the availability of their courses, the course descriptions, and the scheduling of their classes. The exceptions to this are the BINF graduate-level courses which are the responsibility of the Bioinformatics Program Director and the UA Little Rock Department of Information Science. Students are referred to the online listings of courses offered at UA Little Rock (<https://a.ualr.edu/classes/>) and UAMS (<http://www.uams.edu/gradschool/students>).

The Bioinformatics Program Director, is responsible for assisting students in identifying suitable lab rotations and for ensuring that lab rotations meet the above objectives. All lab rotations must be approved by the Bioinformatics Program Director *before* the lab rotation is undertaken. Only current members of the participating bioinformatics faculty (<http://ualr.edu/bioinformatics/faculty/>) may serve as lab rotation mentors. Students who wish to do a rotation with a faculty member who is not listed may nominate that person to become a bioinformatics faculty member by contacting the Bioinformatics Program Director.

Students must prepare a written summary of their accomplishments during each laboratory rotation and submit this to the laboratory rotation mentor and obtain his/her signature concurring with the report. The "Lab Rotation Report" (available at <http://ualr.edu/bioinformatics/student-resources/forms/>) is then submitted to the Bioinformatics Program Director to determine if a passing grade is to be assigned. Grades are ultimately assigned by the Bioinformatics Program Director.

Failure to perform adequately in the laboratory rotations may result in termination of any assistantship funding and/or expulsion from the Graduate Program.

### Choosing Project vs Thesis

Both the Master's Capstone Project and Thesis provides a structured context in which the student completes a culminating scholarly experience for the Master's Degree in Bioinformatics. The project or thesis is supervised by a Review Committee consisting of a lead Faculty Research Mentor, the Bioinformatics Program Director, and a minimum of two project mentors who are members of the Program's graduate faculty. The project or thesis culminates in a public, oral presentation and final grades are determined by the Bioinformatics Program Director in consultation with the student's Review Committee. During the oral presentations, students may be asked to demonstrate their general bioinformatics knowledge and their particular bioinformatics expertise as it relates to their Capstone Project or Thesis.

For those students interested in pursuing the PhD beyond the Master's in Bioinformatics, the Capstone Project or Thesis is an opportunity to identify a faculty mentor and Advisory Committee at an early stage. The work done for the Capstone Project or Thesis can be used as the foundation for the Dissertation Proposal. Students who intend to pursue their PhD may use members of their MS Review Committee as part of their PhD Advisory Committee. In particular under this option, a student should strive for a Capstone Project or Thesis that could result in one or more refereed, publishable papers and/or conference presentations for the student and those who assisted with the project.

The purpose of a project is to solve a practical problem by applying existing knowledge effectively. The most important part of a bioinformatics project is the problem statement. A successful project offers a solution to the stated problem, manifested in one or more tangible deliverables. Examples of tangible deliverables include software tools, database application, web site, simulation results, or experimental data plots/analyses. The main conclusion to be drawn for a project is the degree to which the posed solution effectively solves the stated problem.

Some of the relative merits of a bioinformatics project are:

- Projects tend to have lower risk than theses with respect to raw time of completion. Project deliverables are very explicit, whereas thesis knowledge is often more subjective.
- Projects are typically more flexible in the case of industry-sponsored work in which the deliverables may be more application-focused rather than fundamental in nature.

The purpose of a thesis is to discover new knowledge by posing a theory and investigating it methodically. The most important part of a thesis is the hypothesis. The hypothesis poses a statement that attempts to explain why or how a phenomenon occurs. The investigator applies theory to model the phenomenon and then proceeds to interrogate the hypothesis with experimentation that either supports or refutes the hypothesis. The main conclusion to be drawn for a thesis is the extent to which the hypothesis is supported or not.

Some of the relative merits of a thesis are:

- Some advisers feel that an MS thesis better prepares an individual for the pursuit of a PhD degree and/or an academic research career.
- As archival documents, theses have broader and more lasting impact than project reports.
- With the discovery of new knowledge as the driving motivation, a thesis challenges the candidate to address fundamental, long-term questions rather than narrow, short-term problems.
- Thesis topics are often readily developed into journal article manuscripts, and would provide a pathway to authoring scientific publications.
- Theses have more exacting standards of writing quality and document preparation than project reports, and thereby offer better practice for careers involving professional writing.

Both projects and theses involve experimental work. Experiments for a project typically verify functionality, characterize performance, or validate numerical simulations. Experiments for a thesis may share similar purposes, but have the primary objective of interrogating the hypothesis. Thesis experiments therefore should always be conducted in foremost consideration of how they would support or refute the hypothesis.

## **Doctor of Philosophy**

The Doctor of Philosophy is the highest academic degree offered by UA Little Rock and UAMS and is considered a terminal degree within the field. The Doctor of Philosophy in Bioinformatics is awarded upon completion of a program of advanced study including a significant, original dissertation in bioinformatics involving all four cores of the program. Work accomplished without the supervision of a bioinformatics faculty member will not be accepted in lieu of the dissertation requirement.

The Doctorate Degree is an interdisciplinary degree designed to advance a student's knowledge beyond the Master's Degree and to meet the *depth* requirement of the Bioinformatics Graduate Program. Being depth-focused, the PhD Program is centered upon the student's dissertation research. Completion of a MS Degree in Bioinformatics or closely related degree is a requirement for admission to the PhD Program.

Students who have only been admitted into the MS Bioinformatics Program will need to officially apply for admission to the PhD Program with the UA Little Rock Graduate School. An acceptance decision will be made by the Program Director based upon the student's academic standing in the MS Program and the quality of his/her Master's Capstone project or thesis; the decision will be communicated to the student within two weeks after the semester in which they graduate from the MS Program.

Students must perform at least two years of full-time research (or its equivalent) to complete the PhD. Our goal is to keep the average time spent in the UA Little Rock/UAMS MS/PhD Program in Bioinformatics to < 4 years.

### **Doctoral Advisor**

A student's Doctoral Advisor must be a faculty member at UA Little Rock or UAMS who has full graduate faculty status at either university and must be a registered participating faculty member in the Bioinformatics Graduate Program (<http://ualr.edu/bioinformatics/faculty/>)<sup>1</sup>. The selection of a Doctoral Advisor is one of the most important choices that students will make during their time in the Graduate Program. A Doctoral Advisor should be chosen with the intent of not only matching research interests, but also with an eye toward finding an individual with whom the student feels comfortable entrusting his/her educational future. A student also is dependent upon the Doctoral Advisor for financial support of their dissertation research (fees, supplies, etc.) and, in many cases, this includes funding a Research Assistantship for the student. Therefore, the likelihood of a student's financial support should be clarified early with prospective Doctoral Advisors. Both students and prospective Doctoral Advisors should take advantage of the system of laboratory rotations to determine compatibility prior to making a firm commitment to each other.

Once a Doctoral Advisor is selected, students should complete the "Designation of Doctoral Advisor Form" available at <http://ualr.edu/bioinformatics/student-resources/forms/>. The form should be signed by both the Doctoral Advisor and the Bioinformatics Program Director; an electronic version of the form will be submitted to the UA Little Rock Graduate School. Those students who have not made acceptable progress in finding a Doctoral Advisor by the end of their first six months after completing all core course requirements in the PhD Program may be dismissed from the Graduate Program. Changing Doctoral Advisors after this point is possible – and sometimes advisable – but it usually slows a student's completion of degree requirements. Therefore, this decision should be approached carefully.

An additional Advisory Committee member (see the next section) who is particularly active in a student's research may be designated as a **Co-Mentor**.

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<sup>1</sup> The UA Little Rock Graduate School does make a provision for a faculty member who does not have "full" graduate faculty status to be a Doctoral Advisor, but this comes with many other restrictions related to dissertation committee constitution and this situation must be approved by the Program Director and the Bioinformatics Steering Committee.

## Advisory Committee

Students should strive to select and meet with their individual Advisory Committee no later than the completion of the student's first six months in the PhD Program. Preferably, this occurs no later than the last semester of the student's MS Program during the time the student is undertaking his/her Master's Capstone Project or Thesis. The role of this committee is to advise and help direct the student's academic and research efforts. The Advisory Committee will be composed of a minimum of five members, including the Doctoral Advisor who functions as the Advisory Committee chair. The chair and three other members of the committee must be participating bioinformatics graduate faculty; these are considered the "internal" committee members. The fifth member of the Advisory Committee must be an external member not affiliated with UA Little Rock, UAMS or the Bioinformatics Graduate Program. The Advisory Committee may have up to seven members if necessary to support the students in their research efforts. The primary consideration for a student in constituting his/her Advisory Committee is in identifying faculty who may assist the student with his/her dissertation research.

Students should first consult with the Bioinformatics Program Director about the constitution of the Advisory Committee and prospective members. A "Designation of Advisory Committee Form" (available at <http://ualr.edu/bioinformatics/student-resources/forms/>) must be completed at the first Advisory Committee meeting and signed by the Doctoral Advisor and all committee members. The form should be then be submitted to the Bioinformatics Program Director for approval (who will verify the status of the committee's membership) and ultimate submission to the UA Little Rock Graduate School. Those students who have not made acceptable progress in selecting an Advisory Committee by the end of their first six months after completing all core course requirements in the PhD Program may be dismissed from the Graduate Program. Changing Advisory Committee members after this point is possible – and sometimes advisable – but it may not be done within the six months prior to the student's Dissertation Defense and it requires submitting a new Designation of Advisory Committee form for approval.

The dissertation subject should be selected by the student, with input from their Advisory Committee, at least eighteen months prior to the oral defense<sup>2</sup>. It must be a scholarly contribution to bioinformatics, consisting of new important knowledge or a major modification, amplification, or interpretation of existing significant knowledge. In the first meeting with the committee, the student should provide appropriate background material on his/her education to aid committee members in advising the student on possible, additional coursework. The student also should brief the committee on his/her research interests and any thoughts on the proposed dissertation topic. Obtaining committee consent is essential toward ensuring future success. The "Designation of Advisory Committee" form also lists the additional course(s) that the Advisory Committee has identified that the student needs to complete as part of his/her PhD Program.

Subsequently, the student should minimally meet with their committee members at least once per semester – preferably much more frequently – and whenever major milestones occur or changes of direction are warranted. Regular meetings will ensure that progress is made in accordance with the committee's expectations.

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<sup>2</sup> This is yet another reason that students are strongly encouraged to settle in on a dissertation topic and form their Advisory Committees during the latter stage of their MS Program.

## Program Requirements for the Doctor of Philosophy

A minimum of 34 credit hours beyond the MS Degree (and a minimum of 72 hours beyond the BS Degree) is required for the completion of the Doctor of Philosophy Degree. This consists of

- a minimum of 32 credit hours of dissertation research (a combination of *BINF 9100* through *BINF 9800* over a minimum of four Fall and Spring semesters) **AND**
- a minimum of two credit hours of *BINF 7193 Bioinformatics Seminar*.

### Coursework

Generally, the PhD Program is a research-only program, with the exception of the Seminar requirement. Students entering the PhD Program with a Master's Degree from a different institution may be required to take additional remedial coursework as part of their PhD graduation requirements<sup>3</sup>; this is determined at the time of admission to the program. Furthermore, a student's Advisory Committee may require additional coursework post-Master's should the committee feel that this is necessary for successful completion of the student's dissertation research.

### Candidacy Examination Using a Grant Proposal Format

At least eighteen months prior to their Dissertation Defense and within the first six months of their PhD Program, students must prepare a written Dissertation Proposal for their PhD Advisory Committee. The proposal will constitute the written portion of the Candidacy Exam and must be given to the Advisory Committee a minimum of two weeks in advance of the Candidacy Exam. The student must then present the proposal and successfully defend its rationale and experimental procedures for the proposed Doctoral Dissertation within a closed Advisory Committee meeting. At this time, the Advisory Committee will evaluate the Dissertation Proposal and the student's ability to undertake the research program successfully. The Committee will also determine whether the applicant possesses the attributes of a bioinformatics doctoral candidate through questions addressing the student's overall record, domain knowledge, and research skills as part of a comprehensive Oral Candidacy Examination.

The Student should write the proposal using the format of either an NIH or NSF grant proposal where it is expected that each Specific Aim will approximately form a Chapter in the proposed dissertation. The Student should ensure that there is initial progress and the research design and methods are spelled out unambiguously. While the size of this document may vary, it is expected to be around 25-30 pages. Any publications/supplementary material may be attached.

Students who fail the Candidacy Examination will be given only one second attempt. Students failing a Candidacy Examination the second time will be dismissed from the program. Students who successfully complete the examination may be required by their Advisory Committee to revise and update their written Dissertation Proposal. When the final, acceptable version of the Dissertation Proposal is complete, the full Advisory Committee must approve and sign the student's "Candidacy Examination Form" (available at <http://ualr.edu/bioinformatics/student-resources/forms/>) and the original copy of the form must be turned in to the Program Director, for ultimate submission to the UA Little Rock Graduate School.

### Ph.D. Dissertation and Defense

In order to complete the requirements for the PhD degree, students will prepare and successfully defend a written dissertation in accordance with the format described by the *UA Little Rock Graduate School Dissertation and Thesis Guide*, which can be obtained from the UA Little Rock Graduate School or online at <http://ualr.edu/gradschool/home/thesis-and-dissertation-information/>. Students must orally defend their completed PhD research to their Advisory Committee. The defense will be open to the public and must be publicized at least two weeks in advance. The Dissertation Defense may be scheduled as one presentation within the many UA Little Rock and UAMS Seminar Series (e.g., UA Little Rock's *BINF 7192 Biosciences*

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<sup>3</sup> Since not all Bioinformatics Programs are comparable, some programs might not have emphasized all four cores of the UA Little Rock/UAMS Graduate Program.

*and Bioinformatics Seminar*). Following the open presentation session (including the typical question-and-answer period) there will be a closed examination of the candidate by the Doctoral Advisor and the Advisory Committee. This examination will follow guidelines established by the UA Little Rock Graduate School. 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. If two negative votes are received from committee members, it is considered a failure of the exam. The student will then be notified of the outcome of the committee's vote. If the student fails the Dissertation Defense, a second attempt may be undertaken at a later time after the remedies required by the Advisory Committee have been successfully made. A second failure results in the student's expulsion from the program.

When the final results of the Dissertation is complete, the full Advisory Committee must approve and sign the student's "Supervisory or Examining Committee Report" and the original copy of the form must be turned in to the Program Director, for ultimate submission to the UA Little Rock Graduate School.

### **Recommended PhD Time Table (For PhD students who are entering the program with all core course work completed)**

#### First Six Months of PhD Program (or earlier)

- Select Doctoral Advisor and submit designation form
- Select Advisory Committee members, hold first committee meeting, begin work on a dissertation topic, and submit designation form
- Prepare written Dissertation Proposal in an NIH or NSF Grant Format and present to Advisory Committee for approval during Candidacy Examination [at least eighteen months prior to Dissertation Defense]

#### First Eighteen Months of PhD Program

- In consultation with Doctoral Adviser, complete any PhD coursework (if required)

#### Penultimate Semester of PhD Program

- Confirm all UA Little Rock Graduate Deadlines and schedule final dissertation defense
- No Advisory Committee changes within six months prior to dissertation defense

#### Final Semester of PhD Program

- Complete written dissertation
- Defend dissertation in closed Advisory Committee meeting after presenting during open seminar
- Make final changes to written dissertation, obtain Committee signatures, and submit dissertation to UA Little Rock Graduate School



## **Policies and Procedures**

### **Contacts**

Dr. Elizabeth Pierce: Chair of Information Science and PI on the Arkansas INBRE Bioinformatics Core. Dr. Pierce has expertise in program administration and general course advising. Her office is in EIT 550 and she can be reached at (501) 916-5223 or [expierce@ualr.edu](mailto:expierce@ualr.edu).

Dr. Mary Yang: Associate Professor in Information Science and Coordinator for the Bioinformatics Graduate Program. Dr. Yang has expertise in bioinformatics research, applications, and career information. Her office is in EIT 303 and she can be reached at (501) 916-5243 or [mqyang@ualr.edu](mailto:mqyang@ualr.edu).

Dr. Phil Williams: Technical Director of the MidSouth Bioinformatics Center. Dr. Williams has expertise in cluster computing and technical bioinformatics data issues. His office is in EIT 326 and he can be reached at (501) 916-5244 or [phwilliams@ualr.edu](mailto:phwilliams@ualr.edu).

Ms. Dana Ball of the UA Little Rock EIT Dean's Office handles all UA Little Rock bioinformatics graduate assistantship issues such as paying tuition or initiating personnel action forms. Her office is in EIT 631 and she can be reached at (501) 916-5196 or [dgwhite@ualr.edu](mailto:dgwhite@ualr.edu).

Mr. Clinton Everhart: Assistant PRvoost for Enrollment Services and University Registrar, UAMS Graduate School. He can assist students with their questions regarding the UAMS Registration/Admissions Process. He can be reached at [CDEverhart@uams.edu](mailto:CDEverhart@uams.edu) and at (501) 686-5113.

For other administrative issues such as help with travel forms, please see Ms. Lucy Inserra in the Information Science Main Office (EIT 550 or email [minserra@ualr.edu](mailto:minserra@ualr.edu) or call (501) 916-3951.

### **Faculty Members and Research Interests**

A complete list of participating faculty in the Bioinformatics Graduate Program, their contact information, and their research interests may be found at <http://ualr.edu/bioinformatics/faculty/> (clicking on an individual faculty member's name provides contact information and research interests for that person).

### **Facilities**

The MidSouth Bioinformatics Center at UA Little Rock provides computational hardware, software, and consultation services to students enrolled in the Graduate Program. Additional resources can be found at <http://ARBioinformatics.net>.

### **Grades and Academic Standing**

If a student receives a grade of **C** or lower in his/her course, s/he will be warned by the Bioinformatics Program Director that his/her academic performance is unacceptable, and that the student's performance in the program will be reviewed by the Program Director and the student's Advisory Committee; corrective action may be required, possibly including retaking the course (and without tuition support from the student's assistantship). UA Little Rock Graduate School guidelines state that students who do not maintain a 3.0 cumulative GPA on all courses within their program are placed on academic probation at the end of the semester in which they drop below a 3.0 GPA (this may occur without notification to the student). Students who fail to remove their probationary status by raising their GPA above 3.0 during the next enrollment period will be dismissed by the UA Little Rock Graduate School (please see <http://ualr.edu/gradschool/index.php/home/student-resources/graduate-catalog/>). Note that UA Little Rock Graduate School guidelines also state that the original grade received in a course factors into that student's cumulative GPA even if the student retakes the same course (the new grade also figures into the cumulative GPA).

The Program Director relies upon the recommendations of the student's Advisory Committee regarding that student's status in the PhD program. Normally, a student will be given every opportunity to correct any problem within one year, provided that all other indications (for example, research progress) are positive.

UA Little Rock is becoming stricter about professors assigning incompletes in courses due to new funding formulas of the Arkansas State Government. Please commit to completing your courses in a timely fashion; this includes lab rotations and Master's Capstone Project or Thesis.

### **Advising and Annual Student Progress Reports**

New students should contact the Bioinformatics Program Director as soon as possible to make arrangements for registering for their first semester of classes and for an evaluation of which remedial courses, if any, they need to complete. An initial degree plan will be prepared at this time.

All MS students in the Bioinformatics Graduate Program need to meet with the Bioinformatics Program Director each semester, prior to the opening of enrollment for courses in the following semester. During this meeting, the student's degree plan will be updated, courses will be selected for the upcoming semester, and the Program Director will approve the student's enrollment form.

All students in the Bioinformatics Graduate Program need to update their Student Progress Report once a year. Forms will be sent out to the student by the Bioinformatics Program Director. There are two purposes for requiring students to report their activities. The first is to ensure that all students are making satisfactory progress toward earning their degree(s). The second is to enable complete and quality lists of efforts and accomplishments for our program to use when reporting to our major funding sources.

### **Code of Conduct for Graduate Students**

Graduate students must abide by all relevant standards and rules of the Universities. Students should recognize that there are general ethical standards that they are obligated to follow with respect to activities such as academic dishonesty including cheating or plagiarism. As employees (i.e., students who have work assignments including assistantships), there are different standards with respect to the execution of your responsibilities, including the protection of University property. For instance, you should recognize that all research carried out under a sponsoring faculty member legally belongs not to the student, but to the University. Failure to abide by University or Departmental guidelines can result in dismissal from the program. If you are concerned about an ethical situation, you should consult your Doctoral Advisor, the Program Director, one of the other Student Liaisons from UA Little Rock or UAMS, and/or the UA Little Rock or UAMS Graduate Dean.

### **Financial Aid**

A limited number of assistantships are available on a competitive basis to qualified students admitted into the MS/PhD program (or directly into the PhD program). Assistantships may become available at any time throughout the year, but normally assistantships are assigned for the Fall semester early during the prior Spring. Since most assistantships have a Fall semester start date, interested students are encouraged to complete their application for Fall admission by February 1<sup>st</sup>.

Financial support falls into three broad categories: Graduate Assistantships (GAs), Research Assistantships (RAs), and other work assignments. Currently, GAs are funded by CSTEM, the UAMS College of Medicine, and the Arkansas INBRE (<https://inbre.uams.edu/>), a program sponsored by the National Institutes of Health. All GAs have a twenty-hour-per-week work assignment in the MidSouth Bioinformatics Center at UA Little Rock (some of this time may be re-assigned by the Executive Director of the MBC). RAs are funded by external research grants and have twenty-hour-per-week work assignments in the research lab designated by the grant's Principal Investigator (PI). All GAs and RAs receive a monthly stipend for twelve months (or a designated time period) and have tuition paid (depending on the source, fees are not covered). However, tuition for undergraduate coursework (e.g., remedial coursework) or courses that need to be retaken is not covered by the assistantship and typically neither is tuition for

graduate coursework overloads (i.e., in excess of ten credit hours each semester). Items such as textbooks and class supplies are not covered by assistantships.

UA Little Rock GA and RA issues are handled by the Bioinformatics Program Director and the UA Little Rock CSTEM Dean's Office (including many UAMS RAs which are subcontracted to UA Little Rock for administration). All GA and RA assignments have strict requirements that the student have no other outside income and maintain a full-time status (a minimum of nine credit hours during the Fall and Spring semesters; note that withdrawing from courses without replacing them with other courses will be considered dropping down to part-time status). Failure to meet these requirements could result in revocation of the student's assistantship (including the student being billed for the current semester's tuition) and possible expulsion from the program. Students on GA or RA assignments are required to work the expected twenty hours per week during the Summer *and* are required to make significant progress towards achieving their plan of study; in almost all cases, this will involve making significant progress on their research (it might also involve taking appropriate coursework during the Summer, but this is not required). In other words, students on a twelve-month GA or RA are expected to work full-time on their work assignment and their research combined during the summer and other semester breaks. University holidays typically apply to students working on assistantships, but vacation time is not part of the benefits provided to students working on assistantships (though some individual arrangements may be made with the student's work supervisor). GAs working in the MidSouth Bioinformatics Center are required to maintain accurate time reporting and to have their timesheets approved by the MBC Technical Director.

The obvious advantage of an RA over a GA is that the student ideally will have an opportunity to make major progress on his/her research while fulfilling the work assignment. In fact, most PIs expect that RAs will work in excess of full-time on their combined work assignment/research. This works well for the PI who is only paying a half-time stipend, but it also benefits the student who is able to dedicate his/her time totally to performing research and rapidly progressing toward graduation.

*Graduate students are primarily responsible for their own financial support.* This includes performing their work assignments in an outstanding fashion so as to justify continued funding of their GA/RA and staying on top of the funding status of their assistantship (and soliciting other support in a timely and effective fashion if the funding source is being discontinued), or identifying and securing the "other work assignments" mentioned above (e.g., fellowships, full- or part-time outside employment, work/study arrangements, or an assistantship sponsored by an unrelated organization/department on the UA Little Rock or UAMS campus). Students are primarily responsible for making sure that their financial standing with both UA Little Rock and UAMS is current; in some cases this may involve verifying that tuition has been paid off a supporting grant and verifying at all fees which are the student's responsibility are paid in full by appropriate due dates.

*All GAs are expected to expeditiously transfer to an RA or another work assignment; in fact, some GAs have a very limited funding time period which requires the student to be on an RA within, for example, eighteen months (e.g., GAs sponsored by the UAMS College of Medicine).* This will allow GAs to be used for newly-admitted students thereby keeping the Graduate Program viable; it also supports the student more effectively in his/her research efforts.

No GA or RA assignment is offered or renewed for more than a twelve-month period (and, depending upon circumstances, this may be for a shorter period of time). While the student can reasonably expect some continuation of funding, this is not guaranteed. While the Bioinformatics Program Director should be the primary point of contact for the student regarding financial support prospects, the student must inform the Program Director of all relevant information relating to the status of the student's current assistantship in a timely fashion. The Program Director and the other Student Liaisons are able and willing to assist students with identifying their financial support options.

While students are strongly encouraged to follow their dreams in terms of the research that they choose to undertake, the selection of a research project needs to be made within the context of the limited time period for support on a GA, the overall environment of funding support, and the highly-competitive nature of

available RAs. Given the pressure to transition off of a GA, students need to be actively making contacts in funded research labs if they expect to complete their PhD.

### **Petitioning to Have Requirements Waived**

The requirements described in this handbook provide a well-rounded background for all students in areas important to the pursuit of a career in bioinformatics. While the described guidelines are to be fulfilled by all graduate students, the Bioinformatics Graduate Program recognizes that specific cases may arise in which

- Equivalent requirements (especially course requirements) have been fulfilled recently at a comparable university, or
- A student's program would benefit if specific aspects of the Graduate Program's requirements were modified. If a student feels this to be the case, a formal written petition may be made to the Program Director to request waiving or alteration of the student's Graduate Program requirements.

A determination will be made in consultation with the Bioinformatics Program Director, the student's Advisory Committee, and/or the Bioinformatics Steering Committee. Students may petition only once for each issue, decisions are final, and – in all cases – sufficient documentation must accompany the request. Petitions should be made in a timely fashion prior to graduation (generally within the first year of enrollment in the either the MS or PhD degree plan).

### **Registration Procedures**

**Registration:** Obtain a Registration and Advisement form from the Bioinformatics Program Director.

**Advisement:** Schedule a meeting with the Bioinformatics Program Director, obtain the Program Director's signature on the Registration and Advisement form, and then turn it in to the Administrative Assistant in the Information Science main office. The Administrative Assistant will clear the student's advisement flag, thereby allowing the student to register for classes under the UA Little Rock on-line BOSS system. Even in the event that the advisement flag has not been implemented by the Registrar, all students (MS and PhD) must obtain the prior approval of the Program Director before registering for class. The original copy is retained by the Administrative Assistant and the student is welcome to a copy. There may be other forms and/or paperwork that the student will need to process; this especially applies to new students.

**Drop/Add Course:** Obtain a Drop/Add form from UA Little Rock Records and Registration. Complete the form, sign it, obtain the Bioinformatics Program Director's approval, and return the form to Records and Registration. Under no circumstances are students to add or drop a course without the prior permission of the Bioinformatics Program Director. This is especially important to international students who jeopardize their visa status and to students who are on assistantships who are ineligible for the assistantship if they do not maintain a full course load.

### **UAMS Course Registration**

**Admission:** Bioinformatics graduate students will be admitted first through the UALR Graduate School. To get admitted to the UAMS Graduate School so they can take courses, students need to sign up as Bioinformatics Non-Degree Seeking Students (BINFO-ND), part-time students. Instructions for how to sign up are available at <http://gradschool.uams.edu/pros-students/non-degree-seeking-students/>. Students will need to do this just once.

Note: The UAMS Graduate School (501-686-5454) is located on the second floor of the Admin West building, room 1.213). They can assist with removing academic holds. The UAMS Graduate Student Handbook is available at (<http://gradschool.uams.edu/students/graduate-school-handbook/>). It is important that you identify yourself as a Joint UA Little Rock/UAMS Bioinformatics Graduate Student when contacting the UAMS Graduate School.

**Registration:** Information about the UAMS Registration Process can be found on the <http://gradschool.uams.edu/students/uams-student-information-system-gus/> website. You can find links to see the list of courses available each semester.

***Students should note that the UAMS academic calendar may differ from UA Little Rock's; at times, the UAMS semester can begin a week or so prior to the UA Little Rock semester implying that registration deadlines can also be earlier.***

**Payment:** If you are supported on a Graduate Assistantship which covers your tuition charges and your stipend is paid by UA Little Rock (this includes many of the UAMS-funded GAs which are subcontracted to UA Little Rock), please inform the UAMS Graduate School of this when you register for UAMS courses. The UAMS Graduate School will bill UA Little Rock for tuition under these circumstances.

***Note: For Bioinformatics graduate students taking less than 5 credit hours at UAMS, they will be billed for UAMS tuition only (no fees).***

### **International Students**

International students whose native language is not English and who do not have a degree from a regionally-accredited U.S. institution of higher education or from an institution of higher education in a country whose official language is English, must submit a score of at least 550 on the paper-based Test of English as a Foreign Language (TOEFL), at least 213 on the computer-based version, or at least 79 on the Internet-based version.

Please note that most student visas require international students to maintain a full load each semester; international students should keep this in mind when considering dropping or withdrawing from courses since the University has clear responsibilities to immigration authorities in reporting international students who do not maintain their full-time status. Furthermore, an international student who loses a graduate assistantship regardless of the circumstances may also jeopardize his/her visa status.

### **Graduate Student Travel**

The Bioinformatics Graduate Program encourages student attendance at scientific meetings and workshops. Generally, students should seek travel grants from an appropriate professional organization. Alternatively, a student's Doctoral Advisor is expected to provide support for a student who is presenting a paper or poster at a meeting. Occasionally, other travel funds will be available from university, state or federal sources; these opportunities will be announced by the Program Director if/when they become available. Under some circumstances, funding may be available from the UA Little Rock or UAMS Graduate Deans.

When travel has been authorized through UA Little Rock, provide the appropriate support person with all of your travel information. A Travel Authorization (TA) is completed to make arrangements, including cash advances. Cash advances must be requested a minimum of seven days prior to the travel. During your trip, please keep all your receipts. When returning from a trip, you must complete a TR-1 form (available from the appropriate support person) within 5 days of returning; return it to the appropriate support person with all of your original receipts. ***Please note: you must fill out a travel authorization form before your trip, even if you will not be reimbursed for your travel expenses;*** this will document your activities while on "official business" and may provide insurance coverage.

### **Poster Printing**

Through the funding provided by the Arkansas INBRE grant, printing of students may be supported; this requires approval in advance by the Bioinformatics Program Director, though students should first ask their mentors for this kind of financial support. UA Little Rock will only pay for printing on campus

## Leaving the Program

A student may request a temporary leave of absence from the Graduate Program by petitioning the Program Director. This should be done in writing and should contain appropriate explanations. To re-enter the program, the student must petition the Program Director. Acceptance will depend upon issues such as past performance, funding availability, whether there is an advisor willing to accept the student into his/her laboratory, and a plan of action that indicates that the student is ready to resume his/her studies and make reasonable progress towards completion of a degree. Students should recognize that without formally requesting and receiving such a Leave of Absence, they may be officially terminated by the Graduate Program. The UA Little Rock Graduate School may place students in an inactive status after two years of not registering for classes; after this time period they must officially apply for re-admittance to the University. To prevent the need to reapply for admittance, students might consider registering for *BINF 7193 Bioinformatics Seminar*.

Students may resign from the Graduate Program at any time. To do so, they should write a letter to the Program Director stating their intent and inform the UA Little Rock Graduate School. It is advised that students contemplating such a move should first consult with the Program Director (and their Doctoral Advisor if applicable) before beginning such a process.

Students can be dismissed from a faculty member's research program at any time if the faculty member determines that the student is not making acceptable progress; this is typically done in consultation with the student's Advisory Committee and the Bioinformatics Program Director. Such a dismissal in itself will not constitute dismissal from the Bioinformatics Graduate Program, but it is the obligation of the student to find an acceptable replacement as Doctoral Advisor within one semester. Students will not be allowed to continue their PhD education within the Program without a Doctoral Advisor. The Program Director and Student Liaisons can be valuable resources for determining the best course of action in this situation.

Students can be terminated from the Program by the Program Director for any of the following reasons:

- Failure to meet minimum academic standards
- Failure to make acceptable progress in their degree work
- Failure to meet generally-acceptable ethical standards of the Universities
- Failure on the research proposal defense
- Failure during the dissertation defense

The student's Advisory Committee also may recommend this action to the Program Director.

It is the obligation of the student to ensure that s/he is complying with University and Graduate Program guidelines with respect to these aspects of their education. If students are unsure or concerned about their status within the Graduate Program, they should consult with the Bioinformatics Program Director and/or their Doctoral Advisor.

## Current Contact Information

It is extremely important that students keep current contact information in BOSS; this includes each student's permanent home mailing address, current living address, phone number(s), and alternative email IDs. If the student's contact information changes, he/she must notify the Bioinformatics Program Director, the UA Little Rock and UAMS Graduate Schools, UA Little Rock Human Resource Services (HRS), and the UA Little Rock Registrar's Office.

For international students – according to INS policy – a “change of address” form must be filled out each time there is a change of residence; this is the student's responsibility. Forms are available in the UA Little Rock International Student Office.

The primary means of official communication with students is via the student's UA Little Rock email ID. If you choose to use another email ID primarily, please make sure that your UA Little Rock email is forwarded to your alternative email account. It is a requirement of the Bioinformatics Graduate Program that students respond in a timely manner to all email messages sent to their email IDs on record. This includes a UAMS email ID that the UAMS Graduate School uses for each student.

### **Student Offices**

Students will be assigned office space during their enrollment in the Bioinformatics Graduate Program when possible. Students working as RAs will be assigned office space by their faculty sponsor. Students working as GAs will be assigned office space in one of the MBC student offices. Other students will be assigned office space if and when it is available, most likely in EIT 417 on the UA Little Rock campus. Access to EIT 417 can be obtained by filling out the GIT Electronic Lock Authorization Form (<http://git.ualr.edu/forms/git-locks.pdf>).

### **UA Little Rock Keys/Key Cards**

Key cards are required to obtain any keys on the UA Little Rock campus; blank key cards are obtained from the Bioinformatics Administrative Assistant or the department that controls the space that the student needs to access. Key cards are first approved by the student's supervisor and then must be signed by the Chair of the department and the Director of UA Little Rock Graduate Institute of Technology (GIT). When the request has been approved, key card(s) are taken to the UA Little Rock Physical Plant to pick up the key(s). In addition to keys, a keypad code or a swipe card may be required to enter some areas. Upon graduation, your keys (and swipe cards) must be turned in to the Physical Plant or you will not receive your diploma.

*NOTE: Students are responsible for making sure that office/lab doors are locked and lights are turned off.*

### **Dissertation Expenses**

Students are responsible for all costs pertaining to the preparation and finalization of their dissertation; this includes copying charges, binding charges, special paper costs, etc. Students must submit one original, successfully defended copy of their theses-dissertations to the Graduate School for format review. As of spring 2014, the UA Little Rock Graduate School no longer requires bound copies of theses or dissertations. Instead, an electronic copy in PDF form may be submitted. Please see the Dissertation and Thesis Guidelines below for full review and submission instructions.

### **Graduation**

The Graduation Application should be completed well in advance of the student's projected graduation date. Applications for graduation are available through the student's UA Little Rock BOSS account. Please stay in touch after your graduation! We would like to keep you abreast of future developments and solicit your recommendations for program improvements as you develop practical experience applying what you've learned in our program.

### **Purchasing**

#### *Purchase Orders*

If you are authorized to spend grant funds, a Purchase Requisition form is used to order materials and/or supplies, equipment, etc., for your research project. You must type or neatly and clearly print pertinent information on this form. You will be responsible for finding vendor(s), acquiring price quotes, getting part or catalog numbers, etc. You may need to follow competitive bid guidelines. Please note that you need to add sales tax of 7.5%. The account number or project title, your name, the name of your faculty sponsor, and the date must be included at the bottom of the form.

The completed form is to be returned to the appropriate support person. You will be notified as soon as your order has arrived, but check back within 10-15 days if you have not received your order. Once your

order arrives, check the order to ensure that the complete order was received. Return the packing slip to the appropriate support person to be processed. Please make notes on the packing slip if everything was not received.

A *Reimbursement Claim Form* is used for reimbursements. The appropriate support person will keep a copy of the completed form and you must take the original form to the Purchasing Department. You *will not* get reimbursed at the time you bring this form to Purchasing. They will process the paperwork and a check or automatic bank account deposit will be forthcoming within 10 to 14 working days. If you receive the check, the check stub is to be returned to the appropriate support person to verify the reimbursement.

### **Mail Boxes**

Mail is delivered to a single location in the Information Science departmental office, usually between noon and 1:30 pm. You may use the following mailing address:

*Your name*  
UA Little Rock/BINF Grad  
Information Science/EIT 550  
2801 S. University Ave.  
Little Rock, AR 72204

The Information Science Administrative Assistant will pick up mail daily from EIT 550 and notify you via email that you can come to EIT 550 to retrieve your mail.

Packages are delivered throughout the day. When sending packages via UPS, FedEx or DHL, you must fill out a shipping form from Mail Services; either have Mail Services pick up the package or take it to Mail Services yourself. Permission from a faculty member is required before sending any packages for which you do not personally pay the shipping costs.

### **Announcements**

The primary means of communication within the Bioinformatics Graduate Program is via email, so please check your UA Little Rock email account frequently. The [binfgrad-l@ualr.edu](mailto:binfgrad-l@ualr.edu) listserv itself is included on a number of other bioinformatics listservs maintained by the Bioinformatics Program Director.



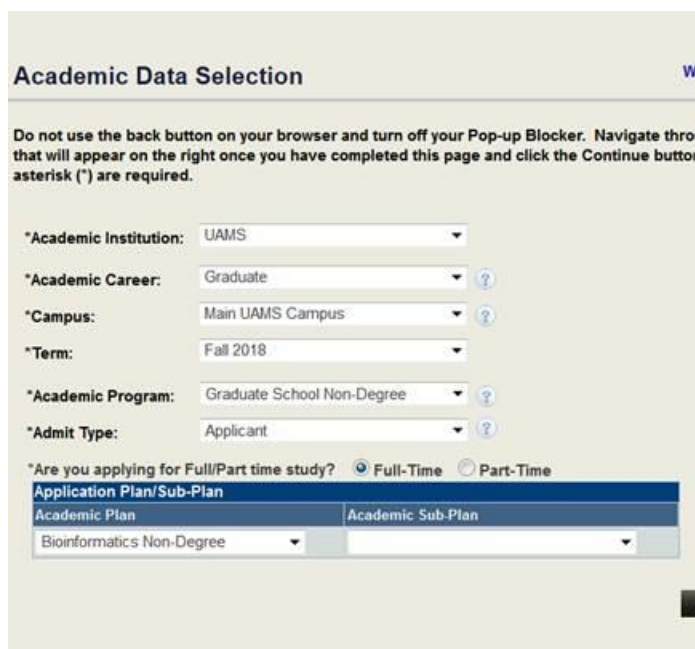
## Additional UAMS Instructions

### How to Apply to UAMS

Students interested in taking courses at UAMS for the first time must fill out a non-degree application with the UAMS Graduate School so they are set up correctly to be able to sign up for courses as well as to have access to the resources on the UAMS campus.

Please do the following to complete and submit an application with UAMS:

1. Go to [oaa.uams.edu](http://oaa.uams.edu) and create an account to fill out an application.
2. Once you have created the account, please use your log-in information to access OAA and click on "Create New Application".
3. You will then be on the Academic Data Selection page. Please choose the information as it is shown in the screenshot below to ensure that you create the correct application:



**Academic Data Selection**

Do not use the back button on your browser and turn off your Pop-up Blocker. Navigate through that will appear on the right once you have completed this page and click the Continue button. Asterisk (\*) are required.

\*Academic Institution: UAMS

\*Academic Career: Graduate

\*Campus: Main UAMS Campus

\*Term: Fall 2018

\*Academic Program: Graduate School Non-Degree

\*Admit Type: Applicant

\*Are you applying for Full/Part time study?  Full-Time  Part-Time

Application Plan/Sub-Plan	
Academic Plan	Academic Sub-Plan
Bioinformatics Non-Degree	

4. Click continue and fill out any section that has required fields marked.
5. Once your application is complete, please be sure to click on the blue "Submit Application" button in the middle of the screen. Failure to do so will not allow UAMS to process your application.
6. Once you have submitted your application, the UAMS Registrar will process what they need to do on their end, and then they will be in contact with you regarding the next steps in this process.