

Computing and Information Sciences

Research Potential Assessment (RPA) Guidelines

The purpose of this formal assessment is to determine early in a student's academic life if he or she has the potential to successfully obtain a PhD from our program. The RPA report is not intended to be the student's dissertation proposal, but rather a document to demonstrate the student's research potential.

Student Requirements

1. Be the sole author of a well-written report of four to six pages in length (including references, and excluding the Appendix). Requirements for the report are provided below.
2. Give a conference-quality presentation of this report to the faculty. The presentation should include the student's future plans for research. Presentations should be 20 minutes in length, excluding questions.
3. Each student's primary advisor will write a letter describing the work that the student has completed, and evaluating the student's potential as a researcher.
4. The student's grades will also be reviewed by the RPA committee.

RPA Presentation Timeline

The RPA presentations are scheduled on Wednesday and Thursday during the final exam week (week 15) of Spring semester. RPA candidates should submit their research report by midnight, Friday of week 13, while students' advisors should submit their evaluation letters by midnight, Friday of week 14.

Format for the Research Report

All students must include all sections below except for Section 4c in their research report, outlining the problem(s) they will work on, related literature, a research agenda, and concrete methods for making progress on this agenda. Students are encouraged to also include Section 4c summarizing preliminary research results, but will not be penalized if it is absent.

1. **Title and Abstract** (at most 1 short paragraph)
2. **Introduction:** What is the area of computing that you are planning to do research in (i.e. your research area), and why is this area important? More specifically, what are the research questions that you wish to address? Why are they important (e.g. how can they generalize), and where do they fit within your chosen research area and computing in general?
3. **Critical Literature Review:** A categorization and summary of key problems and techniques in the student's chosen research area. The review aims to provide context for the student's research questions, based on a careful and thorough study of pertinent literature. The review should be critical, i.e. identify the relative strengths and limitations of different techniques, and identify unanswered questions (i.e. open problems). You should show awareness of both the details of contemporary literature that your research will build upon, and the context of where that research is situated in the field at large. You should also identify appropriate publication venues for your work.

4. Research Plan

- a. *Research agenda*: Based on the analysis in your literature review, identify the steps needed to answer your research questions, including alternative steps if appropriate.
- b. *Methodology*: Describe methods that you have or will use to answer your research question(s). The scope should be roughly what is needed for one research paper. Include pertinent techniques (e.g. algorithms, designs, theories, or protocols), data and other resources, and evaluation metrics. Also provide a rationale for your methodology that is informed by your literature review.
- c. *Results*: (optional) While not compulsory, we encourage students to include preliminary results if available for the work outlined in Section 4b. Negative results are fine: these provide learning opportunities, and often determine future research directions.

5. **Conclusion**: A brief summary of the research problem(s) you are pursuing, relationship of proposed research directions to related work, and next steps you will take in your research.

6. References

7. **Appendix**: Describe how your research fits within the larger context of your advisor and/or lab's research program.

Templates: Use one of the following paper templates to prepare the report.

- Standard IEEE conference paper templates:
http://www.ieee.org/conferences_events/conferences/publishing/templates.html
- Standard ACM conference paper templates:
<http://www.acm.org/publications/article-templates/proceedings-template.html>

Faculty Guidelines

Please remember that first-year PhD students are not fully formed researchers. The RPA is designed to assist with the difficult task of establishing a trajectory for each student, such that faculty members can be confident that a PhD candidate will be able to progress and successfully complete their degree.

While a student's Pre-assessment Committee members are required to assess the student's RPA report, all PhD faculty (permanent, core, and extended) are invited to review student reports and presentations, and then submit their evaluations and comments to the Curriculum & Assessment Committee for consideration. Both the RPA report and presentation should be assessed using the following criteria, based upon skills that one expects a competent researcher to possess. A competent researcher should be able to:

- Explain the value of a research project.
- Explain and summarize existing research in an area, including seminal papers and projects.
- Pose new research questions and creative new directions for research.
- Explain how research fits within a particular research area, and into other lines of inquiry.

- Justify a choice of research methodology, as opposed to alternative methods
- Identify future directions for research.

Faculty are not asked to comment on all aspects of the student's work, but may focus on particular strengths or weaknesses.

Advisor Guidelines

Advisors should provide general review, guidance, and suggestions to a student's report and presentation. In addition, advisors will submit a candid letter commenting on the student's research potential and progress. This letter is not intended as a letter of support, but rather as an evaluation of student characteristics and work quality. The letter should include at least the following information:

- Student's research potential and progress: Provide comments on the student's background, progress, and/or work ethics along with their potential to be a successful PhD candidate.
- Advisor's role: Advisors should provide context for the student's written paper and research, by explaining how student's research fits within the larger context of the advisor's research. The information regarding the advisor's role in problem determination, method selection, data analysis (if applicable), and future direction etc., will help evaluators to give a fair and consistent assessment of students who are exploring a new research direction.

RPA Process

1. Student reports will be distributed electronically to faculty at least one week prior to the presentations.
2. Advisors submit their evaluation letters prior to the RPA presentations.
3. Students' Pre-assessment Committee¹ members submit their research-paper-assessment-rubric prior to the RPA presentations.
4. In their presentations, each student will give a 20-minute talk followed by a 10-minute question period.
5. All PhD faculty are invited to review student reports and presentations, and submit their evaluations and comments to the Curriculum & Assessment Committee.
6. The Curriculum & Assessment Committee attends all presentations and reads submitted materials, such as research reports, letters, transcripts, and PhD faculty assessments.
7. The Curriculum & Assessment Committee makes recommendations to the PhD Program Director, who makes the final decisions regarding the outcome of the RPA.

¹ Student Pre-assessment Committee Policy