Joint Carnegie Mellon University – University of Pittsburgh Ph.D. Program in Computational Biology



Student and Faculty Handbook

Degree Programs Covered by This Handbook:
Joint Carnegie Mellon-University of Pittsburgh Ph.D. Program in Computational Biology

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Contents

1 Welcome & Introduction **4**

2 Program Vision, Mission, and Values **5**

3 Degrees Offered **6**

4 Departmental Personnel **7**

5 Departmental Resources **8**

6 Committees **9**
- 6.1 Executive Committee . . . 9
- 6.2 Admissions Committee . . . 9
- 6.3 Curriculum Committee . . . 9
- 6.4 Seminar Series Committee . . . 9
- 6.5 Professional Development Committee . . . 9
- 6.6 Diversity and Inclusion Committee . . . 10
- 6.7 Steering Committee . . . 10

7 Advising **11**
- 7.1 Role of an Advisor and Advisor Assignments . . . 11
- 7.2 Advisor/Advisee Collaboration . . . 12
- 7.3 Review/Redress of Academic Conflicts . . . 13
- 7.4 Policy on Monitoring of Student Progress . . . 13
- 7.5 Policy and Procedures for Changing Advisors: . . . 14

8 Doctoral Degree Requirements **16**
- 8.1 Residency Requirements . . . 16
- 8.2 Expected Timeline . . . 16
- 8.3 Registration Process . . . 16
- 8.4 Required Units for Degree Attainment . . . 17
- 8.5 Core Courses . . . 18
- 8.6 Electives . . . 19
- 8.7 Program Policy on Double Counting Courses . . . 19
- 8.8 Program Policy for Courses Outside the Department/College . . . 19
- 8.9 Course Exemptions . . . 19
- 8.10 Protocol for Evaluation of Transfer Credit . . . 20
- 8.11 Teaching Requirements/Opportunities . . . 20
- 8.12 Research Requirements/Opportunities . . . 21
- 8.13 Internship/Co-op Requirements and Opportunities . . . 22

9 Dissertation Preparation & Requirements **23**
- 9.1 PhD Qualifying Exam Requirement . . . 23
- 9.2 PhD Criteria for Advancement to Candidacy . . . 24
- 9.3 PhD Dissertation . . . 25

10 Program Policies & Protocols **27**
- 10.1 Program Policy for Withdrawing from a Course . . . 27
- 10.2 Process for Completing a Master's Degree en route to a PhD . . . 27
- 10.3 New Policies / "Grandfather" Policy . . . 27
- 10.4 Time Away from Academic Responsibilities . . . 27

11 Grading & Evaluation **28**
11.1 Grading Scale/System . . . 28
11.2 Program Policy on Grades for Retaking a Course . . . 28
11.3 Program Policy on Pass/Fail, Satisfactory/Unsatisfactory . . . 28
11.4 Program Policy for Incompletes . . . 28
11.5 GPA Requirements and QPA Requirements for Graduation . . . 28
11.6 Regular Reviews and Evaluations by Program . . . 28

12 Funding & Financial Support **33**
12.1 Statement of Department Financial Support . . . 33
12.2 Stipend . . . 33
12.3 Health Insurance Requirement . . . 33
12.4 Department Fees . . . 34
12.5 Travel/Conference and Research Funding . . . 34
12.6 Additional Sources of Internal & External Financial Support . . . 34
12.7 Program Policy on Outside Employment . . . 34

1 Welcome & Introduction

Welcome to the Joint Carnegie Mellon University-University of Pittsburgh Ph.D. Program in Computational Biology (CPCB). Computational Biology is a field that encompasses a wide range of topics, ranging from molecular modeling and protein dynamics to large-scale analysis of genome/proteome data. This program brings together researchers from two leading research universities to provide a broad training program in this rapidly developing field.

The goal of this handbook is to provide as complete a description as possible for program students and faculty of each aspect of the program with a particular emphasis on the requirements and procedures involved. This handbook is updated on a yearly basis, but some information, particularly regarding individual courses, is subject to change. Please consult the program web site for the latest information and feel free to contact the program directors and coordinators about any questions, issues, or suggestions that you may have. We welcome your feedback and look forward to working with you!

Dr. David Ryan Koes, Program Director
University of Pittsburgh

Dr. Carl Kingsford, Program Director
Carnegie Mellon University

While this handbook is specific to your academic experience in the department, it is just one element of the Graduate Student Handbook Suite. There are several other resources within the suite that you should consult when needed. The home school University policies may supersede program policies. Please references University policies below:

- **CMU** University-Wide Graduate Student Handbook (Office of Graduate & Postdoctoral Affairs): `https://www.cmu.edu/graduate/resources/index.html`
- **CMU** The Word Student Handbook: `http://www.cmu.edu/student-affairs/theword/index.html`
- **PITT** Graduate Student Policies and Regulations (Office of the Provost, Graduate Studies): `http://www.gradstudies.pitt.edu/about/student-policies-and-regulations`

2 Program Vision, Mission, and Values

The Joint CMU-Pitt Ph.D. Program in Computational Biology (CPCB) offers a Ph.D. in Computational Biology. Students receive their doctoral degree from either the University of Pittsburgh (**PITT**) or Carnegie Mellon University (**CMU**) depending on the university at which the student's Dissertation Advisor holds their primary appointment. Within **CMU**, the administrative home for the program is the Ray and Stephanie Lane Computational Biology Department and degrees are awarded by Carnegie Mellon University. Within **PITT**, the administrative home is the Department of Computational and Systems Biology, School of Medicine, and degrees are awarded by The University of Pittsburgh.

The goal of CPCB is to provide intensive interdisciplinary education to enable students to become leaders in identifying and solving tomorrow's biological problems using computational and/or mathematical methods and fundamental principles of life and physical sciences. CPCB provides students with cross-disciplinary training in established as well as newly emerging fields of computational biology. Through diversity, equity and inclusion, we strive to provide the leadership and resources necessary to ensure that all members of the program are valued and respected within CPCB through collaboration, policies, and procedures.

CPCB has instituted a curriculum that is designed to train students who will shape the next generation of discoveries in computational biology in academia and industry. The curriculum offers a set of core courses, which provide the students with fundamental concepts and methods in computational biology, and a broad range of elective courses. There are also professional development activities, which include Seminar, Presentation Class, Ethics, and Writing, and MetaSchool.

The core courses aim to provide students with a strong common background in computational biology before they specialize in a particular research area. Students receive a rigorous introduction to the basic methods of computer science in Machine Learning. The other core courses include Critical Thinking in Computational Biology; Cellular, Systems, and Molecular Modeling; and Advanced Algorithms for Biological Problems.

Students also learn advanced experimental methods for quantitative study and analysis of biological systems in Laboratory Methods for Computational Biologists. Three elective requirements allow students to acquire skills and knowledge that are most relevant to their research interests. One elective must be a Life Science elective, a graduate course primarily taught for non-computational graduate students, selected from a list of approved courses. The Curriculum Committee maintains a list of relevant elective courses that students may choose from, but students may select any course offered at the Pitt or CMU that meets their research and training needs.

A comprehensive examination is conducted between the fifth and seventh semester in the program. This examination entails the preparation of a Dissertation Proposal and an oral defense of this proposal to a committee comprised of program faculty and an external member. As they approach the end of their doctoral studies, students are mentored toward finding faculty or postdoctoral positions in academia, or positions in the biotechnology and pharmaceutical industries. The doctoral degree is awarded upon submission and oral defense of the Dissertation.

3 Degrees Offered

Upon completion of the degree, students enrolled through **CMU** will receive a Doctor of Philosophy Degree in Computational Biology from Carnegie Mellon. Students enrolled through **PITT** will receive a Doctor of Philosophy in Computational Biology from The University of Pittsburgh.

4 Departmental Personnel

PITT	CMU
David Ryan Koes, PhD, Director, CPCB Associate Professor, Computational and Systems Biology Dept. School of Medicine University of Pittsburgh 10188 Fifth & Halket 3396 Fifth Ave. Pittsburgh, PA 15213 412-648-8171 (phone) dkoes@pitt.edu	Carl Kingsford, PhD, Director, CPCB Herbert A. Simon Professor of Computer Science, Ray and Stephanie Lane Computational Biology Dept. School of Computer Science Carnegie Mellon University 7719 Gates Hillman Complex 4902 Forbes Ave. Pittsburgh, PA 15213 412-268-1769 (phone) carlk@cs.cmu.edu
Shikhar Uttam, PhD, Associate Director, CPCB Assistant Professor, Computational and Systems Biology Dept. School of Medicine University of Pittsburgh Research Pavilion, Suite 2.6f 5117 Centre Ave. Pittsburgh, PA 15213 412-623-7986 (phone) shf28@pitt.edu	Oana Carja, PhD, Associate Director, CPCB Associate Professor, Ray and Stephanie Lane Computational Biology Dept. School of Computer Science Carnegie Mellon University 7413 Gates Hillman Complex 4902 Forbes Ave. Pittsburgh, PA 15213 oana@cmu.edu
Kelly M. Gentille, Program Manager Computational and Systems Biology Dept. School of Medicine University of Pittsburgh 10122 Fifth & Halket 3396 Fifth Ave. Pittsburgh, PA 15213 412-648-8107 (phone) kmg120@pitt.edu	Nicole E. Stenger, Program Manager Ray and Stephanie Lane Computational Biology Dept. School of Computer Science Carnegie Mellon University 7721 Gates Hillman Complex 4902 Forbes Avenue Pittsburgh, PA 15213 412-268-3779 nstenger@cs.cmu.edu

5 Departmental Resources

Department Computer Clusters:

CMU – LaneCluster: SCS Help Desk (help@cs.cmu.edu, ext. 4231)
PITT – Gengkon Lum (gengkon@pitt.edu)

Lab/Office/Studio Space:

CMU – Janet Garrand (jgarrand@cs.cmu.edu)
PITT – Haniza Yaacob-Ritz (haniza.yaacob-ritz@pitt.edu)

Key/Access Card Distribution:

CMU – ID Card Services (The Hub) - https://www.cmu.edu/idplus/
PITT – Panther Central - https://www.pc.pitt.edu/panther-card
For a sponsored ID cards (CMU cards for Pitt students and **PITT** cards for CMU students) – please get a sponsored ID card from Nicole Stenger (nstenger@cs.cmu.edu) or Kelly Gentille (kmg120@pitt.edu). For building access to Murdoch/BST3 contact Jennifer Watt (jcwatt@pitt.edu).

Purchasing and Reimbursement Procedures and Policies:

Both Universities have detailed and strict policies relating to the purchase of goods, services, equipment, etc. whether using a general ledger account, restricted accounts or grants. There are also reimbursement policies, along with tax exempt considerations.

For **CMU** purchasing, please see your Advisor's Administrator: https://cbd.cmu.edu/people/admin-staff.html
For **PITT** purchases, please see Kelly Gentille: kmg120@pitt.edu or Amanda Axelson: AMA251@pitt.edu

Building Security, Repairs and Services:

For **CMU**: fixit@andrew.cmu.edu (for general repair services) and building@cs.cmu.edu for building related issues. For security, contact: campuspd@andrew.cmu.edu or (412) 268-2323
For **PITT**: For Murdoch Building - Michael Moore 412-779-0257, for BST3 – Lori Burns, lburns@pitt.edu. For security or police, contact: Pitt Police at 412-624-2121 or 911. For Non- Emergency: 412-624-4040 or police@pitt.edu

Graduate Student Organizations:

CMU Graduate Student Assembly: https://www.cmu.edu/stugov/gsa/
PITT Biomedical Graduate Student Association: https://experience.pitt.edu/bgsa/home/

CPCB Graduate Student Representatives:

http://www.compbio.cmu.edu/people/committees/

Press and Media Relations:

CMU: https://www.cs.cmu.edu/news/scs-media-kit-press-contacts
PITT – Jamie Brian, Communications Specialist jlb486@pitt.edu

University Brands and Logos:

CMU: https://www.cmu.edu/brand/
PITT: https://www.brand.pitt.edu/

6 Committees

To better provide rigorous training for our students, CPCB has established seven committees. Committee members can be found at: `http://www.compbio.cmu.edu/people/committees/`.

6.1 Executive Committee

Responsibilities: The Executive Committee oversees the program and approves major changes to the program structure and policies. The Executive Committee ensures that the program is maintained within the general guidelines of the goals and objectives of both universities. The Executive Committee consists of the two Directors of the program, any Associate Directors, and up to eight Faculty members named by the senior administration of the two universities. It is composed of an equal number of Faculty members from Pitt and CMU, and within Pitt it includes members from the SOM and the School of Arts & Sciences. The committee is expected to meet at least annually, although additional meetings will occur as needed. In addition, issues not requiring face-to-face meeting will occasionally be discussed and/or decided via email or teleconference.

6.2 Admissions Committee

Responsibilities: The Admissions Committee is responsible for reviewing applications to the program. It consists of a total of 8 faculty members named by the Directors (4 from each university), including two chairs (one from each university). The committee will also include 8 student members (4 from each university). Faculty will normally serve on the Admissions Committee for a three-year term, and students for a one-year term. The committee will meet the second or third week in December and again twice in January. The committee may additionally be consulted for admissions-related questions or decisions outside the normal admissions season. Details on admissions policies and the role of the Admissions Committee in applying them are provided in the next section.

6.3 Curriculum Committee

Responsibilities: The Curriculum Committee is responsible for maintaining and revising program elective course menus and for making recommendations about curriculum modifications or additions to the program Directors and Associate Directors. The committee consists of 4 faculty members (2 from each university), including two chairs (one from each university). The committee will also include 2 student members (one from each university). The committee will meet at least twice per year prior to the beginning of the Fall and Spring terms (around the time that courses open for registration) to identify courses that qualify for each of the elective menus and to disseminate these lists to students and faculty.

6.4 Seminar Series Committee

Responsibilities: The Seminar Series Committee is responsible for selecting and organizing the Seminar Series speakers, with the aim of providing a slate of speakers representing diverse research areas and speaker backgrounds. This committee will meet at least twice per year during the first week of August and the first week of April to select candidate speakers for the following term.

6.5 Professional Development Committee

Responsibilities: The Professional Development Committee is responsible for organizing professional development activities for first through fourth year students, which include the Journal Club, Presentation Class, and MetaSchool.

6.6 Diversity and Inclusion Committee

Responsibilities: The CPCB Diversity and Inclusion (D&I) committee includes students and faculty from diverse backgrounds and seeks to ensure that all members of the CPCB program are valued, respected, and provided with resources to succeed. The committee acts as an interface between the student body and program leadership to ensure that any concerns regarding diversity, equity, and inclusion within the program are brought up to program leadership. The committee is not a replacement for university resources, and proper avenues should still be used when reporting discriminatory behavior.

6.7 Steering Committee

Responsibilities: The Steering Committee is comprised of the Directors and Associate Directors at both Universities, both program managers, and two committee appointed senior- level students (students are only eligible if they've successfully completed all program course requirements and proposed their thesis). The Steering Committee makes decisions specific to the CPCB Ph.D. program that do not require the attention of all the faculty and students.

7 Advising

7.1 Role of an Advisor and Advisor Assignments

Advisor Responsibilities:

The primary Dissertation Advisor(s) of a student will serve as the student's academic advisor and will guide the student through the execution of his/her Dissertation project. In addition to monitoring the student's progress, the academic advisor will also serve as faculty contact for the student if significant problems arise. Where appropriate, a co-advisor from a complementary discipline (e.g., a primary mentor in computational work and secondary in wet lab experimental work) may be selected to promote interdisciplinary collaboration and training or two advisors may jointly advise a student.

Training Faculty:

A current list of the training faculty and their interests can be found at http://www.compbio.cmu.edu/faculty-list/. An outstanding group of over 100 CPCB training faculty from diverse backgrounds and schools at the two universities provide ample opportunities for cutting edge thesis projects in well-funded research groups. The research interests of the faculty span a broad spectrum of computational biology fields, including computational genomics, computational structural biology, cell and systems biology, biological physics, and bioimage informatics.

Selection Criteria:

A training faculty for the CBCB program must be a member of the graduate faculty of either CMU or Pitt and must do research that involves a significant component toward the development and/or application of computational methods for the analysis of biological data and the modeling of biological systems.

Process for Appointment and Removal:

Training faculty members may be added by requesting membership in an email to the Program Directors that includes a current CV. Training faculty members may be removed by request of the faculty member or decision of the Directors or Executive Committee.

Advisor Assignments:

Directed Studies/Rotations Students are required to do three research rotations with program faculty during their first semester unless they have direct matched to an advisor (which requires approval from both the advisor(s) and the Department head of the program before the start of the rotation schedule). During each rotation, the student and a faculty member will work together on research projects to determine whether there is mutual interest in the student joining the faculty member's group. When a suitable match hasn't been found after the three rotations, additional rotations will be approved for their second semester.

The duration of each research rotation will be at least four weeks, and it will give the student the opportunity to explore research projects in three different groups. At the end of the rotations, students will go through the student-advisor matching process. The precise start and end dates of the rotation periods will be set by the Directors and Associate Directors and announced to the students prior to the start of the fall term. Potential advisors may be selected from amongst the rotation mentors or other faculty based on the student-faculty interactions (in program activities) during the rotations period.

Students who are not matched after completing three rotations in the Fall semester will perform additional rotations in the Spring semester. Unlike the Fall rotations, which are scheduled in advance, Spring rotations, if needed, will be on a rolling basis with the goal of matching the student as soon as possible. Students who are not matched at the end of the Spring semester of their first year may be terminated from the program.

Identification of a dissertation laboratory for thesis research is a requirement in order to pass the preliminary examination[1] at the end of first year of a PhD program.

7.2 Advisor/Advisee Collaboration

Advisor agreement:

Upon matching with a student in the program, advisors must sign and return the CPCB Advisor Agreement Form (https://www.compbio.cmu.edu/current-student- resources/forms.html) committing to the goals of training, supporting, and mentoring Ph.D. students. The advisor commits that their responsibility is to train, mentor, and support the student. The advisor further acknowledges that students are part of the program to receive training and career development and not only to execute the advisor's research program.

Policy on matching of students and advisors:

Prior to admission, applicants may express their interest in being advised by any member of the training faculty and faculty members may express a desire to advise a given applicant.

Faculty members, however, may not provide opinions to applicants on likelihood of admission. A student may select an advisor from either university, subject to approval by the Directors, regardless of the university to which they are enrolled. Advisor matching for each student will follow the procedure of the university in which the student is enrolled, as outlined below. In the event matching is to an advisor at the university at which the student is not registered, registration will be transferred as of the start of the next academic term.

Students admitted into the program may express interest in being advised by any member of the training faculty, and faculty may express their interest in advising any accepted student. Accepted students may therefore receive one or more letters from potential advisors to welcome them into the program and to possibly invite them to join their research group or, to offer them the opportunity to do a rotation in the advisor's group. Such welcome letters are strongly encouraged any time after the admission decision and before the start of the program rotations. Faculty members must acknowledge their acceptance of program policies (including financial responsibility) and obtain written approval from the Directors prior to extending an invitation to a student to join their research group. Invitations to do rotations do not require prior approval.

Students who have accepted admission may choose to accept an invitation to join a specific research group any time prior to the beginning of the Fall term semester (minimum of 1 credit/3 units of Directed Study). A student accepting such an invitation will not be required to do rotations.

Directed Studies/Rotations:

Students are required to do three research rotations of at least four weeks each in the Fall term and, with permission, additional rotations in the Spring term according to the schedule arranged by the Directors.

Students are to provide the Directors with a ranked list of rotation choices (noting if potential advisors have already offered a rotation) by 5:00 pm on the Monday after the Fall Retreat and faculty must provide the Directors with a ranked list of students that they are willing to supervise for rotations (noting to which they have already offered a rotation) by the same deadline. The Directors will create a schedule based on these lists and inform students and faculty. The order of the rotations will be determined as needed to accommodate schedules.

During each rotation, the student and a faculty member will work together on research projects to determine whether there is mutual interest in the student joining the faculty member's group. When a suitable match hasn't been found after the three rotations, additional rotations will be approved for their second semester.

[1] "Preliminary examination" is specific **PITT** terminology for evaluation of first year performance.

The duration of each research rotation will be at least four weeks, and it will give the student the opportunity to explore research projects in three different groups. At the end of the rotations, students will go through the student-advisor matching process. The precise start and end dates of the rotation periods will be set by the Directors and Associate Directors and announced to the students prior to the start of the fall term. Potential advisors may be selected from among the rotation mentors or other faculty based on the student-faculty interactions (in program activities) during the rotations period.

If a student chooses to do rotations, matching that student to advisors will be performed only after all the planned rotations have been completed. At the end of the third rotation period, each student will provide the Directors with a list of advisors with whom they would like to work (ranked in order of preference). In parallel, faculty will provide the Directors with a list of students (ranked in order of preference) whom they are willing to advise and the total number of students whom they wish to support. Potential advisors may not make a direct offer to a student but should rather communicate to the Directors how many (total maximum number) and which students they are willing to advise and any preferences among these students. The Directors and Associate Directors will then match students and advisors and inform each student of the advisor to whom they have been assigned.

Students who are not matched after completing three rotations in the Fall semester will perform additional rotations in the Spring semester. Unlike the Fall rotations which are scheduled in advance, Spring rotations, if needed, will be scheduled on a rolling basis with the goal of matching the student as soon as possible. Students who are not matched at the end of the Spring semester of their first year may be terminated from the program.

Each student must accept an advising offer or be assigned to an advisor by the end of the Spring semester of their first year. Failure to secure an advisor by this time is grounds for dismissal from the program, although the Directors may grant extensions as circumstances warrant.

It is recognized that there may be circumstances in which it is appropriate for a student to change Dissertation Advisors. The process for advisor changing is detailed in Section 7.5 of this handbook.

It is also possible for a student to have two advisors. These may be co-advisors, when the student will be working on a project jointly conducted and supported by two faculty members. Alternatively, one faculty member who will assume scientific and financial responsibility may serve as the primary advisor, and a second as the secondary advisor. The student will be enrolled in the University of their primary advisor. At least one advisor must be CPCB training faculty.

7.3 Review/Redress of Academic Conflicts

Should disagreements about academic credit or research direction or other academic conflicts arise, students should first discuss the issue with their advisor and attempt to resolve it. If they are not comfortable discussing the issue with their advisor (or should the issue not be resolved by that discussion) they should reach out to a Director or Associate Director to discuss.

At any time, a student may reach out to the relevant department head or the program ombudsperson to discuss the issue.

Should they feel it is warranted, students are encouraged to use the relevant ethics and misconduct reporting mechanisms at their university.

7.4 Policy on Monitoring of Student Progress

The progress of each student towards completion of the program requirements will be recorded in a student progress-tracking database.

Each student will be evaluated by the entire program faculty during a faculty meeting at the end of the Fall and Spring semesters, and the results of this evaluation will be communicated to each student in the form of a letter from the Directors on behalf of the entire faculty.

Each advisor will submit a written evaluation of the student's progress and an overall recommendation (satisfactory, unsatisfactory), listing any significant accomplishments and/or deficits, in advance of the evaluation meeting. This evaluation is independent of the student's academic performance. Students who are found by the program faculty to have made Unsatisfactory Progress shall receive written notice of this finding, including a list of measures that need to be taken in the next semester to be considered to have made Satisfactory Progress upon the next evaluation. A student found to have made Unsatisfactory Progress for two or more consecutive semesters can be dismissed from the program.

Before the meeting, the program coordinators, in consultation with the Directors, will evaluate student academic performance and determine whether the student should be placed on academic probation (see Academic Policies and Procedures).

Advisors are encouraged to communicate to the students their personal progress evaluations, suggestions for future directions, and measures to be taken to remedy any deficits. At the discretion of the advisor, copies of such communications may be provided to the program Directors for placement in the student file.

After successful completion of the Dissertation Proposal Exam, the student's Dissertation committee shall meet with the student at least once per year, and more often if desired or needed. Prior to the meeting, the student shall prepare a written report (which may be in the format of slides) briefly outlining the goals of their project, summarizing cumulative progress to date, and detailing progress since the last committee meeting. **It is the program policy to have a penultimate Dissertation Committee meeting with the student, where the Committee determines whether a thesis is ready for defense.**

For **PITT** students: The committee shall complete and sign the appropriate forms documenting that the meeting has taken place and indicating whether progress is Satisfactory or Unsatisfactory. If progress is Unsatisfactory, the committee should indicate on the form or as a supplement those measures that need to be taken in the next semester to be considered to have made Satisfactory Progress upon the next evaluation. While a student is making Unsatisfactory Progress, committee meetings must take place at least once per semester.

7.5 Policy and Procedures for Changing Advisors:

Research and advising fit is a key component of the Ph.D. process.

An advisor may indicate that the research goals or advising fit of the student and the advisor have diverged at a Graduate Student Review meeting, and that they no longer wish to advise or financially support the student.

If the advisor wishes to end the advising relationship, the advisor should present this request at a Graduate Student Review meeting, and if it is approved by the faculty, the advisor should have a 1-on-1 meeting with the student to discuss the situation, inform them of the faculty's recommendation, and explain the reasons.

It is expected that advisors work to resolve challenging situations and that requesting to end the advising relationship should be a last resort or based on true divergence of interests.

The program recognizes that students and advisor interests or styles may diverge through no fault of any party, and the severing of an advisor relationship is not to be taken as any reflection on the capabilities of the student or the advisor.

The current advisor is financially responsible for the student until a new advisor is approved by the directors and department heads or until the next Graduate Student Review meeting, whichever comes first. While supported by their previous advisor, the student is expected to continue to make research progress.

Failure of the student to secure another advisor by the end of financial support is grounds for being dropped from the program.

Students may initiate a change of advisor at any time, for any reason. To do so, they should secure an agreement from a new advisor to take on their advisorship (along with its financial responsibility). They should then have a 1-on-1 discussion with their current advisor to discuss the situation and inform the advisor of their decision. If the student's decision stands following the 1-on-1 meeting, the student should email their current advisor, the CPCB directors, the relevant department head, and their proposed new advisor in a single email to request a change of advisors.

Again, the program recognizes that students may desire to change advisors for a myriad of reasons, and the request to change advisors is not to be taken as a reflection on the capabilities of the student, the current advisor, or the proposed new advisor.

Advisor changes (whether initiated by the student or the advisor) are subject to approval of the CPCB directors and the relevant department head, who will consider scientific fit, the student's educational and training goals, and financial support when considering the advisor change request.

8 Doctoral Degree Requirements

8.1 Residency Requirements

The universities require PhD students to have a minimum of one year in residency on campus. Advisors may have additional expectations about students being on campus.

U.S. government regulations require F-1 and J-1 international students to be enrolled in an in-person degree program, with in-person expectation coursework. Even though this immigration requirement is specifically for international students, residency requirements in a degree program must be consistent for both international and domestic students.

8.2 Expected Timeline

The goal of the Program is that students finish their degree within 5 years of starting the program. However, it is recognized that achieving this goal is dependent on the specific type of research undertaken. In all cases, the degree must be completed within the timeline allowed by the PhD Statute of Limitations of the university at which the student is registered.

While in good standing, students are guaranteed to receive funding and support for **five** years.

After five academic years (not counting time on leave), at the request of their advisor and the agreement of the faculty at the Graduate Student Review, students may be placed on *in absentia* status (ABS). To be placed on ABS status, the student must have completed all their degree requirements except for the penultimate committee meeting and/or the defense of their dissertation. In addition, the Graduate Student Review letter in the semester prior to being placed on ABS status must have communicated the intention to place the student on ABS at the conclusion of the following Graduate Student Review.

In this status, the student remains in good standing with the program but will no longer receive a stipend or tuition support. The expectation is that students will move on to other engagements at this time. They may no longer take classes or substantially use university resources. However, they are encouraged to continue to have committee meetings, to schedule a penultimate committee meeting, and to defend their dissertation.

All But Dissertation/Absentia Status:

Availability and implications of all but Dissertation (ABD) and absentia (ABS) status will be governed by the rules of the university at which a given student is registered. The relevant policies for **CMU** can be found here: `http://www.cmu.edu/hub/registrar/registration/abd.html`

FTDS:

Any full-time **PITT** graduate researcher who has completed all credit requirements for the doctoral degree, including any minimum Dissertation Studies credit requirements (40 Dissertation Study credits), and is working full time on a Dissertation may register for Full Time Dissertation Study (FTDS).

The relevant policies for **PITT** can be found here (see sections "Registering for Full-Time Dissertation Study" and "Statute of Limitations/Leaves of Absence"): `http://www.bulletins.pitt.edu/archive/2011/graduate/regulations2.html`.

8.3 Registration Process

It is the student's full responsibility to register for their courses:

CMU students should follow the guidelines set by The Hub: https://www.cmu.edu/hub/

PITT students should follow the guidelines set by Enrollment Services: https://www.registrar.pitt.edu/students/enrollment

All students are to be cross-registered each semester for one course to maintain their status at the other University via the Pittsburgh Council on Higher Education (PCHE): `https://pche-pa.org/`

8.4 Required Units for Degree Attainment

Students are required to complete 72 credits/216 units of academic work towards partial fulfillment of the requirements for completion of Dissertation Study. Of these, a minimum of 27 credits/81 units must be fulfilled by formal coursework. This includes five core courses, two open electives, and one life sciences elective. In addition, all students must complete an approved Ethics course, Writing Workshop, Presentation Class, and must attend the CPCB Seminar Series in the Fall and Spring. The remaining credits/units will be completed with full-time research. Waivers or temporary deferral of specific requirements may be possible, given a sound educational justification, through petition to the program Directors.

There are different guidelines and requirements for MSTP students. This includes a reduced course load and accelerated thesis timeline:
`https://www.compbio.cmu.edu/prospective-students/medical-scientist-training-program.html`.

PITT Preliminary Examination

A student's performance in their course work, research rotations, and directed research during their first year as evaluated during the Graduate Student Review will be considered their preliminary examination. Successful completion of the preliminary examination milestone requires that the student must have identified a laboratory for their dissertation research. Inability to do so could result in dismissal from the graduate program and hence the University of Pittsburgh. The Program Director must sign the Preliminary Examination milestone form.

Coursework:

Students will normally be expected to take two core courses in the first semester and conduct limited research (either directly with an advisor, or through rotations). In the second semester, they are normally expected to take two more courses, thus completing their core courses, and spend the remaining time on research. In their second year, students will take the required Lab Methods course along with electives.

In some cases, a student whose background is more limited in biology, computer science, or the physical sciences, may delay a core course for a year to pursue basic course work in one or more of these areas. Such basic courses will not normally count towards program requirements, unless the course is selected from approved courses of the CPCB curricular menus, or the student successfully petitions the Directors to allow the course to be counted in lieu of an existing degree requirement. Such a student will take a mix of core courses and other courses that will help them bridge this knowledge gap. These students will complete the remaining core courses and electives in the third and fourth semesters (along with a minimum of 50% research).

Training in Ethics:

Ethical conduct and scientific integrity are an essential aspect of research. This is especially important given the competitive nature of funding processes and the high demand for productivity. Hence, the program aims to help students understand the significance and practice of ethical conduct. This will be accomplished as follows:

Students will be required to take an appropriate course in scientific ethics, which introduces ethical issues and ethical reasoning that arise when conducting or overseeing research. The expected course to meet this requirement is *02-735 Ethics in the Practice of Computational Biology* , but alternative courses may also fulfill this requirement.

Students will complete any university-mandated education and certification program in research practice fundamentals.

Writing Course:

The CPCB Writing Workshop is designed to introduce students to the basics of descriptive scientific writing, grantsmanship, the grant review process, and other related topics that will help them present their research and ideas in an impactful and persuasive way. This summer mini- course held in the second 4-week summer session is a required 1-credit, pass/fail course for CPCB students.

Coursework:

Students who have completed all core courses in the first year will complete their coursework in the subsequent years by taking a total of three elective courses drawn from lists approved by the Curriculum Committee: one Life Sciences elective and two Open Electives, which should be graduate level courses relevant to the student's research interests. Students who have not completed the core courses will do that in the second year (together with taking additional elective courses).

Directed Studies/Dissertation Research:

After the first two semesters and prior to the successful completion of the Dissertation Proposal, students must be enrolled in a minimum of 4 credits/12 units of Directed Study in each semester.

After successful completion of the Dissertation Proposal Exam, students must be enrolled in a minimum of 6 credits/18 units of Dissertation Study in each semester.

Annual Program Retreat:

A program retreat is held each year in the second half of August prior to the beginning of the Fall semester and provides a forum for discussing research topics and socializing. New students can learn about research topics of faculty who are considering accepting students, helping them make more knowledgeable choices about rotations and potential advisors. All students are expected to attend each year.

Program Seminar Series:

Students enrolled in the program will be expected to attend scientific seminars offered through the program seminar series during all years of training. This requirement may be waived at the discretion of the program Directors if there is compelling research or educational justification, such as a conflicting class important to the student's research.

Professional Development:

Effective presentation of scientific data is an invaluable aspect of graduate training. Starting in the fall of their 2^{nd} year, all students will participate in Journal Club and Presentation Class. Each semester, each student will present a scientific article on a topic that introduces students to the methodology and applications of computational biology (Journal Club) or present a current research project (Presentation Class). The talk will be given in a format that allows students to develop their presentation skills.

8.5 Core Courses

The core courses aim to provide a strong background in computational biology before students specialize in a particular research area, consistent with the goal of the program stated above.

Students are expected to take the non-Lab Methods core courses in the first year unless they are advised to take additional courses before taking one or more core courses.

The core courses are listed below:

1. Machine Learning (CMU 10-701)
2. Critical Thinking in Computational Biology
3. Cellular, Systems, and Molecular Modeling
4. Advanced Algorithms for Biological Problems
5. Laboratory Methods for Computational Biologists (CMU 02-760 / Pitt MSC/CMPBIO 2050)

8.6 Electives

In addition to the five core courses, each student will be required to take at least three graduate elective courses (i.e., at least 9 credit hours). At least 3 credits/9 units must be drawn from a specific menu of life sciences classes (life sciences elective). At least 6 credits/18 units must be from graduate level classes relevant to the student's research.

A list of possible elective courses approved can be found on the program website `http://www.compbio.cmu.edu/curriculum/electives/`. Some courses may offer less than 3 credits/9 units and need to be combined with others to yield the required number of credits or units. Students should note that elective menus will evolve over time and that student input is an important part of this evolution; students may propose changes to any elective menu by making a request to the Curriculum Committee.

One elective must be a life science course selected from a menu of courses on the website. Students may petition to substitute an unapproved course for one of the menu classes provided there is a valid educational reason, and the chosen course fulfills the purpose of a life science elective. Such a petition must be submitted in writing to the Directors prior to the start of the term in which the course is offered.

Two additional graduate elective courses should be selected in consultation with the Dissertation Advisor. These must be graduate level courses related to the students research and training objectives.

Curriculum and Elective information can be found on our website: `https://www.compbio.cmu.edu/curriculum/curriculum-overview.html`.

8.7 Program Policy on Double Counting Courses

Some students will have taken some of the required core courses at CMU or Pitt before entering the PhD program: for example, as a MS student entering the PhD program or coming in from another MS program at Carnegie Mellon or the University of Pittsburgh. If students have previously taken the above-named courses at Carnegie Mellon or the University of Pittsburgh before joining the program, those may be used to satisfy the requirements and do not need to be repeated in the PhD program.

8.8 Program Policy for Courses Outside the Department/College

Some students will have taken similar courses at other universities before entering the PhD program. Based on such equivalent coursework, any student can apply to replace (not reduce) up to two courses with open electives. Students who want to apply for course replacement should send a formal request for approval to the Program Directors containing (1) their transcripts, (2) course descriptions for the previous courses and (3) names and course numbers of proposed replacements.

8.9 Course Exemptions

Waiving a course is rare and will only be considered on a case-by-case basis. PhD students who follow their advisors from another university and enter the PhD program are considered exceptional cases and will be reviewed by the Program Directors on an individual basis to determine course waivers.

8.10 Protocol for Evaluation of Transfer Credit

The CPCB Program does not accept transfer credit unless a student is being considered for acceptance as a transfer student from another Ph.D. program. Requirements may sometimes be replaced if students have taken equivalent coursework elsewhere. The Directors of the program will decide whether a certain course may be replaced based on the accreditation of the institution offering the course, the course description, the grade in the course, the course syllabus, and other student work products. A Transfer Student Checklist must be completed and signed by the admissions committee chairs and the program Directors before an offer can be made.

Those students should complete the Transfer Student Checklist on the website: `https://www.compbio.cmu.edu/current-student-resources/forms.html`.

8.11 Teaching Requirements/Opportunities

All students in the program are required to participate in a teaching practicum for at least one semester during the program, typically during the second year of study. Students enrolled through **CMU** are required to complete the practicum in two courses. **PITT** students may elect to get further experience in developing their teaching skills by serving as Course Support Assistants in graduate courses. Those interested should contact their program co-directors. The teaching practicum is a programmatic training requirement and is distinct from a funded teaching assistantship. CPCB students do not receive funded teaching assistant appointments as part of this requirement.

Students completing a teaching practicum will work closely with the faculty member responsible for the course. The teaching practicum is intended to provide hands-on experience in the many activities involved in successfully administering and teaching a course. Responsibilities will vary depending on the structure and needs of the course and may include helping to design homework assignments, assessments, and other instructional materials; leading recitations, tutorials, or other instructional sessions; grading and providing feedback on student work; advising individuals or small groups of students on class projects; holding office hours or providing individual tutoring; helping organize poster sessions or other course activities; and assisting with scheduling, course logistics, or the setup and maintenance of online course resources. Students may also be asked to contribute to other activities reasonably related to the effective operation of the course. The specific mix of responsibilities should provide meaningful experience with teaching, student interaction, course organization, and the practical aspects of delivering instruction.

The practicum is not graded but is recorded as complete or incomplete. Performance in the teaching practicum is also considered as part of the student's overall evaluation of progress at the Graduate Student Review meeting.

Students, advisors, and instructors may request a particular teaching practicum assignment, but final assignments will be made by the Directors and Associate Directors based on a balance of these preferences, program and departmental needs, and student capabilities.

Evaluation and Certification of English Fluency for Instructors:

Graduate students are required to have a certain level of fluency in English before they can instruct in Pennsylvania, as required by the English Fluency in Higher Education Act of 1990. Through this Act, all institutions of higher education in the state are required to evaluate and certify the English fluency of all instructional personnel. **CMU** The full university policy can be reviewed here: https://www.cmu.edu/policies/faculty/evaluation-certification-english-fluency-instructors.html

CMU The fluency of all instructional personnel will be rated by Language Support in the Student Academic Success Center to determine at what level of responsibility the student can take on in their teaching practicum. In addition to administering the International Teaching Assistant (ITA) Test (a mandatory screening test for any non-native speaker of English), Language Support in the Student Academic Success

Center helps students who are non-native English speakers develop fluency and cultural understanding to teach successfully at **CMU**. Visit the Student Academic Success Center website for additional information: https://www.cmu.edu/student-success/

For students teaching in classes offered by **PITT**, the university policy can be found at: `https://www.policy.pitt.edu/ac-09-certification-english-language-fluency-formerly-02-02-16`.

The fluency of students will be determined by CPCB through assessment by the **CMU** Intercultural Communications Center (ICC) or the English Language Institute at **PITT**. Each student's teaching practicum assignments must meet the conditions set out by the ICC and ELI, which may include required remediation policies or limits on the type of responsibilities a given student may undertake.

The Program Coordinators will oversee the process of ensuring that all non-native English- speaking students are ITA- certified by the end of their first year. Depending on the outcome of the test, a student may be required to take additional training in English, be required to retake the ITA test, and/or be restricted regarding his or her allowed course assignments. The specific requirements or restrictions will be provided with the results of the test.

8.12 Research Requirements/Opportunities

Resources and Regulations Governing Research at **CMU**:

- Office of Sponsored Programs
- Office of Research Integrity & Compliance
- Intellectual Property Policy
- Policy on Restricted Research
- Human Subjects in Research Policy

Resources and Regulations Governing Research at **PITT**:

- Human Research Protection Office
- Office of Policy Development and Management
- University Policy on Intellectual Property
- Office of Sponsored Programs

Directed Research:

Students who have been accepted to Ph.D. candidacy will conduct research on a full-time basis. Specifically, **PITT** students are required to complete a minimum of 40 credits/120 units (9 credits/27 units per semester) of full-time Dissertation Study to meet the criteria for Dissertation Defense. Students starting their Dissertation Studies in the Spring semester of Year 2 can potentially finish their doctoral studies in four years.

Summer Research:

During the summer semester, PhD students are expected to continue research with their advisor. Students wishing to secure an external summer internship must first get the approval of both their advisor(s) and the Directors before doing so. Students must submit an Internship Approval Form for consideration: `https://www.compbio.cmu.edu/current-student-resources/forms.html`. Based on summer plans, students must register for the appropriate course: the Reading & Research course, if staying to continue research with their advisor, or 02-801, if approved for a summer external internship.

8.13 Internship/Co-op Requirements and Opportunities

Standards and expectations for internship work vary considerably from discipline to discipline, even within computational biology. Program requirements are intended to accommodate the expectations of each student's discipline. Students therefore may, with the approval of the thesis advisor and program Directors, pursue summer internships after the first year. It is the responsibility of the student and the advisor to ensure in such cases that the internship is consistent with the student's educational goals and does not compromise any intellectual property of the advisor or of the student's Dissertation work. Students are required to maintain full-time student status during the academic year.

The CPCB program is a 12-month Ph.D. program that requires students to be enrolled in summer research units/credits. External internships are approved at the discretion of the student's advisor and program Directors and are only considered if the student is in good standing in the program. If an internship is approved, it must be conducted within the guidelines of the University at which the student is registered.

Students will need to secure advance permission of their Dissertation Advisor and the Program Directors after providing them with a written description of the planned internship project and host environment (`http://www.compbio.cmu.edu/current-student-resources/forms.html`). The student will then register for three units of credit under course **CMU** 02-801 (Computational Biology Internship) or **PITT** 1 credit under course MSCBIO/CMPBIO 2085 and will need to provide a post-internship written description of the work accomplished for approval by the Dissertation Advisor or the 02-801 or MSCBIO/CMPBIO 2085 instructor of record to receive credit for the internship experience. For students enrolled at **CMU**, credits will apply towards an overall degree requirement of 120 units of research credit in either 02-900 (PhD Thesis Research) or 02-801.

International students must consult with the Office of International Education for the University at which they are registered before seeking an internship/co-op or signing an offer letter.

International students should additionally consult with their Program Coordinator 60-90 days in advance of the start of the internship to ensure that they have the proper immigration status during their internship.

Students are expected to maintain full-time student status during the academic year and so internships are therefore prohibited during the academic year.

9 Dissertation Preparation & Requirements

9.1 PhD Qualifying Exam Requirement

Procedures for Dissertation Proposal Exam:

Students are required to defend their Dissertation Proposal no later than the end of their seventh semester (Fall of fourth year) in the program. Petitions for extensions of this date must be submitted in writing to the program Directors no later than eight weeks before the end of their seventh semester in which the defense would normally occur. **PITT** *students are strongly encouraged to form their thesis committee and defend their Dissertation Proposal by the end of their fifth semester* to accumulate the necessary number of Dissertation Study credits for timely graduation (see next section). Prior to defending their Dissertation Proposal students must have completed all core courses and be in good standing with the program. The completion of all core courses and the successful defense of the Dissertation Proposal is the *Comprehensive Examination* for the CPCB students.

Dissertation Committee:

The student together with their advisor(s) should decide upon the members of the Dissertation Committee, which should consist of at least four faculty members as described in Section 9.3. One of the committee members is selected to serve as the Chair (at **PITT** this needs to be different from the advisor, at **CMU** it is traditionally the advisor). The student is responsible for obtaining the agreement of all committee members that they are willing to serve and for finding a date and time that is suitable for the whole committee. The list of committee members and the defense date should be communicated to the program Directors no later than eight weeks prior to the date on which the exam is to be taken.

Written Dissertation Proposal:

The student should prepare a written Dissertation Proposal and provide it to the Dissertation Committee no later than two weeks before the defense.

The Dissertation Proposal should consist of no more than 12 single-spaced pages with 1-inch margins. There is no limit on the number of pages used for references. The Dissertation Proposal should describe:

1. The background and significance of the proposed project.
2. The overall goal and specific aims to be accomplished.
3. The methods and approaches to be used.
4. The preliminary results that have been obtained support the feasibility of the project.
5. The way in which the results obtained will be evaluated.

Note that previous work by others (including by anyone within the advisor(s)'s group(s) other than the student defending) should be included in the background and significance section, not in the preliminary results section.

Dissertation Proposal Exam:

The Ph.D. proposal exam is an opportunity for the student to present their plan for their Ph.D. dissertation. The proposal exam consists of two parts: (1) a 12-page proposal document, and (2) a meeting with the committee at which the student will present the proposal and the committee will question the student about their plan, their research, and their background knowledge.

The proposal meeting will be structured as follows. The student should give an oral presentation of their research proposal lasting no more than 45 minutes (not counting time for questions). At **CMU**, this

presentation is open to all CPCB students, CPCB training faculty, and the members of the research groups of CPCB training faculty. At the conclusion of the presentation, non-committee audience members may ask questions. Then non-committee members are asked to leave, and the Dissertation committee will question the student on the proposed work and any related material to determine whether the proposed work is suitable for a Ph.D. Dissertation and whether the student is adequately prepared to engage in the proposed research.

All committee members must be given ample time to ask any questions that they feel are justified, and the chair of the committee is responsible for managing time and the procedures for questioning. A minimum of 2 hours should be scheduled for the entirety of the proposal. If the committee requires more time, they may schedule a continuation for additional questions/discussion.

Once the committee has asked all the questions they feel are justified, the student will leave the room, and the committee (only) will deliberate on whether the proposal, the presentation, and the answer to their questions meets their standard for passing the proposal exam. This deliberation should note positives and places for improvement. The committee will then vote on whether the student has passed, and the outcome of this vote will be communicated immediately to the student.

If the vote is negative, it must be accompanied by the reasons for the negative vote and suggestions for improvement of the proposal document, presentation, or background knowledge. The proposal exam may be taken at most twice. A negative proposal outcome is grounds for unsatisfactory progress status in the program. If the vote is positive, the committee is still encouraged to communicate suggestions to assist in the training of the student. A "conditional pass" is also possible, where the final decision about whether the student passes is conditioned on completion of a reasonable number of items that the committee clearly specifies. The chair of the committee is responsible for overseeing the completion of the appropriate paperwork and notification of the outcome of the vote to the program coordinators.

A student may retake the Dissertation Proposal exam no more than once.

Funding information in CPCB proposals:

CPCB dissertation proposal documents must include a section on planned financial support for the proposed work. This may be as simple as a single sentence referencing the grant that will support the work, or a stipulation that the advisor supports the work and commits to funding it. The point is that the proposal must make a case (briefly) that the work can be financially supported in some fashion and that it aligns with the available funding support.

This support is evaluated as part of the evaluation of the proposal. This statement may reference planned fellowship or other submissions — the likelihood of receiving such fellowships or other support is part of the evaluation of the proposal.

While the proposal contents remain the responsibility of the student, the advisor should assist the student in writing the financial support section, for example, by providing the relevant funding information.

The funding-related contents of the proposal should be viewed as an argument and evidence that the proposed work can be financially supported and that it aligns with the funded research program of the advisor, but this does not restrict sources of support or relieve the advisor from the responsibility of providing financial support.

9.2 PhD Criteria for Advancement to Candidacy

Admission to Ph.D. Candidacy constitutes a promotion of the student to the most advanced stage of graduate study and provides formal approval to devote essentially exclusive attention to the research and the writing of the dissertation. To qualify for admission to candidacy, students must be in full graduate status, have completed core course work with a minimum GPA of 3.00, and have passed the Dissertation Proposal exam.

9.3 PhD Dissertation

Dissertation Committee:

The Dissertation Committee shall consist of at least four members: the advisor(s), two faculty members from within the Program (at least one from each University), and one faculty member outside of the Program. **PITT** students must have an absolute majority of committee members (>50%) from the University of Pittsburgh graduate faculty. One of the committee members should be external to the program and – for **CMU** students – must be from another University. The Dissertation Advisor(s) is/are part of the Dissertation committee. Members of the Dissertation Committee may be the same as from the Dissertation Proposal exam; however, the student and mentor are given the option of selecting an entirely new committee.

The composition of the Dissertation Committee may change over time for various reasons. Changes to the Dissertation Committee may be made at any time prior to the Dissertation defense with approval of the Dissertation Advisor and the Directors.

Requirements:

Dissertation Studies Credits Students who have been accepted to Ph.D. candidacy will conduct research on a full-time basis. Specifically, **PITT** students are required to complete a minimum of 40 credits/120 units (9 credits/27 units per semester) of full-time Dissertation Study to meet the criteria for Dissertation Defense. Students starting their Dissertation Studies in the Spring semester of Year 2 can potentially finish their doctoral studies in four years.

Yearly Committee Meetings The Dissertation Committee shall provide mentorship and support for the student while critically evaluating the progress of the Dissertation project. To accomplish this objective, may meet with their Dissertation Committee when needed. The procedure for these meetings is described in the section on Advising and Evaluation.

Penultimate meeting of thesis committee A penultimate meeting of the thesis committee is required for students to schedule their defense. This meeting should ideally be held at least 6 months prior to the desired defense date but cannot be earlier than 1 year prior to the desired defense date.

At this meeting, the student should present their planned dissertation contents, discussing the remaining work to be completed and its timeline. The committee should then vote on whether the student should be allowed to schedule their defense. Such a vote may be accompanied by a recommended timeline, as well as recommendations for work that should be completed before the defense is scheduled. The committee should communicate the result of the vote and any additional recommendations directly to the student during the meeting. A positive vote should also be communicated by email from the committee chair to the relevant program coordinator, CCing the student.

A negative vote merely means that the committee does not yet believe that the work is ready for scheduling a defense. The committee must communicate to the student what work needs to be completed to obtain a positive vote. In this event, the penultimate meeting becomes a regular yearly committee meeting, and the student may schedule another penultimate meeting once they believe they have addressed the concerns raised. A negative vote does not need to be communicated to the program coordinator.

In general, the penultimate meeting should be held in person (either physically or virtually) to allow all committee members to ask questions and interactively evaluate the dissertation plan. If a regular committee meeting has been recently held, an email discussion may substitute for the penultimate meeting, but in this case, it is still required that the committee chair obtain and communicate a positive vote of the committee to schedule the defense.

Written Dissertation:

Each student must write a Dissertation that presents the results of a research project carried out by the student. An appropriate research project involves a substantive piece of original and independent research grounded in an appropriate body of literature. It is relevant to an identifiable field as it is currently practiced. It provides a significant contribution or advancement in that field. It is the responsibility of the student's Dissertation Committee to evaluate the Dissertation in these terms and to recommend the awarding of the doctoral degree only if the Dissertation is judged to demonstrate these qualities.

Characteristics that a Dissertation should demonstrate are:

1. The establishment of a historical context for the presentation of an innovative and creative approach to the problem analysis and solution.
2. A clear understanding of the problem area as revealed by analysis and synthesis of a broad literature base.
3. A well-defined research design.
4. Clarity in composition and careful documentation.
5. Results of sufficient merit to be published in refereed journals or to form the basis of a book or monograph.
6. Sufficient detail so that other scholars can build on it in subsequent work.

If the Dissertation is the result of a collaborative research effort, the project should be structured in such a way that the student's Dissertation results from at least one clearly identified piece of work in which the student has supplied the unquestionably major effort. The contributions of the student and the other collaborators must be clearly identified.

Published articles authored by the student and based on research conducted for the Dissertation study may be included in the Dissertation, if permitted by the policies of the student's school. In any case, the published work must be logically connected and integrated into the Dissertation in a coherent manner, and sufficient detail must be presented to satisfy the characteristics of a Dissertation. The student should be the sole or primary author of the published work. If the published articles were coauthored, the contribution of the student must be clearly delineated in the introduction so the committee can ascertain that the student's own work satisfies the requirements of a Dissertation.

Dissertation Defense:

Ph.D. candidates must communicate their written Dissertation to their Dissertation Committee at least two weeks prior to their Dissertation Defense date. If the Dissertation is not submitted to the Committee on time the Dissertation Defense may be postponed.

The Dissertation Defense is conducted by the Dissertation Committee and is open to the public. Although the committee may optionally elect for a closed defense, any member of the CPCB Training Faculty may attend and participate in the examination. The date, place, and time of the examination should be published well in advance. Other qualified individuals may be invited by the committee to participate in the examination. Only members of the Dissertation Committee may be present during the final deliberations and may vote on the passing of the candidate. A report of this examination, signed by all the members of the Dissertation Committee, must be sent to the Program Directors. If the decision of the committee is not unanimous, the case is referred to the Directors for resolution. The chair of the Dissertation Committee should ensure that the written Dissertation is in final form before requesting signatures of the members of the committee.

10 Program Policies & Protocols

10.1 Program Policy for Withdrawing from a Course

The CPCB program follows the guidelines set by the Universities for Course Changes: Add, Drop, Withdrawal & Voucher Election **CMU:** `https://www.cmu.edu/hub/registrar/course-changes/` and **PITT**: `https://www.provost.pitt.edu/sites/default/files/GSR-Academic-Regs-6-1-22-x.pdf`.

10.2 Process for Completing a Master's Degree en route to a PhD

This degree is only available to current **CMU** students in the PhD program and must be requested in writing to the program manager and Director. For students enrolled through CMU, the M.S. degree in Computational Biology will be conferred by the Computational Biology Department.

For a student to receive an M.S. degree through Carnegie Mellon University, the student must complete all core courses, all three required electives, one TA assignment and an oral proposal. The student must receive a B or better in each individual core course and B- or better in each individual elective class credited and must have received a cumulative B average or higher.

The requirement for passing an M.S. comprehensive examination is met by an oral exam based on a brief (approximately two page) proposal for the Master's thesis research. A Thesis Committee comprised of 2 committee members will conduct this examination. The scope of the Master's research proposal should be appropriate for a Master's thesis and therefore less than for a Ph.D. Dissertation. For students who transfer to the M.S. track after attempting the Ph.D. comprehensive examination, the examining committee has the option of deciding that performance in the Ph.D. comprehensive examination meets the standard required for an M.S. comprehensive examination.

10.3 New Policies / "Grandfather" Policy

When policies are changed it is because the department believes the new rules offer improvement; any such changes are communicated to the current graduate students. The students currently enrolled whose degree program is affected by a change in policy may choose to be governed by the older policy that was in place at the time they joined the department. In case degree requirements are changed and certain courses are no longer offered, the department will try to find some compromise that allows those students to satisfy the original requirements.

10.4 Time Away from Academic Responsibilities

Students receiving full financial support from their department are expected to continue research during all academic breaks, including summer, except for official University holidays. Students who wish to take limited additional time off, of no more than two weeks, must seek prior approval from their advisors. Extended leave of more than two weeks requires prior approval of the Program Directors. International students are also required to consult with the Office of International Education before planning any extended leave to ensure they are compliant with requirements of their visas and U.S. immigration law.

CMU: `https://www.cmu.edu/leadership/the-provost/campus-comms/2022/2022-03-16.html`
PITT: `https://www.gradstudies.pitt.edu/about/guidelines-policies-resources`

11 Grading & Evaluation

11.1 Grading Scale/System

All required core courses must be completed with a grade of B or better, with the sole exception of Machine Learning. Students receiving a grade of B- in Machine Learning will be considered to have met the requirement upon completion of a remedial project under the supervision of their Dissertation Advisor. Alternatively, a B grade or higher in any Ph.D. level graduate class offered by the Machine Learning Department at CMU would also be considered as satisfying the remediation requirement. For the elective courses the minimum course grade requirement is B-. Students are required to repeat any core course that they have completed with a grade less than the required minimum, preferably at the next offering of the course.

Students who do not achieve the required minimum grade in a required course, who elect to take an incomplete in a required course, or whose cumulative grade point average is below 3.0, will be placed on academic probation. Students on probation are not eligible to defend their Dissertation Proposal, or to graduate.

11.2 Program Policy on Grades for Retaking a Course

If a student fails an elective or core course, she or he will need to repeat the same or take a substitute course. There are times (at the discretion of the Directors, on a case-by-case basis) when remedial work can be done in place of retaking a course.

All grades count towards the GPA, except for repeated courses, in which case the final grade replaces the previous grade.

Students should otherwise refer to the grading policy of the university at which they took a given class, which supersedes CPCB policies.

CMU policies can found here: `http://www.cmu.edu/policies/student-and-student-life/grading.html`
PITT policies can be found here: `https://catalog.upp.pitt.edu/index.php`

11.3 Program Policy on Pass/Fail, Satisfactory/Unsatisfactory

There are also professional development activities, which include Seminar, Journal Club, Presentation Class, Writing Workshop, and MetaSchool are given a Pass/Fail grade. All other courses assign a letter grade.

11.4 Program Policy for Incompletes

Students who elect to take an incomplete in a required course will be placed on academic probation.

11.5 GPA Requirements and QPA Requirements for Graduation

All required core courses must be completed with a grade of B or better, with the sole exception of Machine Learning. Students who do not achieve the required minimum grade in a required course, who elect to take an incomplete in a required course, or whose cumulative grade point average is below 3.0, will be placed on academic probation. Students on probation are not eligible to defend their Dissertation Proposal, or to graduate.

11.6 Regular Reviews and Evaluations by Program

Every fall and spring semester the entire faculty of the program meet to collectively discuss, evaluate, and formulate advice for every doctoral candidate (Graduate Student Review). The result of the meeting is a determination of the student's status in the program and feedback about progress and performance.

PITT Student Worker Evaluation for Graduate Student Researchers (GSRs). In addition to the annual academic assessment conducted by the CPCB program, Graduate Student Researchers (GSRs) also undergo annual employment evaluations as required by University policy and the collective bargaining agreement between the University of Pittsburgh and the Graduate Student Union. Students should refer to current University guidance for information regarding the evaluation process and timelines

Purpose of the Review

It is the aim of the faculty that every doctoral candidate succeeds. Everyone admitted to the program is believed to be capable of completing their doctoral studies and obtaining a Ph.D. This biannual review helps to ensure that success.

The purpose of the review is to provide individualized advice and guidance to Ph.D. students so that they know what is expected of them in the coming semester and overall. It is not the purpose of the review to eliminate candidates from the program; this may rarely occur consequently, but it is never an objective.

Timeline for the Review

1. ∼2 weeks before student self-assessments are due, the Directors will email the students about the process, the rationale, and importance of the Graduate Student Review. At about the same time, the Directors will email the training faculty about the process, the rationale, and importance of the Graduate Student Review.
2. Student self-assessment will be due ∼three weeks prior to the Graduate Student Review. Program Coordinators will contact students who have not submitted their assessment.
3. Faculty letters will be due ∼2 weeks prior to the Graduate Student Review. By the same date, faculty will be asked to identify to the directors any student where there are issues. Program Coordinators will contact faculty who have not submitted their letters.
4. Students are divided up into 4 groups, assigning 1 group to each Director or Associate Director (D/AD). This will be done "randomly" but with Pitt-side administrators getting Pitt students, and CMU-side getting CMU students. D/ADs will shepherd their assigned students, as described below.
5. By ∼0.5 weeks prior to the Graduate Student Review, D/ADs will go through their assigned students and edit letters to make sure they are in the right format, contain all the standard language, and mention important items from the student's self-assessment. They will also identify any student that looks like they should be discussed. If a student needs to be discussed, the D/AD will reach out to the advisor and/or the student to discuss, understand the issues, and update the letter.
6. A few days before the Graduate Student Review, the D/ADs will meet to discuss any issues or problem cases.
7. A day before the Graduate Student Review, the faculty will be emailed with the discussion order, a reminder for the meeting, and asked to check their letters.
8. The Graduate Student Review is typically set around the final grade schedule at the end of each semester. Students with potential issues will be discussed first, followed by others in decreasing order of seniority. Edits to the letters will be made during the meeting.
9. Within 3 days following the Graduate Student Review, letters will be finalized, and an email will be sent to the students.

Discussion of all Doctoral students

Most doctoral candidates are making satisfactory progress toward their Ph.D. Any difficulties must be reviewed, yet the faculty discusses every case to learn about significant developments, see what strategies are

working and not, and to stay informed about everyone. The faculty's primary source of information about the student is the student's advisor but through courses, committees, and research, many of the faculty will have knowledge and perspective to impart. It is also helpful for the advisor to learn about the student from different perspectives.

Progress Status

The status indicates whether the faculty agrees that the student is making reasonable progress, doing well, and on track. The highest status is Satisfactory, and students should strive to maintain satisfactory progress throughout their doctoral studies. Each semester may be different in activities and accomplishments, but all may be satisfactory in the evaluation of the faculty. The faculty will assign a status that will be communicated in the student's semiannual review letter.

Faculty Participation

By having all the faculty meet to discuss all the students we help to ensure uniformity and consistency in the evaluation by all the different advisors. The faculty measure each student's progress against the goal of completing the program in a reasonable period. In their evaluation, the faculty consider courses taken, directed research, teaching if applicable, skill development, and overall progress.

It is the responsibility of the faculty to advise and evaluate all candidates in the department. The collective nature of the review serves several purposes. The faculty and students function as a collaborative research community with knowledge and experience dispersed among the members, so it makes sense to get diverse input about student activities. It is also important to have the faculty well-informed about students to help identify and foster continuing collaboration. Additionally, participation helps faculty to learn and become better advisors.

Advice and support are guaranteed, not by the individual advisor, but by the department (the faculty body).

All students making satisfactory progress will receive financial support, regardless of advisor funding and similarly all students will have a doctoral advisor even if their current advisor cannot continue for any reason. Lastly the review expresses the perspective of faculty and their consent on the advice given, so all must be able to participate in the review process.

Importance to the Department and University

The overarching goals of the faculty when advising Ph.D. students are to produce high-quality research and to graduate highly successful Ph.D. students. The number and success of a faculty member's Ph.D. graduates is a major part of their reputation, and thus their own career success. The faculty truly want their advisees to have successful Ph.D. careers, both before and after graduation. To achieve these goals, it is crucial for departments to evaluate Ph.D. students carefully, consistently, and fairly.

What happens in the Graduate Student Review Meeting

The meeting is held in closed session with the faculty who advise students, the Ph.D. Directors, and the PhD program manager attending. To the greatest extent possible faculty attend in person for the entire meeting. The discussion proceeds by annual cohort, by seniority and decreasing seniority order, alphabetical within cohort. The graduate student database is accessible by all faculty and during the meeting each student's record in turn is projected on the screen for common reference. The draft letter (prepared in advance by the student's advisor(s)) and the student statement are viewable. The advisor is responsible for assembling information about the case and presenting it. The student should make sure their advisor is informed about participation in activities and research progress made during the semester. This can be both through advisor meetings and through the online student statement.

For each student:

- present the case, initially by the advisor or designated proxy, viewing the student statement, and draft letter
- discuss the case with emphasis on progress
- identify any areas of concern
- formulate specific advice determine expected or required activities or accomplishments
- decide on status

The faculty review the students' previous semester's coursework and research progress and the student's next semester's plans to ensure that the student is making satisfactory progress.

It is quite common for multiple faculty to contribute to the discussion and advice for any one student. The student's advisor speaks first but others, particularly committee members, course instructors, and research collaborators offer their thoughts. The faculty decides whether a student is making satisfactory progress in the program. If so, the faculty usually suggest goals for the student to achieve over the next semester. If not, the faculty makes more rigid demands of the student.

Ultimately, permission to continue in the program is contingent on whether the student continues to make satisfactory progress toward their degree. If a student is not making satisfactory progress, the faculty may choose to dismiss the student from the program. This only happens after a student receives an unsatisfactory progress warning letter (sometimes referred to as a "N-1" letter) and continuing lack of progress towards requirements prescribed by the faculty.

The review is serious, and the tone is constructive discussion of how to help students to succeed. Faculty hold each other to a high standard and the chair keeps the discussion positive. The review focuses on public not private persona and particularly on academic performance. Advisors do not share private information without prior permission and only when relevant to the evaluation.

Review Letter Progress Code Definitions

SP (satisfactory progress) means the faculty have determined that progress toward the PhD is satisfactory. This is the highest status that can be received.

USP (unsatisfactory progress, also known as an "N-1" letter) means the faculty have determined that progress is unsatisfactory. The letter will explain how progress is deficient and give instructions for how to return to satisfactory progress. You may not be allowed to continue in the program past the next semester unless you satisfy specific conditions that will be given in the letter.

AP (academic probation) means the student has dropped below a 3.0 GPA average, and/or received an Incomplete or lower than a B in a core course. A B- in 10-701 can be remediated with the approval of the directors to avoid academic probation. The student remains on AP until their GPA returns to a 3.0 and/or the work is completed, and the Incomplete grade is replaced with a passing letter grade (B or higher).

M-2-M (month-to-month) may rarely be applied to manage and guide student progress with monthly milestones. This status is only assigned following an unsatisfactory progress letter where a student failed to satisfy all the specific requirements to achieve satisfactory progress. Continuation is not guaranteed beyond the coming month if the stated monthly milestones are not met.

If it is indicated in the student's letter that they are being asked to leave the program, they will be informed of the Summary of Graduate Student Appeal and Grievance Procedures:

CMU: `https://www.cmu.edu/graduate/resources/appeal-grievance-procedures.html`
PITT: `https://www.provost.pitt.edu/policies-guidelines`
and notified that they can appeal any/all of these decisions.

12 Funding & Financial Support

12.1 Statement of Department Financial Support

When a student applies for the program, his or her application is an application for financial aid as well. All enrolled students receive full financial support, consisting of full tuition and a stipend. The stipend is set to provide a competitive level of support for our students. Students are assumed to be responsible for any university fees that are not explicitly waived or covered by their departments of registration and may be responsible for paying for required health insurance, according to the policies of the university at which they are registered.

Continued receipt of financial support is conditional on making satisfactory progress towards the Ph.D. The process of evaluation of progress is described elsewhere in this handbook.

12.2 Stipend

A monthly stipend is provided for all students in the program. Stipends are determined at the school level at each University and not the program.

Funding Payment Schedule

CMU- Stipend pay periods begin Aug 16 of each year. Stipends are paid semi-monthly on the 15th and last day of the month.
PITT- Stipend will be paid in equal monthly installments for the term(s) of appointment with the first payment being issued on the last business day of the first month of the term of the appointment.

Dates for the beginning and end of each term are available on the current academic calendar. Graduate student tax information is available on the Payroll Department website. University of Pittsburgh and School of Medicine academic regulations on academic appointments require all students appointed as a Graduate Student Researcher, Predoctoral Fellow, or Predoctoral Trainee to be enrolled for full-time credits or Full Time Dissertation Study (FTDS) to receive a tuition scholarship and individual medical insurance coverage.

12.3 Health Insurance Requirement

CMU – All students are required to have health insurance. Please visit the University Health Services (UHS) website at `https://www.cmu.edu/health-services/student-insurance/` for additional information.

In addition to the tuition, stipend, and fees support referenced above, if you elect to enroll in the Carnegie Mellon University's Student Health Insurance Plan (SHIP), the University will cover the premium cost for your individual coverage. While you will have the opportunity to purchase partner, spouse or dependent coverage under the SHIP plan, the University's support is limited to the enrolled student's coverage as an individual.

Please note that if you wish to satisfy the health insurance requirement under an alternate plan you will not be eligible for the University support referenced here. To be eligible for financial support, you must enroll in the SHIP program not later than July 31st.

Please be advised that your enrollment will be verified with University Health Services prior to processing the insurance premium support. For those who elect spouse or dependent coverage, the University has a payment plan available. Information can be found here: `https://www.cmu.edu/sfs/billing/payments/monthly-plan/index.html`.

PITT- Student health insurance plans for medical (including mental health), vision, and dental are available to current Pitt students, including family/domestic partners.

Review the summary guide, plan descriptions, and coverage and rate details at the Office of Human Resources Student Health Plans page: https://www.gradstudies.pitt.edu/student-life/health-and-wellness/health-insurance. Students must enroll in (or waive) the medical coverage at http://my.pitt.edu/.

12.4 Department Fees

CMU – see the University-Wide Graduate Student Handbook for information about Technology, Student Activities, and Transportation fees.

PITT – see the School of Medicine Expenses / Tuition Rates and Fees website for fee information: https://www.tuition.pitt.edu/school-medicine-expenses.

12.5 Travel/Conference and Research Funding

The department encourages PhD students to travel to conferences and workshops to enhance their professional and career development.

If a PhD student wishes to attend a conference or workshop, they may inquire / ask permission of their advisor or research sponsor.

CMU- Students may also inquire about additional funding through the Office of Graduate & Postdoctoral Affairs: https://www.cmu.edu/graduate/funding/index.html.

PITT – Students may inquire about additional funding through the Graduate Studies office: https://www.gradstudies.pitt.edu/fellowship-opportunities.

12.6 Additional Sources of Internal & External Financial Support

PITT encourages students to apply for fellowships and grants available internally from Pitt, as well as from national, international, industrial or foundation sources. Below we have listed some of the major national fellowships available for graduate study: https://www.gradstudies.pitt.edu/fellowship-opportunities

12.7 Program Policy on Outside Employment

CMU PhD Students enrolled in our program and funded by research grants, fellowships or other funding mechanisms are expected to spend all their work time on their academic activities towards completing their degree.

Graduate students are generally discouraged from consulting, especially as this distracts from their educational goals. Outside paid work is not normally compatible with full-time PhD student status. There is great potential for conflict of interest when graduate students consult for spinoff companies. However, in some circumstances the department may permit full-time PhD students to devote up to 8 hours per week (averaged over any one semester) to outside, paid, professional activities, where that activity is consistent with the student's role as a member of the student body, and where that activity also enhances the contribution of the student to the university.

To obtain that permission, a student must apply ahead of time by filling out the PhD Student Consulting Policy & Agreement form: https://www.compbio.cmu.edu/current-student-resources/forms.html. The start and end dates must be within the semester dates, as determined by the university. The student must also make sure they comply with all applicable U.S. laws, including specific terms of their visa, if applicable.

CMU International Students must contact OIE and fill out the CPT Form. https://www.cmu.edu/oie/foreign-students/docs/cpt-advisor-recommendation.pdf.

PITT PhD students are expected to effectively carry out their research and participate in orientation and training programs. Graduate student researchers are also expected to meet enrollment requirements and to maintain satisfactory academic performance.

Graduate students are not permitted to hold more than the equivalent of one full appointment within the University at a time. In rare circumstances, graduate students may seek additional appointments, but they must be approved by the departmental chairperson and the dean.

Due to federal immigration regulations, graduate students on J-1 or F-1 visas may not be engaged in research that is not directly integrated with the student's thesis or dissertation for more than 20 hours per week on campus when school is in session during the fall and spring terms, and those on regular appointments are not eligible for additional appointments during these terms.

Given the intensive and time-consuming nature of graduate studies and training, graduate students holding graduate student research appointments are discouraged from employment outside the University.

`https://www.provost.pitt.edu/sites/default/files/GSR-Academic-Regs-6-1-22-x.pdf`