

17-723 PhD Research Project

Spring 2024

Released: April 5, 2024

Due: May 3, 2024 11:59 pm

PhD students who are enrolled in 17-723 may choose to do a mini research project instead of Homework 3.

You are given flexibility to align this project with your interests. Combining it with research you are already doing as part of your PhD is also a possibility. Projects should relate to software design, and must have some elements of research, in that it addresses an open or previously unexplored question. Potential ideas include:

- A **case study** of a specific project, system, or failure. This study could involve studying public artifacts, interviewing people involved, or others.
- An **empirical study** in the form of a survey, interviews, controlled experiment, or analyzing public artifacts (e.g. mining software repositories).
- An **evaluation of a technical design or tradeoff**, such as a systematic benchmark of different design solutions.
- A **technique** for aiding a design activity (e.g., a modeling notation for communicating an aspect of a design or a method for analyzing a quality attribute).
- A **literature survey** on a specific topic within design, including surveys of academic literature and surveys of grey literature. Surveys should follow a principled approach and synthesize new insights.

The study should aim to provide some insights for a research question. A pure opinion report, essay report, or tool report without any evaluation or evidence is not in scope.

If you have a potential idea in mind and would like to discuss its suitability with the course staff, please feel free to reach out.

Given the short time frame of this project, we do not expect a fully complete study, but we do expect at least some preliminary results. For example, when planning an interview study, the report should contain the methods section fleshed out and some results from at least one or two pilot interviews.

The submission should be a **self-contained report** (between 4~8 pages) that motivates the work, describes the research question(s), outlines the state of the art, gives an overview of the study design, and presents some preliminary results. For more empirical work, a description and justification of a study with very preliminary results or even without full results is acceptable. For a literature survey, we expect at least a partial overview of the relevant publications with synthesized insights.

Submission & Grading

Compile your report into a single PDF file and upload it through Gradescope by the indicated deadline.

This project is out of **120** points. For full points, we expect:

- (30 points) The research described in the report is in scope for this course.
- (20 points) The research described in the report makes a good faith attempt at exploring something novel in this field.
- (20 points) The report states a clear research question and motivates why answering that research question is important and to whom.
- (10 points) The report discusses the state of the art regarding the problem studied.
- (10 points) The report makes a good faith attempt at describing the research method proposed or used to answer the research question.
- (10 points) The report includes some preliminary results.
- (20 points) The report is reasonably well written, easy to follow for a reader with basic knowledge in software design, and self-contained.