FACULTY HANDBOOK

BIOINFORMATICS GRADUATE PROGRAM

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1. Introduction.
This handbook should serve as a guide for faculty mentoring Bioinformatics students, either in rotations in the first or possibly second year of the student’s studies, and for direction of a student’s thesis work in your (wet or dry) lab.

Bioinformatics is an interdisciplinary subject area, so our students require both breadth and depth. A related challenge is to maintain Program coherence and identity when our students are working in a wide variety of geographically and thematically scattered labs. Finally, we need faculty to be involved in the courses and other educational activities that develop fine students.

At the end of the handbook are copies of each of the forms needed by a mentor throughout a student’s academic career. You will also find sample course tracks followed by our students and a list of courses usually recommended for students in the Program. If you have a suggestion for courses that should be added or a new course to develop, please contact the director; we would be pleased to receive this information.

Please read this handbook over and keep it available if you are mentoring or planning to mentor a Bioinformatics student. It is updated annually.

2. First Year: Lab Rotations.
In the first year, Bioinformatics students rotate each semester in a different lab. They must complete two rotations and may complete a third if desired. Rotations serve at least 3 purposes: a) for the student to decide whether this is a suitable thesis lab, b) for the mentor to decide if this is a student s/he would like to mentor, c) to expand students’ horizons. We strongly encourage students from quantitative backgrounds to try at least one rotation with an opportunity for hands-on wet lab experience. Before a rotation, the mentor and student should discuss whether space and funding is in place for thesis work.

Rotation mentors are asked to complete an evaluation after each rotation, which will be co-signed by the student and entered into the student’s file.

The Bioinformatics Program and PIBS maintain a list of faculty labs with rotation openings, including topics and potential for thesis work. Please help us keep this list current by responding to requests every term for updates.
3. Mentoring Students in the Second Year
The second year is a transition year for students, their mentors and the Program: Students continue to take classes, but also prepare for preliminary exams. Some may accept a GSI position for educational and/or financial reasons and most will have started their thesis work in a mentor’s lab. Funding sources will also vary.

a. Second year rotations
Second year rotations should be a rare exception. Rotation mentors in these circumstances must only take second year students if there is a high likelihood of funding and a post-rotation lab position availability in the case of such a student.

b. Prelims and candidacy
Successfully completing prelims is the last step before the Program requests Rackham approve candidacy. Before being allowed to take the prelim, the student must have declared a mentor who has signed mentoring and funding agreement forms.

When does a student take the preliminary exam?
Preliminary exams will typically be taken during in the second year and every effort will should be made that all contingencies and retakes will be finished before the beginning of the third year.

A student may take Prelim Exams earlier than this – they can complete them after their first year or just before the second year begins. While this can have a significant financial advantage for their mentor, mentors need to recognize that priority goes to the educational needs of the student to achieve breadth.

What is required of the preliminary exam?
Prelim procedures are located at the end of this book and are posted on the website. To initiate the prelim process, the student drafts an abstract, asks 4 faculty members of the program to participate in the prelim, and submits this information to the Bioinformatics Preliminary Exam Advisory Committee. The mentor is not allowed to be a member of the student’s prelims examination committee.

The student’s proposed exam committee is vetted for breadth and balance (e.g., quantitative versus biological faculty). The proposal is evaluated as acceptable or not on the basis of novelty, significance, and whether the proposal is too close to the student’s likely thesis topic. This last, if in doubt, is resolved in consultation with the thesis mentor. Once these are accepted, the student has approximately one month to finish the preparation of the oral presentation. During this period the mentor should not consult with the student about the prelim proposal, though the members of the prelims committee may be consulted. They are not obliged to work with the student on the proposal.
Inexperienced faculty unsure of Program expectations regarding prelims can also consult the Program Directors or experienced colleagues on this point. Mentors should recommend that students coming up to prelims consult with older students on their experiences in the examination.

**What does the preliminary exam entail?**
The basic exercise of the prelim exam is to produce a research proposal, which includes a written proposal in NIH format, plus an oral presentation and defense of the proposal. The proposal is not to be on the likely topic of the student’s thesis. Instead, it needs to represent some independent work of the student in formulating or proposing a solution to a topic of novelty and interest, and to block out a problem where a considerable portion of the problem can be believably completed in three years.

**What do the results mean?**
On successful completion of the prelim exam, the Program seeks to get the student accepted into candidacy by Rackham as soon as possible. The faculty mentor must complete the financial commitment form at this point, if that has not already been done.

4. **Interdisciplinary Breadth.**
Bioinformatics is an interdisciplinary field that requires scientific breadth of those who would be leaders in the field. Consequently, the Program may require special mentoring or course requirement arrangements, even after the student has become a candidate. These requirements should be adhered to regardless of the source of the student’s funding.

**a. Course work beyond candidacy.**
In some cases, the Directors or the Bioinformatics Steering Committee may deem it necessary for a student to strengthen some particular portion of his or her academic background, in the interests of scientific breadth.

   **Example:** A typical example is a student whose background is in laboratory biology but whose analysis component of the thesis work requires some statistical analysis. If such analysis is at the heart of the thesis, it probably will not be adequate to use off-the-shelf statistics for this analysis. The Program would expect a serious analysis, even with some novelty to it if it were the central claim to scientific excellence or significance in the thesis project. In this case, the Program can impose a further requirement to take – for credit – suitable course(s) in statistics. The Program may determine the need for such coursework from either annual thesis committee meeting reports or from the student’s annual presentation in the Program’s BISTRO seminar series.

   The mentor can seek to have such course work taken at times more convenient to the lab’s work schedule, but in the end the Program maintains the right to require this coursework, even if it is at an inconvenient time. Any questions about this should be discussed with the Directors well in advance, as some classes at this level are not offered frequently. Such post-candidacy coursework will be arranged if at all possible so that the
student does not incur further tuition expenses beyond those already covered by typical GSRA funding, i.e., one course per semester.

b. Co-mentors.
Given the interdisciplinary nature of the program, it is usually in the best interests of the student to have two mentors.

Example: A student would be strongly discouraged from a thesis project which was purely computational or algorithmic, removed from any specific biological or biomedical context serving at least for illustration of techniques and motivation. In such a case, the Program may deem it necessary to require that the student and mentor agree on a co-mentor who might bring the missing dimension of expertise to the team. This is often useful simultaneously as a way to add a more translational aspect to the thesis research, and as a way to find GSRA funding through biomedical grants. Such requests will be worked out between the Program and the mentor.

5. Financial Responsibilities of the Mentor.
Usually students in the first year will be supported financially by the Program or through a variety of Training Programs (Bioinformatics TG, PIBS, MSTP, et al.) or Fellowships (Rackham Merit Fellowship, NSF Fellowship, etc.).

In students’ second year, s/he may continue to receive such funding, obtain a GSI position, or begin as a GSRA on an advisor’s grant.

All students in the third year and beyond are expected to be in candidacy and supported by the thesis mentor’s lab. The mentor must make a commitment to fund the student in this period, and a signed record of this commitment is part of the student’s file. The mentor is required either (a) to provide a funding line to the Program or (b) to indicate where the funding will come from if not from personal grants controlled by the mentor.

If the student has co-mentors, then all mentors and the Program must agree to the funding formula proposed. In cases where the proposed funding line is based on a grant which is to expire or be up for renewal before the student is likely to complete the thesis work, the mentor must indicate whether there is alternative funding at that point or what contingency plans s/he has in the event of non-renewal or loss of funding. Alert the Directors as early as possible to potential shortfalls; Bioinformatics students are not expected to fully fund themselves throughout their thesis by teaching.

The Program seeks for its students in candidacy to avail themselves to the maximum degree possible of Training Grant and Rackham funding outside individual mentors’ grant funding and will help mentors and students apply for such funding. As information about funding options is received by the Graduate Office, this is forwarded to you. If you know of an opportunity which would be available to Bioinformatics students, please notify the Program so that others might also try to benefit from this opportunity. In particular, please keep the
office notified of all funding opportunities you and your students apply for, even if unsuccessfully.

As noted earlier, the transitional second year is more complicated. If a second year student is rotating in a lab because s/he does not yet know with certainty which lab will be the thesis lab, then the rotation lab is not under a binding obligation to provide funding for the student. However, once the student and lab director have agreed on the mentoring arrangement for the future, the lab will then be expected to support the student in the same manner as a thesis candidate. This is also true if the student is participating in the lab in a way not practically distinguishable from a thesis student (e.g, in terms of hours of commitment, or insistence on the prioritization of lab needs above the student’s other work commitments).

Once into the candidacy period, mentoring a thesis student is first and foremost the responsibility of the thesis mentor. In addition to other Rackham rules which can be gleaned from the web or obtained from the Graduate Program office, the student must name a thesis committee within 1 year from advancing to candidacy. The committee composition must be approved by the Bioinformatics Directors. This committee must meet at least once annually and submit an evaluation of the committee meeting to the Program commenting on the student’s progress towards degree.

Please keep the Program posted well in advance as to when a student is likely to complete his or her thesis. Please be sure that mentees who are about to finish have checked the Rackham requirements with the Graduate Office well before the time expected for thesis defense. Practically speaking, this should be at least six months in advance.

All Bioinformatics thesis defenses should take place in the Palmer Commons building where the Bioinformatics office is located. Please make arrangements to reserve space and answer any questions.

7. Involvement in Program Activities.
As an interdisciplinary program, with faculty drawn from many diverse corners of the University, Bioinformatics finds its thesis students largely scattered across the campus in their last two or three years in the Program. This makes it difficult to give them a coherent sense of program and connectedness to their fellow students and to other faculty besides the mentor. All CCMB faculty, but especially thesis student mentors, are expected to participate in Program activities. These include the Bioinformatics Journal Club, the Bioinformatics Seminar series and the BISTRO Seminar of student research presentations. Just as importantly, the mentors of students should impress upon such students the value and importance of such activities in their scientific development, both in terms of actual content, but also in terms of Program coherence. It can be very hard to drum up student participation if there is no concordant support from mentors.
8. Teaching Bioinformatics Courses.

The most fundamental way for a mentor to participate in Bioinformatics Program activities is to participate in the Program’s teaching activities. This is the best way for faculty interested in recruiting Bioinformatics students to reach them, interest them in the work they are doing, and prepare them to participate in lab activities. Faculty who mentor Bioinformatics students are expected to participate actively in these teaching efforts.

The Program needs your support here in several different ways. The Program offers several basic courses, as well as a few service oriented courses, usually at the request of other UM units. Most of the lecture courses are offered by teaching teams, and the Program can always use faculty volunteers to give a limited number of lectures in such a course. One can also volunteer to coordinate or organize such a course. This is obviously very important for the long-term survival of the Program. Unfortunately, as a Program, Bioinformatics is not able to compensate teaching faculty of this sort.

In addition, several CCMB faculty have offered to cross-list courses which have substantial content of interest to some Bioinformatics students. This is a good way to keep Bioinformatics students aware of a course the faculty thinks is relevant and enables the Program to propose a broader course of study to prospective students. Furthermore, it enables a faculty member to support the Program while fulfilling basic teaching commitments in the faculty’s home Department and thus to be paid for the teaching at the usual salary. CCMB faculty should please respond to our regular requests for information on courses available to Bioinformatics students which faculty may be aware of in their home programs, or elsewhere. The Program tries to keep an up to date list of such offerings posted online.

There are several organizational efforts which faculty should not overlook as possible contributions to the Program’s teaching efforts. These efforts would be extremely helpful and should not be considered burdensome. They include organizing the Bioinformatics Seminar (BI 601), the Bioinformatics Journal Club (BI 602) and the BISTRO Seminar.

Finally, one can contribute to the teaching efforts of the Program by working with the Curriculum Committee, which helps promote the development of necessary new curriculum and quality control on the current offerings. For example, Training Grant partners of the Program regularly request either extra offerings or adjustments to the existing curriculum.
9. Teaching Experience for Ph.D. Students.
The Program considers it a high priority that Ph.D. students who have interest in a career on the academic track get some exposure to teaching, at least to the level of one semester’s experience as a GSI. Such experience is the basis of letters of recommendation on that aspect of the student’s development. The Program has courses each year which require the services of a GSI. Please have your student enquire at the Program office about GSI possibilities.

Please plan with your student when a good semester would be for the student to fulfill this GSI experience, and please be practical about the level of lab demands on the student while s/he teaches.

10. Bioinformatics Committees and Service
There are a limited number of committee duties which have to be performed by faculty to ensure the practical needs of the Program. Please let the Program know if you are interested in contributing to the Program in these capacities; please be receptive if you are asked to help with these committees. In general, these committees try to keep meetings to a minimum.

The Program’s committees are:

(1) the Seminar Committee, which organizes the Bioinformatics Seminar. This group sets the seminar speaker list, with input from the general faculty at large.

(2) the Curriculum Committee, which meets once per year to review the status of courses offered by the Program and to review and encourage the development of new curriculum for the Program. The implementation of such developments is distributed to specific working groups.

(3) the Admissions Committee, which meets between the months of November – February to review applications to both the Bioinformatics Program and the PIBS Program, where Bioinformatics is the primary choice for the applicant.