University of Idaho
Bioinformatics and Computational Biology
Graduate Degree Program
Student Handbook

2004-2005

INTRODUCTION

University requirements for graduate degrees are described in the University of Idaho General Catalog. While these requirements are quite specific in many instances, individual departments retain considerable discretion with respect to their interpretation and implementation. The purpose of the "Graduate Program Guidelines for the Department of Bioinformatics and Computational Biology" is to summarize and document policies and procedures that are to be followed in implementing the requirements of the General Catalog. These guidelines are intended for use by faculty, graduate students, and prospective graduate students in planning and executing graduate study programs in bioinformatics and computational biology.

Additional information on the graduate program in Bioinformatics and Computational Biology (BCB) may be obtained from the web at http://www.ibest.uidaho.edu/BCB, or by contacting:

Department of Bioinformatics and Computational Biology
P.O. Box 441010
University of Idaho
Moscow, Idaho 83844-1010
(208) 885-6514

1. GRADUATE DEGREES OFFERED

The Department of Bioinformatics and Computational Biology (BCB) offers both MS and PhD degrees in Bioinformatics and Computational Biology. The Master's degree requires a combination of course and thesis work. The PhD degree requires a combination of coursework, teaching, lab rotations, and a dissertation representing a significant, original contribution to the field.

2. ADMISSION REQUIREMENTS

Admission to the BCB program is highly competitive. Even exceptional applicants are admitted only when there is an opening with one of the participating BCB faculty.

Please contact individual faculty members if you have questions.

Minimum admissions requirements:

- At least a 3.0 undergraduate GPA if the student graduated within the last five years.
- Total Graduate Record Examination score of at least 1800 (in the old system) or 1300+4 (in the new one). Note: GRE is required of all applicants.
- For applicants for whom English is a second language, a TOEFL score of at least 600. Note: TOEFL is required of all applicants for whom English is a second language.

To apply:
Please follow the instructions on the University of Idaho Graduate Admissions webpage, or contact the Graduate Admissions Office at:

Graduate Admissions Office
http://www.grad.uidaho.edu/home/admissions/
University of Idaho; PO Box 443017
Moscow, ID 83844-3017

In addition, applicants must provide:

- At least three letters of reference, that speak to the applicant's aptitude for graduate research.
- A statement of research interests that clearly identifies the research he or she would like to pursue and why he or she wants to pursue it at the University of Idaho.
- A letter of support from a BCB faculty member agreeing to sponsor this applicant.

Note: Students with specific research projects directed by specific BCB faculty members who have agreed to direct this research will have priority in admissions decisions — it is the responsibility of the student to identify these research topics and to obtain sponsorship from BCB faculty members.

3. DEGREE PROCEDURES

The required procedural steps for the MS and PhD programs are summarized below. These tables have been adapted from the General Catalog and modified to reflect procedures followed in the Department of Bioinformatics and Computational Biology. For more detailed information please refer to the General Catalog.

REQUIREMENTS FOR A MASTER'S DEGREE
(Adapted from the University's General Catalog)

Step	Procedure	Time Element
Admission to the College of Graduate Studies	Write or consult departmental administrator and Graduate Admissions Office.	At least three months before intended registration.
Appointment of Major Professor and Committee	Prepared by student. File form, "Appointment of Major Professor and Committee." Approval by major professor and committee, departmental administrator, and graduate dean required.If a change is made, file form "Graduate Program/Committee Changes."	During the second semester and whenever a change is needed.
Study Plan	Prepared by student, major professor, and committee. File form, "Program for a Master's Degree." Approval by major professor and committee, departmental administrator, and graduate dean required. If a change is made, file form, "Graduate Program/Committee Changes."	Will not be processed unless the "Appointment of Major Professor and Committee" form for the master's degree has been approved by the graduate dean.
Graduate Handbook for Theses and Dissertation	Student picks up from Graduate College or online at: http://www.grad.uidaho.edu/	Shortly into your program to assist in preparation of your thesis.
Application for Degree (commencement excuse)	Student and major professor certify requirements completed or will do so by completion of current registration. File form, "Application for Advanced Degree." You must notify graduate dean if you will not be participating in commencement.	Completed at the beginning of the semester in which the student intends to graduate. Date appears in calendar printed in Time Schedule.
Final Semester Registration	Student must register for credit during the semester of expected defense or completion of non-thesis requirements.	Date appears in calendar printed in Time Schedule.
Request to Proceed with Final Defense of Thesis	Students request this form from the Graduate College. Form requires major professor and committee members' signatures. Students return form to Graduate College before defense of thesis.	When ready to defend thesis.
Final Defense Report (for MS Degree)	Issued by the Graduate College upon receipt of the "Application for Final Defense" form.	To be taken to final defense for completion and returned to Graduate College following defense. Due date for results appears in the calendar in the Time Schedule.

REQUIREMENTS FOR A DOCTORAL DEGREE
(Adapted from the University's General Catalog)

Step	Procedure	Time Element
Admission to the College of Graduate Studies	Write or consult departmental administrator and Graduate Admissions Office.	At least three months before intended registration.
Appointment of Major Professor and Committee	File form, "Appointment of Major Professor and Committee for the Doctoral Degree." Approval by the departmental administrator and graduate dean is required. If a change is made, file form, "Graduate Program/Committee Changes."	During the second semester and whenever a change is needed.
Study Plan	Prepared by student, major professor, and committee. File form, "Doctoral Study Plan." Approval by graduate dean is required. If a change is made, file form, "Graduate Program/Committee Changes."	Will not be processed unless the "Appointment of Major Professor and Committee for the Doctoral Degree" form has been approved by the graduate dean.
Graduate Handbook for Theses and Dissertation	Student picks up from Graduate College or online at: http://www.grad.uidaho.edu/	Shortly into your program to assist in preparation of your thesis.
Preliminary Examination	Time and place set by major professor.	The Preliminary Examination will be taken no later than the beginning of the fifth academic semester.
Advancement to Candidacy	Major professor certifies all requirements for advancement to candidacy. Have been met; file form, "Advancement to Candidacy" (Examination Report).	Immediately after successful completion of preliminary examination.
Application for Degree (commencement excuse)	Student and major professor certify requirements completed or will do so by completion of current registration. File form, "Application for Advanced Degree." You must notify graduate dean if you will not be participating in commencement.	Completed at the beginning of the semester in which the student intends to graduate. Date appears in calendar printed in Time Schedule.
Final Semester Registration	Student must register for dissertation credit during the semester of expected defense.	Date appears in calendar printed in Time Schedule.
Request to Proceed with Dissertation	Students Student will present the Graduate College with this form signed by the committee.	Must be filed with the Final Defense of Graduate College at least 10 working days before the scheduled defense.
Final Defense Report	Issued by the Graduate College upon receipt of the "Request to Proceed with Final Defense of Thesis/Dissertation" form	To be taken to final defense for completion and returned to Graduate College following defense. Due date for results appears in the calendar in the Time Schedule.

4. Degree Requirements

BCB degrees are highly interdisciplinary. Coursework, hands-on experience at both research and teaching, and regular conversations with experts in multiple disciplines are required.

Required Coursework

BCB degrees require the following types of courses. See the table below for a list of courses/knowledge for background, core, and depth coursework.

Background courses:

Required background knowledge in biological, mathematical, and computational sciences. These courses, or equivalent knowledge, are necessary for core courses. We assume that BCB students may have to make up one or two background subjects as deficiency requirements (See Admissions for admissions requirements.)

Core courses:

Shared educational foundations that provide common language and understanding for interdisciplinary research.

Depth courses:

Detailed knowledge of bioinformatics and computational biology.

Research and thesis:

BCB500 (for MS) or BCB600 (for PhD): Leads to significant original contribution to science.

Seminar:

BCB501: Interact with experts who have diverse research backgrounds.

Lab rotation:

BCB506 (biology), BCB507 (computer science), or BCB508 (math):
The lab rotation is designed by the student and his or her thesis committee and provides practical experience in research questions and methods outside the major emphasis area of the student.

Teaching experience (BCB597):

The thesis committee determines what constitutes acceptable teaching experience. It is possible to meet this requirement by teaching a course or workshop, organizing a seminar, or being a teaching assistant for an appropriate course.

The course requirements for the three disciplinary areas within the Bioinformatics and Computational Biology degree program.

Disciplinary Areas			
	Computer Science	**Biological Sciences**	**Mathematical Sciences**
Background - each required of all students	A high level programming language. Data structures.	General biology (organisms, ecosystems). Basic genetics.	Two semesters of calculus. Basic probability and statistics.
Core - each required of all students	Computational Biology I:Sequences (CS515)	Principles of Systematic Biology (Biol545)	Mathematical Methods in Genetics (Math563)
Depth - see "Credit Requirements" on the next page to determine which depth courses to take.	High Performance Computing (CS504, to be renumbered)	Biochemistry and Molecular Biology (MMBB542)	Computer Intensive Methods (Stat540)
	Artificial Intelligence (CS570)	Advanced Evolution/Population Dynamics (Bio 421)	Mathematical Statistics (Math452/Stat452)
	Database Management Systems (CS561)	Introduction to Population Genetics (For511)	Probability Theory (Math451/Stat451)
	Evolutionary Computation (CS572)		Stochastic Processes & Models (Math453/538)
			Mathematical Biology (M437)

Credit Requirements

The MS requires a minimum 32 credits and the PhD requires a minimum 78 credits.

The BCB program assumes the usual graduate full time load of at least 9 credits per semester.

The credits and a typical program of study for both BCB degrees follow:

M.S. degree credit requirements:

type	required
background	As needed to meet discipline area requirements.
core	9 credits
depth	12 credits 6 in one area, 3 in each of the other two
seminar BCB 501	2 credits
lab rotation	none
supplemental BCB504	as needed
thesis BCB500	9 credits
total	32 credits minimum

Ph.D. degree credit requirements:

type	required
background	As needed to meet discipline area requirements.
core	9 credits
depth	15 credits: 9 in one area, 3 in each of the other two
seminar BCB501	3 credits
lab rotation BCB506 BCB507 BCB508	3 credits
supplemental BCB504	as needed
dissertation BCB600	30 credits
teaching experience BCB597	3 credits
other	as needed
total	78 credits minimum

Note: The PhD requires at least 18 credits of "other", supplemental, or workshop courses at the 400 level or above, since there are a total of 60 minimum required core, depth, thesis, seminar, and laboratory credits, and the student must have at least 78 credits to graduate. No more than 3 credits of workshop may apply to the degree, and credits for courses numbered below 400 cannot apply toward the degree.

Thesis Work

Both the MS and PhD degrees require a thesis. The MS degree requires at least nine credits of thesis research and the PhD degree requires at least thirty. MS Theses for a BCB degree will demonstrate a high level of scholarly achievement, and doctoral dissertations will represent a significant, original contribution to the field. In addition to the thesis and dissertation, students will publish their work in appropriate peer-reviewed venues. Students will present their theses and dissertations publicly at their final defense.

Thesis committee

Each student's graduate committee will consist of at least four faculty members. This committee will represent the three BCB disciplines (biology, computer science, and mathematical sciences) and will include at least three participating BCB faculty members. There is no explicit requirement for an “external” committee member, since each committee will already include faculty from at least three different disciplines.

Preliminary Examination and Thesis Proposal

The function of the PhD preliminary examination is to determine whether the student has a workable and appropriate research plan that, if fulfilled, will produce an acceptable thesis. This exam also determines whether the student has sufficient background to undertake the proposed research.

The preliminary examination will be taken no later than the beginning of the fifth academic semester. Under rare and extraordinary circumstances, a student may not be able to meet the above timeline for the preliminary exam. In such cases, the student is required to provide a detailed written request to take the preliminary exam later, and the petition must be approved by both his/her committee and the governing board.

The preliminary examination will have three components:

1) A written thesis proposal prepared in the format of a federal research grant, submitted to the committee at least four weeks prior to the oral examination.
2) A public, oral presentation of the research proposal.
3) A non-public oral examination in which committee members will ask questions about the proposed research, and about background and core coursework.

In the event that a student fails the preliminary examination, he/she must retake the exam within one year. Students are allowed to retake the exam only once.

5. Financial Assistance

A number of research assistantships are available each year and are awarded by individual faculty members. Students should contact individual faculty members about such opportunities.

6. Graduate Program Statistics

Degree	2002/2003	2003/2004	2004/2005
Masters Enrollment	2	2	3
PhD Enrollment	12	14	16
Total	14	16	19

7. Faculty

The following University of Idaho faculty members constitute the BCB faculty, and may serve as major professors on BCB thesis committees. Faculty members may be added to or removed from this list periodically, at the discretion of the BCB faculty. "Area" is the primary designation of the faculty member for determining diversity on graduate committees and lab rotations.

Dr. Celeste Brown - Research Associate Professor
Biological Sciences
Research: Bioinformatics, Protein Flexibility
BCB area: BioSci

Dr. Steve Brunsfeld - Associate Professor
Forest Resources
Research: Molecular Systematics, Conservation Biology
BCB area: BioSci

Dr. Gary Daughdrill - Assistant Professor
Microbiology, Molecular Biology and Biochemistry
Research: Protein Flexibility and Function
BCB area: BioSci

Dr. Brian Dennis - Assistant Professor
Fish and Wildlife Resources and Division of Statistics
Research: Mathematical Statistics and Ecology
BCB area: BioSci

Dr. Larry Forney - Professor
Biological Sciences, Chair
Research: Microbial Ecology
BCB area: BioSci

Dr. James A. Foster - Professor
Computer Science
Research: Evolutionary Computation
BCB area: CS

Dr. Frank Gao – Professor
Math
Research: Mathematical Statistics
BCB area: Math

Stephanie Hampton - Assistant Professor
Fish and Wildlife Resources
Research: Liminology, Ecological Data Mining
BCB area: CS

Dr. Robert Heckendorn - Assistant Professor
Computer Science
Research: Theory of Genetic Algorithms
BCB area: CS

Dr. Paul Joyce - Professor
Mathematics, Statistics
Research: Mathematical Statistics, Stochastic Processes Population Biology
BCB area: Math

Dr. Stephen Krone - Associate Professor
Mathematics
Research: Stochastic Processes, Population Biology
BCB area: Math

Dr. Mike Laskowski - Professor
WWAMI Medical Program
Research: Cell Signaling
BCB area: BioSci

Dr. Jim Lorenzen - Associate Professor
Plant, Soils, Entomological Sciences
Research: Potato genetics
BCB area: BioSci

Dr. Stephen Lee - Associate Professor
Statistics
Research: Neural Networks and Computational Statistics
BCB area: Math

Dr. Scott Nuismer – Assistant Professor
Biological Sciences
Research: Coevolutionary Genetics
BCB area: CS

Dr. Ronald Robberecht - Professor
Rangeland Ecology
Research: Plant response to the environment & scientific visualization in ecology
BCB area: Ecology

Dr. Terence Soule - Assistant Professor
Computer Science
Research: Evolutionary Computation
BCB area: CS

Dr. Jack Sullivan - Associate Professor
Biological Sciences
Research: Molecular systematics, phylogeography
BCB area: BioSci

Dr. Eva Top - Associate Professor
Biological Sciences
Research: Microbial Ecology, Plasmid Evolution
BCB area: BioSci

Dr. Lisette Waits - Associate Professor
Fish and Wildlife Resources
Research: Conservation Genetics. Ecology
BCB area: BioSci

Dr. Holly A. Wichman - Professor
Biological Sciences
Research: Experimental Evolution, Genetics
BCB area: BioSci

Dr. Christopher Williams - Professor
Statistics
Research: Quantitative Genetics, Statistics
BCB area: Math