PROGRAM POLICY STATEMENT
FOR PHD IN BIOINFORMATICS DATA SCIENCE

I. PROGRAM HISTORY

A. RATIONALE FOR CHANGING THE NAME OF THE PROGRAM TO BIOINFORMATICS DATA SCIENCE

The completion of the human genome sequence marked the beginning of a new era of biological research. Scientists have begun to systematically tackle gene functions and other complex regulatory processes by studying organisms at the global scales. Advances in high-throughput biotechnologies and large-scale bioscience have further enabled modeling and simulation over a multitude of length, time and biological scales from biomolecules, cells, tissues and organs to organisms and population. With the enormous volume of data being produced, biology is becoming an increasingly quantitative science. Computational approaches, in combination with experimental methods, have become essential for generating novel hypotheses, deriving new scientific knowledge, and driving discovery and innovation.

Bioinformatics Data Science is an emerging and rapidly expanding field where biological, computational, and quantitative disciplines converge. According to the National Institutes of Health, the working definition of bioinformatics data science is as follows:

- *Bioinformatics*: Research, development, or application of computational tools and approaches for expanding the use of biological, medical, behavioral or health data, including those to acquire, store, organize, archive, analyze, or visualize such data.
- *Data Science*: The interdisciplinary field of inquiry in which quantitative and analytical approaches, processes, and systems are developed and used to extract knowledge and insights from increasingly large and/or complex sets of data.

Fundamental to modern day biological studies and key to the basic understanding of complex biological systems, bioinformatics data science is impacting science and technology in fields ranging from agricultural and environmental sciences to pharmaceutical and medical sciences. The research requires close collaboration among multi-disciplinary teams of researchers in quantitative sciences, life sciences, and their interfaces.

The UD *Ph.D. in Bioinformatics Data Science* is training the next-generation of researchers and professionals who are playing a key role in multi- and interdisciplinary teams, bridging life sciences and computational sciences. The PhD program builds upon the successful foundation of the Master's degree program in Bioinformatics and Computational Biology strengthening bioinformatics data science research at the University of Delaware.

A unique feature of this program is that students receive training in experimental, computational and mathematical disciplines through their coursework and research that is in contrast to other graduate programs with solely experimental or solely computational focus. Students who complete this degree will be able to generate and analyze experimental data for biomedical

research as well as develop physical or computational models of the molecular components that drive the behavior of the biological system.

Due to the interdisciplinary nature of bioinformatics data science, experts in these fields within the University of Delaware are housed in many Colleges and Departments on campus spanning several engineering, math or life sciences disciplines. Therefore, the PhD in Bioinformatics Data Science is offered as a university-wide interdisciplinary graduate program that attracts students to many Departments across Colleges. The student identifies a Primary Faculty Advisor who is responsible for defining the student's responsibilities and for evaluating the student's performance. The students are housed in the Department associated with their Primary Advisor and the degree is awarded by the College of residence.

The scientific curriculum builds upon the research and educational strength from departments across the Colleges of Engineering (CoE), Arts & Sciences (CAS), Agriculture & Natural Resources (CANR), College of Health Sciences (CHS) and Earth, Ocean & Environment (CEOE), as well as the curriculum from the existing Master's program in Bioinformatics & Computational Biology. In addition, this Ph.D. program will be synergistic to the existing degree programs, providing a critical component to University's strategic priorities in energy, environment, and life and health sciences. The core course requirements include:

- *Bioinformatics:* A field that utilizes and applies computational biology to design, collect, organize, analyze, and share biological data through bioinformatics resources and database tools.
- *Systems Biology*: A discipline at the intersection of biology, mathematics, engineering and the physical sciences that integrates experimental and computational approaches to study and understand biological processes in cells, tissues and organisms.
- *Data Analytics*: The integration of health-care sciences, computer science, information science, and cognitive science to assist in the management of healthcare information.

The Center for Bioinformatics and Computational Biology (CBCB) administers the PhD program in Bioinformatics Data Science and coordinates with the individual Departments involved in the program. While this interdisciplinary degree program is offered to students within various Departments, students will be required to meet program specific requirements to be awarded the degree in Bioinformatics Data Science. The newly launched Data Science Institute (DSI) research initiative will foster additional multidisciplinary research collaboration providing further synergy among data science research and academic programs.

B. DATE OF PERMANENT STATUS
Provisional status, March 2012; Pending review for permanent status in 2018

C. DEGREES OFFERED

The program offers the degree Doctorate of Philosophy in Bioinformatics Data Science (BINF-PhD).

II. ADMISSION

A. ADMISSION REQUIREMENTS

Admission to the graduate program is competitive. Those who meet stated requirements are not guaranteed admission, nor are those who fail to meet all of those requirements necessarily precluded from admission if they offer other appropriate strengths.

The following are the admission requirements to the Ph.D. program in Bioinformatics Data Science:

- A completed University of Delaware Graduate Studies application. Students may apply to the program prior to arranging a primary faculty advisor; however, all students in the program will need the agreement of a Program Faculty member to serve as the primary faculty advisor before being offered admission into the program;
- A bachelor's degree at an accredited four-year college or university, with a minimum grade average of 3.0 on a 4.0 system;
- Official, up-to-date transcripts of all undergraduate and graduate programs attended;
- Applicants may have undergraduate degrees from biological, computational, or other disciplines but are expected to have scholarly competence in mathematics, computer science and/or biology;
- The following GRE scores are competitive: Quantitative: 650, Verbal + Quantitative: 1200 if taken prior to August 1, 2011 or Quantitative: 151, Verbal + Quantitative: 307 if taken after August 1, 2011. No GRE subject test is required;
- International student applicants must demonstrate a satisfactory level of proficiency in the English language if English is not the first language. International applicants must have an official TOEFL score of at least 600 (paper-based) or 100 (Internet-based). TOEFL scores more than two years old cannot be considered official. Alternatively, IELTS can be accepted in place of the TOEFL. The minimum IELTS score is 7.5 overall with no individual sub-score below 6.0.
- Three letters of recommendation are required. At least one letter must be from a professor; other letters can be from employers or others who have had a supervisory relationship with the applicant and are able to assess the applicant's potential for success in graduate studies; and
- Applications must also include a resume outlining work and academic experience, as well as an application essay that includes answers to the following questions:
  1. What educational background and scientific research or employment experience prepare you for this degree program?
  2. What are your long-term professional objectives?
  3. What specific attributes of the program make you feel that this degree is appropriate to help you achieve your professional objectives?

Primary Faculty Advisor: Applicants must at the time of admission have a Primary Faculty Advisor who has agreed to direct and advise a program of study. Once the Graduate Program Committee has determined that the applicant meets all admission requirements, the application

will be circulated to the Program Faculty in an effort to identify a faculty that may be interested in serving as the student's Primary Faculty advisor. The student is also encouraged to directly contact Program Faculty whose research is of interest to them. The Graduate Program Committee must approve all advisor selections. It is the expectation of the Committee that graduate advisors will have active research programs with funding at a level sufficient to support graduate student training. If during the course of the degree, a student's advisor is unable or unwilling to continue as advisor, it is the student's responsibility to identify a faculty member willing to be the new advisor. If a student is unable to identify a new Primary Faculty Advisor, the Graduate Program Committee will review the situation and may recommend to the Program Director that the student be dismissed from the program for failing to make satisfactory academic progress.

Option for Direct Admission: Applicants with a M.S. degree in related field are preferred. Direct admission to the Ph.D. program from a B.S. degree will only be considered for exceptionally qualified candidates, as determined by the Graduate Program Committee. However, these candidates will be required to complete an additional nine credit hours for the Ph.D. degree. The specific courses that are a required will be determined by the Graduate Program Committee at the time the student is admitted.

B. APPLICATION

Application to the Doctoral program in Bioinformatics Data Science will be submitted using the on-line graduate admission application that includes transcripts from all previous college or university study, letters of recommendation, resume, application essay, and official GRE and TOEFL scores (if applicable). If any part of an application is missing, evaluation of the application cannot begin.

B.1. APPLICATION DEADLINES*

Admission decisions are made on a rolling basis as and when applications are complete. Decisions on financial aid awards are usually made in March-May for the Fall Semester and in August-October for the Spring Semester. The central graduate admissions office continues to process applications and transcripts throughout the year and follows the stated two (2) week processing timeline for all materials received in the office.

The application deadlines are:
- Fall Semester: April 15th (regular application); February 15st (financial aid)
- Spring Semester: October 15th (regular application); July 15th (financial aid)

*If there are remaining positions within the program, applications will be considered until July 15th for Fall enrollment and December 1st for Spring enrollment.

B.2. CHANGE OF CLASSIFICATION

Students currently matriculated in other graduate degree programs should complete a "Change of Classification" Form to seek approval to enter the Doctor of Philosophy program in Bioinformatics Data Science. The Bioinformatics Graduate Committee will evaluate each Change of

Classification request on a case-by-case basis and determine whether the student is also required to submit a completed admission application form to the Office of Graduate and Professional Education and follow the same procedures for admission as other applicants.

C. ADMISSION STATUS

Students may be admitted into the Doctoral program in Bioinformatics Data Science with regular status.

Regular. Regular status is offered to students who meet all of the established entrance requirements, who have a record of high scholarship in their fields of specialization, and who have the ability, interest, and maturity necessary for successful study at the graduate level in a degree program. Applicants offered as Direct Entry may lack one or more specified courses and will be required to complete these course requirements as part of and concurrent with the degree requirements. Students who file an application during the final year of undergraduate or current graduate work and are unable to supply complete official transcripts showing the conferral of the degree will be admitted pending conferral of the degree if their records are otherwise satisfactory and complete. For students lacking appropriate preparatory course work, additional courses applicable to certain areas of study may be required prior to admission or students may be admitted with the provision that completion of certain area content courses be completed concurrent with the courses in the degree program.

III. ACADEMIC REQUIREMENTS

A. DEGREE REQUIREMENTS

The student is to establish a Dissertation Committee within the first year of study. The Committee should consist of at least four faculty members, including the primary faculty advisor, a secondary faculty advisor (in a complementary field to the primary advisor), a second faculty from the home Department, and one CBCB affiliate faculty outside the Departments of the primary and secondary advisors.

The development of a program of study will be the joint responsibility of the student in consultation with the primary advisor and it must be approved by the two faculty advisors (primary and secondary) and the Program Director by the end of the first year.

The degree requires a total of 33 credits. Students must complete a minimum of 15 hours of coursework, plus 3 credit hours of seminar, 6 credit hours of research and 9 credit hours of doctoral dissertation (summarized in Table 1). Students who are admitted directly after a B.S. degree will be required to complete up to 9 additional credits in order to fulfill the core curriculum in the following areas: Database Systems, Statistics, and Introduction to Discipline. In addition, if students entering the program with an M.S. degree are lacking equivalent prerequisites, they also will be required to complete courses in these three areas; however, these courses may fulfill the elective requirement in the Ph.D. program, if approved in the program of study.

Table 1. Ph.D. Program Course Requirements Summary

Degree Requirements (33 - 42 Credits)	
Core and Elective Courses (15 - 24 Credits)	
Bioinformatics Data Science Core	9 Credits
Prerequisites – Direct Admit Students	3-9 Credits
Electives	6 Credits
Seminar and Research (18 Credits)	
Seminar*	3 Credits
Research	6 Credits
Doctoral Dissertation	9 Credits

*Attendance in seminar is required for six semesters.

B. GRADE REQUIREMENTS

Grade of B or higher in the core courses is required to be eligible to continue in the program. Students receiving a B- or lower in a required core course are subject to dismissal from the program. However, students may file an appeal to the Bioinformatics Graduate Committee for approval to retake a course and remain in the program. Students must obtain at least a 3.0 cumulative grade point average to be eligible for the degree.

C. The **preliminary examination** should be taken before the end of the fourth semester and will consist of an oral exam in subjects based on the Bioinformatics Data Science core.* In recognition of the importance of the core curriculum in providing a good test of the student's knowledge, students must achieve a minimum 3.0 GPA in the core curriculum before taking the preliminary exam. Students will not be permitted to take the preliminary examination if the core grade requirements and cumulative GPA of 3.0 has not been achieved. The exam will be administered by the Preliminary Exam Committee, which will consist of one instructor from each of the three core courses. The student's primary adviser is invited to attend but they will not be an active participant in the examination. Each member of the Committee will provide a single grade (pass, conditional pass or fail) and the final grades will be submitted via the Results of Preliminary Exam Form:

1. **Pass.** The student may proceed to the next stage of his/her degree training.
2. **Conditional pass.** In the event that the examination committee feels that the student did not have an adequate background or understanding in one or more specific areas, the preliminary exam committee will communicate the conditional pass to the student and must provide the student with specific requirements and guidelines for completing the conditional pass. The student must inform the preliminary exam Committee, the Graduate Program Director and Program Committee when these conditions have been completed. The preliminary exam committee will then meet with the student to ensure all recommendations have been completed and whether a re-examination is necessary. If required, the re-examination will be done using the same format and prior to the beginning of the next academic semester. If the student still does not perform satisfactorily on this re-examination, he/she will then be recommended to the Graduate affairs committee for dismissal from the graduate program.

3. **Failure.** This outcome would indicate that examination committee considers the student incapable of completing degree training. The student's academic progress will be reviewed by the Graduate Affairs Committee, who will make recommendations to the Program Director regarding the student's enrollment status. The Program Director may recommend to the Office of Graduate & Professional Education that the student be dismissed from the Program immediately.

*Students who need to complete prerequisite courses may request a deadline extension for the preliminary and subsequently the candidacy examination. Requests must be submitted to the Graduate Program Committee prior to the start of the third semester.

D. The **candidacy examination** must be completed by the end of the sixth semester of enrollment.* It requires a formal, detailed proposal be submitted to the Dissertation Committee and an oral defense of the student's proposed research project. Upon the recommendation of the Dissertation Committee, the student may be admitted to candidacy for the Ph.D. degree. The stipulations for admission to doctoral candidacy are that the student has (i) completed one academic years of full-time graduate study in residence at the University of Delaware, (ii) completed all required courses with the exception of BINF865 and BINF969, (iii) passed the preliminary exams, (iv) demonstrated the ability to perform research, and (v) had a research project accepted by the Dissertation Committee. Within one week of the candidacy exam, complete and submit the Recommendation for Candidacy for Doctoral Degree form for details.

*Students who need to complete prerequisite courses may request a deadline extension for the preliminary and subsequently the candidacy examination. Requests must be submitted to the Graduate Program Committee prior to the start of the third semester.

E. The **dissertation examination** of the Ph.D. program will involve the approval of the written dissertation and an oral defense of the candidate's dissertation. The written dissertation will be submitted to the Dissertation Committee and the CBCB office at least three weeks in advance of the oral defense date. The oral defense date will be publicly announced at least two weeks prior to the scheduled date. The oral presentation will be open to the public and all members of the Bioinformatics Data Science program. The Dissertation Committee will approve the candidate's dissertation. The student and the primary faculty advisor will be responsible for making all corrections to the dissertation document and for meeting all Graduate School deadlines. A copy (electronic and printed hard copy) of the final completed dissertation should be provided to the Education and Outreach Coordinator.

B. COURSE CURRICULUM

The tables below list the course curriculum for the major components of the Ph.D. in Bioinformatics Data Science.

Table 2. Ph.D. Program Course Curriculum

Course Curriculum (33-42 credits)	
Bioinformatics Data Science Core (9)	
Bioinformatics (3) [select one]	
Bioinformatics	BINF644: Bioinformatics (3)
	CISC636: Computational Biology and Bioinformatics (3)
Data Science (6) [select two]	
Systems Biology [select one]	BINF694: Systems Biology I (3)
	BINF695: Computational Systems Biology (3)[*]
Data Analytics[*] [select one]	NURS/HLTH 844 Population Healthcare Informatics (3)
	CISC681 Artificial Intelligence (3)
	CISC683 Introduction to Data Mining (3)
	CISC684 Introduction to Machine Learning (3)
Prerequisites – if required (3-9)[**]	
Introduction to Discipline (3) [select one]	BISC609: Molecular Biology of the Cell (3)
	BISC654: Biochemical Genetics (3)
	PLSC667: Applications of Genome Science: From Microbes to Mammals (3)[****]
	BINF690: Programming for Bioinformatics (3)
Database (3) [select one]	BINF640: Databases for Bioinformatics (3)
	CISC637: Database Systems (3)
Biostatistics (3) [select one]	STAT656: Biostatistics (3)
	STAT611: Regression Analysis (3)
Seminar (3)	
Seminar	BINF865: Seminar (0-1)[***]
Research (6)	
Research	BINF868: Research (1-6) - Until successful completion of preliminary exam
	BINF964: Pre-Candidacy (1-6) - Until successful completion of candidacy exam
Doctoral Dissertation (9)	
Doctoral Dissertation	BINF969: Doctoral Dissertation (1-9)

Table 3. Ph.D. Program Electives

Recommended Electives
BISC609: Molecular Biology of the Cell (3)
BINF690: Programming for Bioinformatics (3)
BINF695: Computational Systems Biology (3)
BISC654: Biochemical Genetics (3)

CISC667 Introduction to Human-Computer Interaction (3)****
CISC681 Artificial Intelligence (3)
CISC683 Introduction to Data Mining (3)
CISC684 Introduction to Machine Learning (3)
CISC685 Modeling and Simulations for Bioinformatics Systems (3)
CISC841 Algorithms in Bioinformatics (3)
CISC844 Computational Biomedicine (3)
NURS/HLTH 844 Population Healthcare Informatics (3)
PLSC667: Applications of Genome Science: From Microbes to Mammals (3)****
BUAD840 Ethical Issues in Global Business Environments (3)
UAPP650 Values Ethics and Leadership (3)
Electives
BHAN 856 Multivariable Biostatistics (3)
BINF650 Protein Modifications: Protein Structure and Function (3)
BISC602 Molecular Biology of Animal Cells (3)
BISC605 Advanced Mammalian Physiology (3)
BISC610 Endocrine Physiology (3)
BISC612 Advanced Cell Biology (3)
BISC615 Vertebrate Developmental Biology (3)
BISC625 Cancer Biology (3)
BISC656 Evolutionary Genetics (3)
BISC671 Cellular and Molecular Immunology (3)
BISC679 Virology (3)
BISC682 Bacterial Pathogens: Molecular Mechanisms (3)
BISC690 Fundamentals of Pharmacology (3)
BISC833 Special Topics in Biology: Grant Writing (1)
CHEG620 Biochemical Engineering (3)
CHEG621 Metabolic Engineering (3)
CHEM624 Principles of Mass Spectrometry (3)
CHEM641 Biochemistry (3)
CHEM645 Protein Structure and Function (3)
CHEM646 DNA-Protein Interactions (3)
CHEM649 Molecular Biophysics (3)
CISC621 Algorithm Design and Analysis (3)
CISC640 Computer Graphics (3)
CISC642 Introduction to Computer Vision (3)
CISC650 Computer Networks (3)
CISC675 Object Oriented Software Engineering (3)
CISC849 Advanced Topics in Computer Applications (3)
CISC882 Natural Language Processing (3)
CISC886 Multi-Agent Systems (3)

CISC889 Advanced Topics in Artificial Intelligence (3)
CPEG655 High-Performance Computing with Commodity Hardware (3)
CPEG657 Search and Data Mining (3)
ELEG633 Image Processing (3)
ELEG652 Principles of Parallel Computer Architectures (3)
ELEG671 Mathematical Physiology (3)
ELEG679 Introduction to Medical Imaging Systems (3)
ELEG680 Immunology for Engineers (3)
KAAP602 Data Analysis and Interpretation in Health Sciences (3)
MAST607 Writing Papers in the Marine Sciences (3)
MATH611 Introduction to Numerical Discretization (3)
MAST616 Methods in Molecular Biology (3)
MAST618 Microbial Ecology (3)
MAST623 Physiology of Marine Organisms (3)
MAST625 Microbial Physiology and Diversity (3)
MAST626 Microbial Molecular Genetics (3)
MAST634 Marine Molecular Sciences (3)
MATH637 Mathematical Techniques in Data Science (3)
MEEG621 Linear Systems (3)
PHYT632 Applied Physiology I (3)
PLSC671 Paradigms in Cell Signaling (3)
STAT608 Statistical Research Methods (3)
STAT612 Advanced Regression Techniques (3)
STAT615 Design and Analysis of Experiments (3)
STAT617 Multivariate Methods (3)
STAT619 Time Series Analysis (3)
STAT621 Survival Analysis (3)
STAT670 Introduction to Statistical Analysis I (3)
STAT671 Introduction to Statistical Analysis II (3)
STAT674 Applied Data Base Management (3)

[*] substitution requires permission of Graduate Committee and Graduate Program Director.

[**] necessary for students lacking equivalent courses

[***] must enroll in every semester for the first three years and present one seminar in the second and third years

[****] new course being developed

C. COMMITTEES AND DIRECTOR

The development, administration and progress assessment of the Ph.D. program in Bioinformatics Data Science will be guided by the Director, the Bioinformatics Steering Committee, and the Bioinformatics Graduate Committee as outlined below.

C.1. BIOINFORMATICS STEERING COMMITTEE

The Bioinformatics Steering Committee will advise the development and progress assessment of the Ph.D. program in Bioinformatics Data Science. The committee consists of faculty members from ten Departments across five Colleges participating in this degree program.

C.2. BIOINFORMATICS GRADUATE COMMITTEE

The Bioinformatics Graduate Committee will be responsible for admission, advising, award recommendations, and progress assessment of the students in the Ph.D. program in Bioinformatics Data Science, working closely with the students' Faculty Advisors. The committee consists of at least one representative faculty members from each participating College in this degree program.

C.3. DIRECTOR

The Director of the Ph.D. program in Bioinformatics Data Science will be responsible for the overall implementation, quality and progress of the degree program, advised by the Steering Committee and the Industry Advisory Board. The Director will also be the Chair of the Bioinformatics Graduate Committee. We propose that the Director of the Ph.D. program in Bioinformatics Data Science be a rotating position. The CBCB Education and Outreach Coordinator will provide administrative support to help manage day-to-day program activities.

D. SATISFACTORY PROGRESS

D.1. FACULTY ADVISOR

Students are required to choose an appropriate Faculty Advisor from a list of faculty members participating in the degree program or have an appropriate Faculty Advisor appointed by the Director of the Ph.D. program in Bioinformatics Data Science. The participating faculty members are faculty approved to advise students and/or serve as research mentors or co-mentors. The list of participating faculty, along with their departments and research interests, are available from the Bioinformatics program web site (https://bioinformatics.udel.edu/people/affiliatedfaculty/).

The Faculty Advisor will be the primary contact of the student for questions and advice. The student will develop a plan of study for the program with the Faculty Advisor before the beginning of the second semester. The Director of the Ph.D. program in Bioinformatics Data Science will verify that the student has completed the requirements for the program and will approve the application for the degree upon successful completion of the requirements.

D.2. ACADEMIC LOAD

Students in the Bioinformatics Data Science Ph.D. program will typically complete the program in four to six years.

Students enrolled in at least 9 credit hours or in sustaining credit are considered full-time students. Those enrolled for fewer than 9 credit hours are considered part-time students, although students holding assistantships are considered full-time with 6 credits. Generally, a maximum load is 12

graduate credit hours; however, additional credit hours may be taken with the approval of the student's adviser and the Office of Graduate and Professional Education. A maximum course load in either summer or winter session is 7 credit hours. Permission must be obtained from the Office of Graduate and Professional Education to carry an overload in any session.

D.3. TRANSFERABILITY

Prior to admission to the Ph.D. program in Bioinformatics Data Science, a prospective student from another institution can be approved by the Bioinformatics Graduate Committee to take up to 9 graduate credits that, if/when admitted to the degree program, would be applied to that degree. Once the student has successfully completed 9 approved graduate UD credits and been admitted to the degree program, then a maximum of 9 graduate credits, but not the grades or quality points, can be transferred into the Ph.D. program from another institution with the approval of the Graduate Committee.

Students who complete graduate credits with the classification of CEND (Continuing Education Non-degree) at the University of Delaware may use a maximum of 9 graduate credits earned with this classification toward their graduate degree.

All requests for transfer credit should be directed to the academic home department, Department of Computer & Information Sciences, using a "Request for Transfer of Graduate Credit" Form. Transfer credits will be accepted provided that such credits: (i) were earned with a grade of no less than B-, (ii) are approved by the Bioinformatics Graduate Committee, (iii) are in accord with the Program Policy Statement of the Ph.D. program in Bioinformatics Data Science, (iv) are not older than five years, (v) are graduate level courses, and (vi) were completed at an accredited college or university. Graduate courses counted toward a degree received elsewhere may not be transferred into a degree at UD. Credits from institutions outside of the United States are generally not transferable to UD.

D.4 CONSEQUENCES OF UNSATISFACTORY ACADEMIC PROGRESS

The Bioinformatics Graduate Committee will meet at least once each semester to evaluate each student's progress. If a student is failing to make satisfactory progress towards a degree, the committee will recommend suitable action to the Director of the Ph.D. program in Bioinformatics Data Science. Possible actions include (but are not limited to): (i) requirement for additional courses, (ii) suspension of financial support, and (iii) recommendation for dismissal.

D.5 STANDARDS OF STUDENT CONDUCT

All graduate students are subject to University of Delaware regulations regarding academic honesty. Violations of the UD regulations regarding academic honesty or other forms of gross misconduct may result in immediate dismissal from the Program.

D.6 DISMISSAL

The procedures for dismissal as detailed in the University Catalog will be followed. Briefly, the Bioinformatics Graduate Committee will report its recommendation and reason for dismissal to the Director of the Bioinformatics Ph.D. program. The Director will make a recommendation to the Office of Graduate Studies, who will decide whether to dismiss the student. The student may appeal this decision to the Office of Graduate Studies, following the procedure given in the University Catalog.

D.7 GRADUATE STUDENT GRIEVANCE PROCEDURES

Students who feel that they have been graded inappropriately or receive what they perceive as an unfair evaluation by a faculty member may file grievances in accordance with University of Delaware policies. Students are encouraged to contact the Director of the Bioinformatics Ph.D. program prior to filing a formal grievance in an effort to resolve the situation informally.

D.8 . ATTENDANCE AT CONFERENCES AND PROFESSIONAL MEETINGS

The Bioinformatics Ph.D. program encourages students to attend conferences and professional meetings. They provide opportunities to meet future employers and colleagues, and can offer specialized training beyond course work.

IV. FINANCIAL AID

A. FINANCIAL AWARDS

Admission to the Ph.D. program in Bioinformatics Data Science requires graduate assistantship or fellowship funding. Students may seek financial aid opportunities, such as fellowships or scholarships from sources within the University and from private and federal agencies. Interested students should check the Office of Graduate Studies for the most current opportunities.

Financial aid is awarded on a competitive basis from the pool of admitted applicants. The University of Delaware's policies apply to all forms of financial aid. Please refer to the University Policies for Graduate Student Assistantships and Fellowships.

Students in the Ph.D. program in Bioinformatics Data Science may apply for the Graduate Assistantships:
- Research Assistantships (RAs) are generally funded by research grants and contracts provided by external funding agencies. Students may be supported as an RA through their Faculty Advisor's research funds after their first year. A research assistantship provides full tuition and a stipend. The RA's advisor is responsible for defining the student's responsibilities and for evaluating the student's performance. The amount of service or research may vary from week to week but the average is usually expected to be 20 hours per week.
- Teaching Assistantships (TAs) are offered for graduate students to perform teaching and other instructional activities. The amount of service may vary from week to week but the average is usually expected to be 20 hours per week. A teaching assistantship provides full tuition and a stipend. In accordance with University of Delaware regulations, foreign

students must achieve a TOEFL score of at least 600 (paper-based) or 100 (Internet-based) in order to qualify for teaching assistantships.

B. CONTINUATION OF FINANCIAL AID

Students who are awarded financial aid must maintain satisfactory academic progress with satisfactory performance of assistantship duties (when applicable). Satisfactory academic progress includes registering for a minimum of 6 graduate-level credits each Fall and Spring semester, and maintaining a minimum 3.0 GPA.

The RA's responsibilities and performance standards will be established by the Faculty Advisor. In the event of an unsatisfactory performance by an RA, the advisor will notify the student and the Bioinformatics Graduate Committee at least four weeks prior to terminating the assistantship.

The TA's responsibilities and performance standards will be established by the Director of the course in which the student teaches. In the event of an unsatisfactory performance by a TA, the Course Director will notify the student and the Graduate Committee of the academic department offering the course. The Committee may recommend termination of the assistantship to the Department Chair.

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