

Plan for Diversity and Inclusion
Department of Computer Sciences
University of North Carolina at Charlotte

Purpose. The main purpose of this plan is to promote the success of underrepresented minority (URM) doctoral students in the Department of Computer Science in completing their PhD and preparing for faculty careers.

Assessment of obstacles in the PhD program

The data used to assess the obstacles for students in the PhD program at the Department of Computer Science at UNC Charlotte comes from the following sources:

- Annual review of PhD students - this includes student and faculty online surveys, and the results of the PhD review committee documented in review letters sent to PhD students.
- Annual graduate faculty meetings - this includes anecdotal notes and feedback from faculty members regarding the progress of PhD students.
- Feedback from the director of graduate studies and the associate chair for graduate education.

After compiling all this data, we note several challenges regarding the progress of PhD students in our program.

1. On average, students meet PhD milestones (core courses, qualification exam, proposal, and defense) a year later than the published guidelines. This has significant implications as the financial aid provided by the graduate school is limited.
2. The annual review of PhD students is biased towards research productivity sometimes at the cost of milestone completion.
3. In annual surveys, the main complaint of PhD students is about the rather limited offerings of advanced graduate level courses at the 8000 level.
4. The second main complaint of PhD students is with respect to increasing the number of student-student and student-faculty collaborations and interactions in the department.
5. Graduate faculty complain about slow research progress of PhD students, which emerges from miscommunications and long periods of time with no visible progress.
6. Finally, we note that the collection and query of PhD student progress involves a rather human intensive endeavor that requires managing multiple Google Sheets and Surveys making the corroboration of data from multiple years challenging.

Concrete actions to promote success

- 1. Review PhD students every semester and improve the mechanism for generating the review letters.** We believe that this approach is going to address some of the deficiencies of the current annual review approach and improve some of the challenges previously mentioned (#1, #2, #5).
 - The old review approach excludes first year students. This results in having students reviewed after 1.5 years if they join in Fall or even 2 years if they join in Spring. Because of this, students receive less feedback regarding the requirements and milestones for the PhD degree.
 - The old approach is driven by the advisor to generate the review letter which results in review letters that are mainly focused on research progress.
 - A new semester based review, provides students with reinforcing information regarding PhD requirements even though it might be redundant in some cases.
 - The review letters will be generated by the PhD review committee, balancing this way all the aspects of a PhD progress - academics, milestones, and research.
 - The letters will provide pointers to the PhD requirements and concrete actions that students need to take to be in good standing and complete milestones within the recommended guidelines.
 - This also provides the review committee with early indications of friction between advisors and PhD students to further investigate and generate appropriate plans of action.

- 2. Offer more research oriented graduate level courses.** While a challenging task because of their rather small enrollment, we believe that offering more courses at the 8000 level are crucial for student success especially with passing their Qualifying Exam and developing their Proposals. We are confident that the current university-wide effort to turn UNC Charlotte into an R1 institution will provide opportunities to make this happen. We already see a sustained increase in the number of faculty hirings at all levels.

- 3. Build a community for PhD students.** While a PhD emphasizes the notion of developing students into independent researchers, collaborations and interactions with peers are crucial for developing their critical-thinking and exploring multi-disciplinary ideas.

Several actions and ideas have been taken and are proposed to help students interact with their peers and faculty within the department and college.

- **New physical spaces for student collaboration.** The college has already developed a dedicated lounge for graduate students and a new tech lounge has just been opened in front of the amphitheater where graduate students usually attend the graduate seminar.
 - **Encourage more interaction between the PhD committee members and the graduate student.** The new PhD review approach requires both the student and the PhD committee members to provide information in the online surveys about their interactions during the semester. While this cannot be enforced, the surveys are checked on a semester basis by the PhD review committee and appropriate feedback is provided. The hope is to see more interactions before proposal and defense by the mere fact that both the PhD student and PhD committee members have to report on their interactions every semester.
 - **Take steps toward developing a many-to-many mentoring program.** We plan to leverage our efforts at the department level in developing new *research identities* to encourage the formation of cohesive groups of 3-4 faculty members and 6-8 PhD students that are meeting regularly to exchange ideas and find new collaboration avenues. We already have a couple of examples in the department, which have presented their type of interactions during the faculty meeting, and hope that more will be created.
 - **Encourage PhD students to publish in top tier CS conferences.** The department has just launched a new program in funding the travel for PhD students who have papers accepted to top-tier CS conferences.
 - **Entry into the professoriate.** While the majority of our PhD students find employment in industry after graduation, we do have alumni in academia who engage with our current PhD students. This engagement can be done via invited talks during the Graduate Seminar but also more organically given that our department currently employs several faculty and instructors that have obtained their PhD degree from our department.
- 4. Develop/acquire a data infrastructure to track PhD student progress and facilitate analytics.** Assessing the state of the PhD program requires timely access to data where longitudinal studies can be generated. Unfortunately, we do not have access to such a system and generating any meaningful reports requires significant human resources. We are proposing developing or acquiring a system capable of helping with tracking the progress of PhD students from academics, advising, to financials. The requirements for the new system have been generated and supplied to the IT department.

- 5. Develop a PhD pipeline of URM students.** Currently we only have 2 URM PhD students in the SIS department but none in the CS department. The department and the college have made several efforts to increase the PhD enrollment from the local undergraduate students, which we hope to result in more URM students in our PhD program. We are collaborating with the Office of Undergraduate Research and programs like NC-LSAMP. The college is going to also engage with UNC Asheville and Western Carolina, which have a larger American Indian population in attendance. Efforts are concentrated on developing a community for undergraduate URM students and educating the local undergraduate students regarding grad school applications and admissions (examples include how to write a personal statement and how to request letters of recommendations). Converting a small fraction of our undergraduate population will have a significant impact on our PhD population. We already have made some steps in this direction using the GAANN Fellowship program. This also includes incorporating graduate school information into the Career Paths class.

Assessment of impact in the PhD program

Data is collected on a semester basis by the PhD review committee and will allow us to assess whether these changes will have an impact on the PhD program. In particular the following types of impact assessment can be carried based on the data that we have started to collect.

Milestone completion. We already see that students who received “concern” letters (first signs of derailing from PhD requirements) are taking appropriate steps in the following semester such that the new review letter is not elevated to a “warning” or “probation” letter. Every semester, feedback is provided to the students about the PhD requirements and their next steps.

Increased interactions. This data is now required during the review process from both the PhD student and the PhD committee members every semester and it can be tabulated and compared over time.

Publishing in top conferences. This data is collected at the department level every time funding is requested by PhD students to present their research at top CS conferences.