PhD Degree Requirements

Department of Computer Science

Brown University

Missive

The PhD program has various requirements that establish a baseline for every graduating student. Even an algorithms student must learn to write programs others can read and maintain; even a graphics student must learn to prove algorithms correct. But each should become expert in his or her own field, and any necessary related fields, and developing this expertise will not come from merely satisfying the baseline requirements. Here are some suggestions for planning your graduate education.

One of the best ways to ensure success is to constantly assess your strengths and weaknesses, and attack the weaknesses. While the requirements do this at a minimal level, you should think about your **goals** rather than the requirements. Your weaknesses may be more evident if you're a beginning student whose background is not in computer science: e.g., you may need to become better at programming or at some branches of mathematics. But you should continue this assessment throughout your career.

Even after identifying a weakness, students sometimes mistakenly assume that they should do *no more* than the requirements. Don't make this mistake: If you spot a weakness, address it! If this means taking strictly more than the minimum number of courses, do so. For instance, if you know your programming is weak, take CSCI 0320 even though it doesn't count towards requirements.

Courses in the department are not the only way to prepare for your career. You can also take courses in other departments or at other universities (did you know that Brown participates in an Exchange Scholar Program that lets you enroll in about ten peer institutions, and that you can take individual courses at Harvard?). In addition, contemporary computer science offers many more ways to gain expertise. You might take an on-line course, watch a series of videos, complete a relevant internship, work through an on-line text, or attend a summer-school—or even just organize an old-fashioned study group within the department. Collaborating on a project with a student from another area can also be a wonderful way to expand your horizons. Your annual reporting form gives you room to tell the faculty about such activities, and to check up on yourself. If you find yourself reporting no such activities, you should check whether there are opportunities you're passing up. Talk with your advisor and with others in the department.

Finally, while your advisor has your best interests in mind, remember that there are things you know about yourself that they don't know about you. If you are uncomfortable discussing these with them (especially as a new student), find other mentors within the department. Peer mentors can be especially effective. However, keep in mind that ultimately your advisor is responsible for your progress and funding, so do not make decisions that might affect them (e.g., accepting a summer internship, being away for two months, taking a course, etc.) without consulting them. They might be relying on you for a deadline. They might also have better suggestions! Be in regular contact, and be proactive.

Welcome to Brown. We're happy to have you here, and we look forward to your growth and success!

The Faculty

Requirements

This document describes the requirements for the PhD degree in computer science at Brown University. Should these requirements change, a student may apply any requirements document since the time of their entry.

Summary of Requirements

To graduate with a PhD a student must attain candidacy, pass the depth exam, and complete a dissertation that embodies the results of original research and gives evidence of high scholarship.

All proposal and defense presentations must include the student's committee and a member of the Graduate Examinations Committee (unless stated otherwise), and are open to any other faculty who wish to attend. The talk is followed by a question-and-answer session (q&a) for all present, then a q&a for only committee and faculty members, and then a discussion between committee and faculty members without the student present. The adequacy of the work will be judged by the committee and the faculty in attendance.

1. Advancement to Candidacy

To become a candidate for the PhD, a student must complete course requirements, a programming requirement, and a research project. These requirements must be completed by the end of the student's second year.

Course Requirements:

The student must earn eight course credits in the first two years, excluding Reading and Research. Of these:

- At least six must be in computer science at the 1000-level or higher. Two of these must be at the 2000-level.
- Up to two courses outside computer science can count towards the eight; both must be approved by both the advisor and the DGS.
- At least four (non-Reading and Research) courses must be completed by June 1 of the first year.
- Courses must cover at least three of the four PhD course areas. For more information about areas, see: http://www.cs.brown.edu/grad/phd/reqs/course-areas-phd.html.
- All courses must be completed with a grade of B or better, with at least as many A's as B's.

Non-2000-level courses may no longer offer a "2000-level supplement".

Programming Requirement:

The student must pass a programming exam by the end of the second year. The exam is defined by a subset of assignments in the course CSCI 0190, which is offered every fall. The student must complete this work individually and at high quality. Students are welcome, but not required, to attend CSCI 0190 to prepare for the exam.

Teaching Requirement:

Our doctoral program trains students to become educators as well as researchers, and the successful dissemination of research also depends on teaching ability. Thus, teaching is an integral part of graduate education. All PhD students are therefore required to train as teaching assistants for at least one semester. This requirement can be waived with approval of the DGS.

Research "Comps" Requirement:

The student must successfully complete a research project that demonstrates the ability to conduct independent, quality research. This requirement has several steps:

- By March 15th of the first year, the student must select an advisor and two additional research committee members. The advisor must approve the choice of the two committee members.
- By April 21st of the first year, the student must propose. The proposal consists of a 1-3 page document and a 10-minute presentation (which does not require a member of the Graduate Examinations Committee present). The student's proposal document must be submitted to the department one week before the date of the proposal. The committee may pass or fail the student, or defer decision. A deferral must be accompanied by clear criteria for improvement, and a revised deadline. A student who fails or has the decision deferred must pass the second time.
- In fall of the second year, the student must present their progress in acceptable form to the committee.
- By March 15th of the second year, the student must defend their project. The project consists of a written report that is roughly equivalent to a conference submission, as judged by the committee and other interested faculty. The defense is a 20-minute presentation. At least one week prior to the presentation, the student must submit the written report—after the advisor has approved it—to the department. If the student does not pass, they may be invited to defend again no later than May 15th. The student must pass the second time.
- Students must complete the University's program on ethics and responsible research conduct (called BEARCORE) by the end of their second year.

Students entering with Master's-level research experience are encouraged to accelerate the research comps schedule. They should present the results of this previous research to their advisor and committee members by December 1st of their first year. If the committee does not find the previous research adequate, the student must follow the regular research project exam procedure. Regulations on scheduling are on-line at http://www.cs.brown.edu/grad/phd/reqs/Advancement_to_Candidacy_Contract.pdf.

2. Demonstration of Depth

A student can satisfy the depth requirement through an exam or coursework.

The coursework option requires two related, non-Reading and Research 2000-level courses. The courses must be in computer science or, if in other disciplines, must be approved by the advisor and the Director of Graduate Study (or one other faculty member, in case those two are the same). These courses can count for candidacy.

The exam option consists of a reading list that is approved by the curriculum committee and provided to the student during the second year of study (or earlier). The exam is administered by a committee of three faculty members. Students will be given three questions, each expected to take about one week to answer. The student should schedule an oral defense of the written answers, to be conducted within two weeks of turning in the answers. The oral defense should last no longer than two hours.

Dissertation:

Dissertation Proposal

Within two years of attaining candidacy, the student must select a committee and present a dissertation proposal. The committee consists of an advisor and two additional members (chosen with the advisor's approval). The proposal is usually between ten and thirty pages. The proposal should discuss relevant past work, research objectives, expected contributions, results already achieved, and a timeline for remaining work. The student must defend the proposal at a 50-minute presentation. The permitted outcomes are the same as for the research comps proposal. Regulations on scheduling the dissertation proposal are on-line at http://www.cs.brown.edu/grad/phd/proposal/Thesis_Proposal_Checklist.pdf.

Dissertation Defense

The dissertation must complete the proposed work, satisfy the requirements of the Graduate School, and meet the highest standards of both content and presentation. The student must defend the dissertation at a 50-minute presentation, whose talk and first q&a is open to the general public. The defense should take place at least six months after the thesis proposal. A complete draft of the dissertation must be presented to the committee and department at least four weeks prior to the defense. The permitted outcomes are the same as for the research comps proposal. Regulations on scheduling the dissertation defense are on-line at http://www.cs.brown.edu/grad/phd/proposal/Thesis_Defense_Checklist.pdf.

Yearly Progress Updates:

Once every academic year, students who have passed candidacy must submit a written update on their status. The form can be found on the web in the post candidacy sub-area.

Advising:

The student is responsible for finding an advisor for the research and dissertation requirements. In many cases, the same faculty member will serve as the advisor for both requirements. However, at their discretion, either the student or the faculty member or both may elect to not continue working together once the research requirement is complete. In such cases, the student is responsible for finding another advisor.

Standing and Penalties:

The graduate school defines several levels of standing, with corresponding semantics (http://www.brown.edu/gradschool/academics-research/rules-regulations/academic-standing). Any failure to meet a requirement, to maintain a high quality of work, or to make reasonable progress towards completing the degree, can result in a decrease in standing or even termination.

Transfer Credits from Other Institutions:

With the approval of the graduate advisor and the graduate school, a student may transfer up to eight graduate courses, typically those taken as part of a master's program. To be eligible for transfer credit, the course must be judged to be of difficulty comparable to corresponding courses in the department.