Computer Science 399 senior seminar
(2018-2019)

Instructor: Professor Steven Lindell **Schedule**: Mondays 7:30-10:00 PM in E309

Overview: According to the college catalog, the senior thesis is an opportunity "to challenge the student's powers of analysis and synthesis and to foster the creative use of the knowledge and skills that have been acquired in previous studies." As such, it is the culmination of your course work at Haverford, and for many students can be the highlight of their college experience. Proper attention to details and deadlines will make this a successful and pleasant experience for you and your advisor.

This year, the senior thesis requirement in CS can be satisfied in one semester by taking 399 in *either the fall or spring*. The requirements include a thorough literature review of a research topic, culminating in a written thesis and an informal presentation at a poster session toward the end of the semester. Work on a fall thesis can be continued into the spring with agreement of your advisor, and the second semester will count as a 300-level research elective toward the CS major. Students who choose this option typically engage in original research contributions extending their literature review, the demonstration of which can be a factor in determining departmental honors. In previous years, these full year theses have included a formal presentation at the end of the spring semester.

You will undertake all of this under the guidance of a faculty advisor on a topic jointly chosen by you and your advisor. Begin by looking at the thesis advising topics documents posted by faculty and following the links provided on the course web page. Selection of a proper topic is one of the most important steps of the thesis process; a good topic will be of interest to both student and their advisor.

Details: An undergraduate senior paper must present an in-depth exploration of a topic in computer science, with special focus on understanding and evaluating some element of the computer science literature. The paper should demonstrate the student's ability to apply, in a new context, the fundamental themes and objectives that connect all CS classes, such as:

- separating a problem definition from its solution.
- describing clearly a proposed solution (typically with examples).
- understanding the correctness and applicability of a proposed solution.
- comparing several proposed solutions in terms of clarity, resource requirements, etc.

It is common for the thesis to center on a particular algorithm or computing system and present the correctness and/or computational complexity thereof. However, this is not required. Students have successfully pursued other diverse topics, such as human-computer interaction. The one core requirement is that the student demonstrates the ability to think deeply and communicate clearly about a computer science topic beyond the depth covered in classes. The written thesis therefore often resembles a review article, which explores in depth a collection of primary source articles from a single research group, or a survey article, which compares primary sources from different origins. Students will be expected to demonstrate all of this in accordance with the deadlines overleaf.

Schedule for Wednesday Sept. 5, 2018:

7:30 – 8:00	senior thesis orientation
8:00 – 8:30	faculty research presentations
8:30 – 9:…	discussions with individual faculty

Schedule and deadlines

Successful completion of your senior thesis depends crucially on regular weekly meetings with your faculty advisor. So, choosing an advisor that works well for you is an important part of the process.

- *At the beginning of the year*, faculty members in the department give a short presentation on their research interests centered around common themes, along with a list of reading materials for students to look over. After this, all students will submit a ranked list of three possible advisors, each including a potential topic that has been briefly discussed with that advisor. You may have an advisor from another institution with prior written approval from the faculty member running senior seminar. Students may continue working with a faculty supervisor on a prior research project if they build upon that previous work and demonstrate new and improved understanding of their research topic. You will be assigned a **faculty advisor** who will guide your project, and you will know in which semester it commences.

<u>Fall or Spring semester</u>

- *By the end of the third week*, submit a **topic proposal** consisting of a one-page summary describing the proposed work, together with a preliminary reading list of references you have found. Each student will present a short overview of their topic to the senior seminar class.

- *At the end of the sixth week*, a **rough draft** of the literature review is required, with chapter outlines and an annotated bibliography. This is a standard bibliography in which each reference includes a short description of what material was used from that citation.

- *At the end of the tenth week*, a **full draft** is due. One or two weeks later, a second reader (not the faculty advisor) assigned to your thesis provides written feedback to both you and your advisor.

- *Toward the end of classes*, students are required to give a public **poster presentation**. This is a fulfilling experience where the work you have completed comes together in a more visual form.

- *At the end of classes*, your complete **literature review** is due. This includes an abstract, table of contents, introduction, and a potential plan for future work (even if you won't be continuing it).

Grading: Attendance and participation in the senior seminar (including the poster presentation), together with meeting deadlines, will account for about 25% of your grade. The remaining 75% is based on the thesis itself, and our assessment of your understanding of it. Your advisor is the most crucial element in determining this latter component.

The senior paper is primarily assessed by the student's advisor. Usually one or more other members of the department also read the paper and provide feedback for the student and advisor; if the student has a separate subject-matter advisor at another institution, that advisor is consulted during the grading of the paper if possible. All faculty (and many students) are typically in attendance for the oral presentation. The grade for the senior experience is assigned by the advisor, based on the quality of the student's written paper (judged in terms of illustrating mastery of the learning objectives relevant to the chosen topic), on participation in the oral presentation, and on work habits demonstrated during the year's work.