



CIHR/MSFHR Strategic Training Program in
BIOINFORMATICS

Bioinformatics Graduate Program Requirements

Guidelines for Students and Mentors/Supervisors

1. Admissions

Acceptance into the Program is dependent on:

- (a) meeting the Bioinformatics Program requirements of a B.Sc. or equivalent, majoring in a biological discipline (biology, genetics, microbiology, molecular biology, medicine) or quantitative science (computer science, mathematics, physics, engineering, statistics), and significant experience in a second one of these fields,
- (b) meeting the general entrance requirements of the Faculty of Graduate Studies at UBC and/or SFU,
- (c) obtaining a letter of acceptance from the Bioinformatics Training Program, which confirms full funding through a CIHR/MSFHR stipend,
- (d) acceptance by the Bioinformatics Graduate Program at UBC, or the Computing Science or Molecular Biology and Biochemistry department at SFU,
- (e) receiving a letter from the Faculty of Graduate Studies (SFU or UBC) confirming acceptance into the Program.

Students are required to have an adequate facility in verbal and written English. For applicants required by the Faculty of Graduate Studies to complete a TOEFL test, the requirement of the Bioinformatics Program is a score of 625 (260 computer-based or 100 internet-based), or IELTS of 7.0, taken within 24 months of application submission. Taking the GRE is highly recommended for students who obtained their degrees outside Canada, but not required.

Students, who already have a M.Sc., will be admitted as M.Sc. candidates and must fulfill the program course requirements. Transfer from the M.Sc. to the Ph.D. program is possible if the student shows demonstrable progress in laboratory rotations and obtains an average of 80% or higher in graduate courses.

Students will receive a CIHR/MSFHR stipend of \$21,000/annum for two years by the program via the BC Cancer Agency, but must apply for applicable scholarships. In the event of achieving external scholarship funding less than that sum, the program will contribute to a maximum of \$1,750/month. Continued enrollment in the program is dependent on good academic standing.

Application Documents:

- Official transcripts from all post-secondary institutions attended.
- Official TOEFL score or equivalent (for students whose first language is not English).
- Three strongly supportive letters of reference (either sent directly from the Reference or enclosed in a sealed envelope with the Reference's signature across the seal).
- Bioinformatics Training Program application form.

Additional materials or fees may be required once the student is accepted into the Bioinformatics Program and is applying to be accepted at one of the Universities, SFU or UBC.

2. Committees

(a) **Candidate's Acceptance Committee and Home University**

The initial Acceptance Committee will consist of an assigned mentor/supervisor, who is one of the appointed program mentors, and two other members, who may be from the mentor list or from the list of associated faculty. The role of this committee is a) to provide a home lab and resources for the student through access of their mentor's facilities, b) to provide guidance regarding course work, research rotations and other career and/or personnel issues, and c) to assess student progress. It is important to note that the student's initial mentor/supervisor will not necessarily be the final supervisor for their M.Sc. or Ph.D. thesis. The thesis supervisor will be identified after the beginning of the third research rotation. At this time, some or all of the other committee members may also change to best reflect the needs of the thesis topic.

The initial mentor/supervisor is chosen to best complement the research interests outlined by the student in their original program application. It will be expected that the student will be enrolled at the same university as their mentor/supervisor. Although we will endeavour to accommodate the wishes of incoming students, the program reserves the right to determine which university the student will be enrolled in initially. Students assigned to UBC will have the Bioinformatics Graduate Program as their home department, and students assigned to SFU will have either the Computing Science department or the Molecular Biology and Biochemistry department as their home department. Any differences in tuition/student fees between the two universities will be equalized by the program for the two years the stipend is provided by the program.

Initial Meeting:

The timing of the first committee meeting may vary according to the needs of the student and availability of faculty, but must be **held no later than Oct 31** of the first year, for all students. At this meeting the student's background, course selection, and any goals will be briefly reviewed, to ensure that their course choices are suitable, and

the student will be encouraged to bring up any questions they have about the program or how to best reach their goals.

The bioinformatics committee meeting report form must be signed by the committee members present, and a copy received by the coordinator of the program no later than November 10. A home department committee meeting form must also be signed and sent to that institution's departmental graduate secretary (available from home department). The student also signs the document and has a space to add comments if they wish. Students not meeting these requirements will not be permitted to remain registered in the program.

Meeting to declare Academic Path:

All students must declare their academic path (M.Sc. or Ph.D) at the start of their second year. At this time, students should choose their third research rotation carefully, as this research may or may not be continued as thesis research. A committee meeting must proceed to discuss a student's suitability to transfer to the Ph.D. stream, or finish the M.Sc. program. Candidates are expected to provide each committee member with a summary report of their progress one week prior to the meeting. All paperwork, regarding a transfer, must be signed off and completed **no later than Aug 15**, of the first year of study. A signed report of the committee meeting must be received by the program coordinator and the graduate secretary of the home department by this date. Students not meeting this requirement will not be permitted to remain registered in the program.

(b) Candidate's Thesis Committee

- i) M.Sc. Thesis: The Thesis Supervisory Committee will consist of the supervisor and two members, at least one of whom must be one of the program's mentors.

- ii) Ph.D. Thesis: The Thesis Supervisory Committee will consist of the supervisor and three other members, at least one of whom must be one of the program's mentors.

What is a Bioinformatics Thesis: A bioinformatics thesis project would not commonly involve wet-work, except for familiarization with the techniques used in deriving data, or for a small follow-up study to validate a computational analysis. A bioinformatics thesis project would commonly involve one (or more frequently both) of the following: i) computational analysis of biological sequences or other associated biological data, to investigate a biological question, ii) derivation of new algorithmic approaches to analyze biological data.

Initial Meeting with Established Thesis Supervisor & Committee:

The first Thesis Supervisory Committee meeting will be held to approve the thesis proposal, following the decision regarding the student's academic path (this may be the same meeting as the meeting to declare academic path – see above, if the student is continuing as an M.Sc. student.

If the student is transferring to the Ph.D. stream, a date should be set for the Ph.D. qualifying examination (UBC) or public seminar (SFU), which shall take place ideally by June 15, but no later than Aug 31 of the second year of study.

Subsequent Meetings:

At least one committee meeting must be held annually to review the progress of the student. Candidates are expected to provide each committee member with a summary of their progress. Additional committee meetings may be called when necessary, due to changes in the program or for any reason which may affect the candidate's progress. A signed report of the Thesis Supervisory Committee meeting, along with the student's progress report, must be received by the program coordinator and home university department. Students not meeting this requirement will not be permitted to continue their registration in the program.

Committee meetings are formal. Students are expected to prepare a brief progress report that outlines the project and their progress since the last meeting, and that includes relevant data. They are also required to submit an updated CV. The report and CV should be distributed to committee members **at least two working days in advance**. Failure to distribute this material will mean that the meeting is subject to cancellation at the discretion of the committee members. Students are expected to present a brief (20 min) talk that emphasizes experimental design, interpretation of the data and planned experiments. Committee members may suggest alternative approaches, prioritize experiments, set deadlines, or recommend changing direction.

It is the responsibility of the student to schedule all committee meetings, to ensure that they take place in the timeframes required by the program and to ensure that all required documentation is processed.

Records:

The progress report must be completed by the supervisor at the time of the committee meeting, and signed by the student, the supervisor and all committee members present. A copy will be sent to the coordinator of the Bioinformatics Program to be kept in the student's central file and the original will be forwarded to the student's home department.

Supervision:

The student and the Thesis Supervisory Committee share the responsibility to ensure that the structure of the student's program meets the requirements of the Faculties of Graduate Studies at SFU or UBC, and the Bioinformatics Program. The final responsibility for meeting all the requirements rests with the student. A student has the privilege to change research supervisor and/or members of their committee after consultation with the supervisors and committee members involved. In case of disputes between the student and supervisor, the student is encouraged to consult with the director of the bioinformatics program or other program mentors.

Interested faculty, who wish to supervise a Bioinformatics student for their Ph.D thesis, are required to sign a waiver indicating that they will provide a minimum amount of support (stipulated by the home department) to students who are not externally funded.

3. **Course Requirements**

Students who do not have the appropriate background will not be admitted into the Bioinformatics program. Students lacking the necessary background in (for example) biology or computation, are expected to remedy these deficiencies prior to application for admission into the program. Students admitted to the program may be required by their Admissions Committee to take specific courses offered by either of the affiliated universities to fill specific gaps in their background. If the student has already taken any of these courses, or their equivalent, as an undergraduate, they are not required to repeat these; rather an additional elective(s) must be selected to make up the graduate course requirements. No course credits will be given for exempted courses taken before acceptance into the program.

M.Sc. All students are required to take four core bioinformatics courses and two bioinformatics-related electives, at the graduate level. As well, students must participate in three four-month research rotations in affiliated research laboratories. Other courses may be required if recommended by the student's Thesis Supervisory Committee.

Ph.D. Course requirements are determined by student's home department. Students may also be required to take courses if recommended by their Thesis Supervisory Committee.

Course requirements will normally be taken in the first year of the program, with the recommendation that three classes be undertaken in the first semester and three in the second semester, to allow for adequate laboratory time in the research rotations.

4. **Promotion from M.Sc. to Ph.D Program**

(a) **Internal University transfer**

Students transferring to Ph.D. studies, without completing their M.Sc., require an 80% average in M.Sc. course work, and if they are registered at SFU, they must submit evidence that they are capable of undertaking substantial original research. Students who meet the criteria set out by their institution's Faculty of Graduate Studies and their home departments, and who have the approval of their Admissions Committee, may transfer from the M.Sc. to the Ph.D program at the end of their first year of M.Sc. studies. As a pre-requisite for transfer, students are required to successfully complete a Ph.D. qualifying examination/public seminar. If they are unsuccessful in this examination, they will remain in the M.Sc. program. They will continue to be eligible for consideration for admission into Ph.D. studies after completion of the M.Sc. degree.

Students wishing to transfer from the M.Sc. program to the Ph.D. program must provide the following materials to the Bioinformatics Program at the end of their first year of graduate studies, and **no later than August 15:**

PRIOR to August 15:

- (i) Admissions Committee transfer approval (signed committee report is required).
- (ii) Student application to applicable University Department (letter of intent).
- (iii) Departmental approval of request.

AFTER August 15:

- (i) A Ph.D. supervisory committee is established, with at least 4 members.
- (ii) A committee meeting is held to approve the Ph.D proposal prior to the qualifying examination/public seminar. No qualifying examination/public seminar will be scheduled without the signed committee report approving the project proposal.
- (iii) Qualifying examination/public seminar is scheduled, ideally before June 15, but no later than Aug 31. Inform the home department and the Bioinformatics program coordinator of date, time, and location, title of research and committee members.

Incomplete or late applications for transfer will not be considered.

(b) **External University transfer**

Students may transfer from one institution to the other to complete their Ph.D., if their chosen thesis supervisor is not from their home university.

Students must apply to the new university as an outside candidate, and meet the criteria and deadlines set out by that institution's Faculty of Graduate Studies and their supervisor's home department. It is the student's responsibility to assemble the documents and complete the paperwork required for this transfer.

NOTE: CIHR/MSFHR funding will remain in place, regardless of M.Sc. or Ph.D. status, until the end of the second year of graduate work.

Thesis supervisors outside of the student's home department must attain affiliated status with the relevant department to supervise a Bioinformatics student. A letter of intent must accompany the application and approval is granted by the program and home department's director.

5. Qualifying Examination/Public Seminar

- (a) M. Sc. – none required.
- (b) Ph.D. – All Ph.D. candidates in the Bioinformatics program will be required to pass an oral qualifying examination (UBC) or present a public seminar on their research (SFU) to continue in the Ph.D. program.

Purpose: The qualifying examination/public seminar is intended to test the student's understanding of the chosen field of study as a whole, and the student's preparation for the thesis research to follow.

NOTE: All students are required to have a Thesis Supervisory Committee meeting at least one month prior to the qualifying examination/public seminar. The student is strongly advised to meet with each member of the Examination Committee before the examination to obtain guidance regarding preparation for the examination.

Timing: For Ph.D. candidates, the qualifying examination/public seminar will be held within two years of entry into the program. Examinations should be held by June 15, but no later than Aug 31 of the second year of graduate work.

Failure to pass the qualifying examination will result in the student remaining in the M.Sc. program, and they will not be permitted a second attempt.

6. Thesis Preparation

SFU students should consult "[Guidelines for Thesis Preparation](#)", available via the SFU Graduate Studies website.

UBC students should consult the "[Instructions for the Preparation of the Graduate Theses](#)" and also "[The Final Oral Examination – Guide to Doctoral Candidates](#)"; both accessible via the UBC Faculty of Graduate Studies website.

Before proceeding with the writing of the thesis, the student must meet with their Thesis Supervisory committee to review the proposed contents of the thesis with respect to scientific adequacy, and receive formal approval. At SFU, please see the MBB or CS Graduate Secretary for a written handout documenting the steps to "[Thesis Preparation, Defense and Submission](#)". The program coordinator in the Bioinformatics Graduate Program should be consulted for similar handouts/instructions.

The supervisor **MUST** read the complete thesis draft form, and the appropriate revisions must be made before the rest of the committee reads the thesis. The examination copy of the thesis should not be prepared before revisions suggested by the rest of the committee have been incorporated. Members of the Thesis Supervisory committee should return their comments to the student within three weeks of receiving the thesis.

The thesis must be approved by the Thesis Supervisory committee before it is forwarded to the examination committee.

NOTE: that “Bioinformatics Graduate Program” must appear on the title page of the thesis if the Bioinformatics student is registered at UBC in the Bioinformatics Graduate Program. Requirements for SFU students are outlined on a thesis template available through that institution’s library.

7. **Thesis Examination Procedure**

M.Sc. Defense:

- (a) Student submits thesis to supervisory committee and obtains committee approval for defense.
- (b) Student consults home university department for relevant thesis examination requirements.
- (c) Student or supervisor notifies the program coordinator of the examination committee, date, time, location and thesis title. Room bookings can be arranged by the home department or by the program coordinator at the Genome Sciences Centre, BCCA. Approximately two weeks notification is required in order to make arrangements. Defense is open to the university community.
- (d) An **exit seminar** is required to be completed in advance of the thesis defense – program coordinator/home department need at least two weeks prior notification. Seminar can be done in the home department or at the GSC. Seminar is open to university community and public.
- (e) Student submits the number of copies required by the home institution.
- (f) Upon successful completion, student is reminded to apply for graduation.

Ph.D. Defense:

The student should follow the instructions and procedures required by their home University and relevant department.

9. **Copies of Thesis**

The student is responsible for submitting the required copies of the thesis to their home university, according to the institution’s deadline. The Program also requires a PDF format of the thesis to be provided to the program coordinator.