

PhD Student Orientation Fall 2017

Dr. Hakan Aydin
Director, PhD Program
Computer Science Department
George Mason University

Goals

- Introduce the CS Department
- Describe the PhD Degree Requirements
- Provide suggestions and general tips

Today's Agenda

- 10:30 PhD Orientation Presentation
- 12:00 Lunch & Reception
- 13:00 Research Talks by the CS faculty

Computer Science @ GMU

- People
 - 41 faculty (from which to choose a dissertation director)
 - Plus 7 instructional, 3 emeriti, and 3 affiliated faculty
 - Five research centers and ten research labs
- Programs
 - **Undergraduate**: Computer Science and Applied Computer Science
 - **Masters** in Computer Science, Software Engineering, Information Systems, Information Security and Assurance
 - **PhD** in Computer Science
 - In addition, we participate in the school-wide PhD program in Information Technology

Areas of Research Expertise

- Algorithms and Theory of Computation
- Artificial Intelligence and Robotics
- Bioinformatics
- Computer Game Design
- Computer Vision
- Databases
- Graphics and Image Processing
- Programming Languages
- Software Engineering
- Security
- Systems and Networks
- Parallel and Distributed Computing
- Data Mining
- Information Systems
- Computer Science Education

Key People

- Chair of the Computer Science Department: Sanjeev Setia
- Director of the PhD program: Hakan Aydin
- Your **Academic Advisor**
 - Assigned based on your areas of interest
 - Advises you on all academic/procedural matters
- Your **Dissertation Director**
 - When you have one, he/she will serve as your academic advisor.
- Office staff
 - Ryan Lucas (**PhD program specialist** – wlucaas@gmu.edu)
 - Michèle Pieper (office manager)

What is PhD (in CS)?

- Highest academic degree awarded in Computer Science
- On top of multi-year graduate study, PhD degree requires producing **original research** in a sub-field of Computer Science, culminating in the **creation and defense of a research dissertation**
- The research must be worthy of publication in **peer-reviewed** academic journals and/or conference proceedings.

PhD Degree Requirements

- GMU Catalog is the official resource
catalog.gmu.edu
- Lots of information on the CS web site
<http://cs.gmu.edu>
- Degree requirements
 1. Courses
 2. Written Qualifying Exams
 3. Oral Comprehensive Exam
 4. Dissertation Proposal
 5. Dissertation

PhD Degree Requirements

- Success in the formal courses and qualifying exams is a necessary condition
 - But not sufficient!

- The culmination of the PhD study is the dissertation which requires
 - Becoming an active researcher in a specific area
 - Producing original research

1. Course Work

- 72 credits post Bachelor's degree (GMU requirement)
- Up to 30 credits may be granted for MS degree (discussed next)
- 42 credits post-Masters
 - CS 600 (3 credits) - Theoretical Computer Science -- B+ or better
 - CS 700 (3 credits) - Quantitative Methods and Experimental Design in Computer Science
 - 4 advanced graduate courses (12 credits)
 - Complete list of approved courses on the web site (almost 100).
 - At most 3 credits of CS 896 Directed Reading and Research may be included in the 12 credits of advanced courses
 - CS 800 (2 x 0 credits) - CS Colloquium
 - CS 990 (0 credit) - Dissertation Proposal Workshop
 - CS 998 (proposal) and CS 999 (dissertation)
 - At least 24 credits (at least 12 in CS 999)
 - Not more than 24 will be counted towards the degree

Credit for Previous Graduate Work

- If you did graduate work in computer science you may get credit (maximum 30).
 - Courses must be graduate level computer science (IT or business courses do not count).
 - Grade B or better
- An MS degree in computer science may get you a total of 30 credits.
- Must apply during your first academic year
- Case-by-case evaluation
- Transcripts are required.
 - Sometimes, additional course details could be required.

Advice: Courses

- Consult your academic advisor on your course plan.
- Students who do not receive the full 30 credit reduction should choose additional graduate level computer science courses.
- Those additional courses must be selected from the list of graduate level courses in Computer Science or a field related to the intended doctoral research area of the student, in consultation with the academic advisor.
- Courses that will prepare the student for the Qualifying Exams should be considered.

- With careful selection of courses, students may earn an MS in Computer Science degree as part of their PhD studies.
 - Consult the catalog for the requirements of the MS-CS.

Advice: Courses

- Students who do not receive the full 30 credit reduction may also choose to take additional credits of CS 896 – Directed Reading and Research with the dissertation director's approval
 - Must pass the qualifying exams before enrolling in CS 896
 - May be repeated up to 18 credits

2. PhD in CS Qualifying Exams

- Qualifying exams test **breadth** of knowledge in CS.
 - In general, they test knowledge acquired in a Masters program.
- Must pass exams in **four** different areas:
 - Foundations of CS + any 3 from 8 areas (software construction, software modeling, OS, networks, languages & compilers, databases, AI, information security)
- Each area has a recommended graduate course
 - If you have MS degree, you may have taken suitable courses.
- Exams offered in August and January
 - **Two** chances to pass four exams in **two consecutive semesters**.
 - Must take exams after completing **24** credits at the latest (**18**, if received reduction of credits for 15 or more credit hours).

Advice: Dissertation Director

- The students should formally link up with a dissertation director no later than this point.
- Common Mistake: Postponing research activity to the completion of the formal course work or qualifying exams
 - Finding a dissertation topic and director does not happen in one day!
- Start exploring potential research topics and interacting with the faculty while taking courses!

How to get involved in research?

- Identify the areas of Computer Science you are interested in
 - But be open-minded as well!
- Attend departmental research talks / symposia
- Take the courses in those areas to build a good background
 - Seminars, independent study based courses.
- Check the web pages of the CS faculty, learn more about their research activities
 - The faculty will be happy to provide more pointers/papers to get you trained in their areas
- Start to get involved in their research!

Dissertation Committee

- Each student must form a dissertation committee.
- Four (or five) members:
 - **Three** members must be tenured or tenure-track faculty in CS Department.
 - **One** member from outside CS Department.
 - Dissertation director chairs the committee.
 - Committee must be approved by the Chair of the Computer Science Department.

3. Comprehensive Exam

- Comprehensive exam tests the **depth** of knowledge in the intended area of research.
 - Typically two hours
 - Two chances to pass
- Scope of exam is defined by a **reading list** prepared by the student and the dissertation director.
 - Reading list must be accompanied by a one-page description of intended research.

4. Dissertation Proposal

- Each student must prepare a written dissertation proposal.
- CS-990 (0 credit workshop) helps students understand how to write and present a proposal.
- While preparing the proposal, student enrolls in CS 998.
- Proposal must be presented to and approved by the dissertation committee.
 - Two chances to pass
- Committee determines:
 - Whether the proposal has merit and can lead to significant research contributions, and
 - If the student has knowledge and skills to complete proposed work successfully, and in timely manner.
- Upon completing proposal successfully and finishing the course work, the student is **advanced to candidacy** for the PhD degree.

5. Dissertation

- While preparing the dissertation, the candidate enrolls in CS 999.
- When the work is complete, the dissertation is defended.
- Public defense is preceded by a **pre-defense** meeting:
 - Candidate meets with the dissertation committee and the Director of PhD program.
 - If the committee approves, the candidate may schedule the **public defense**.
- At least 1 month between pre-defense and public defense.

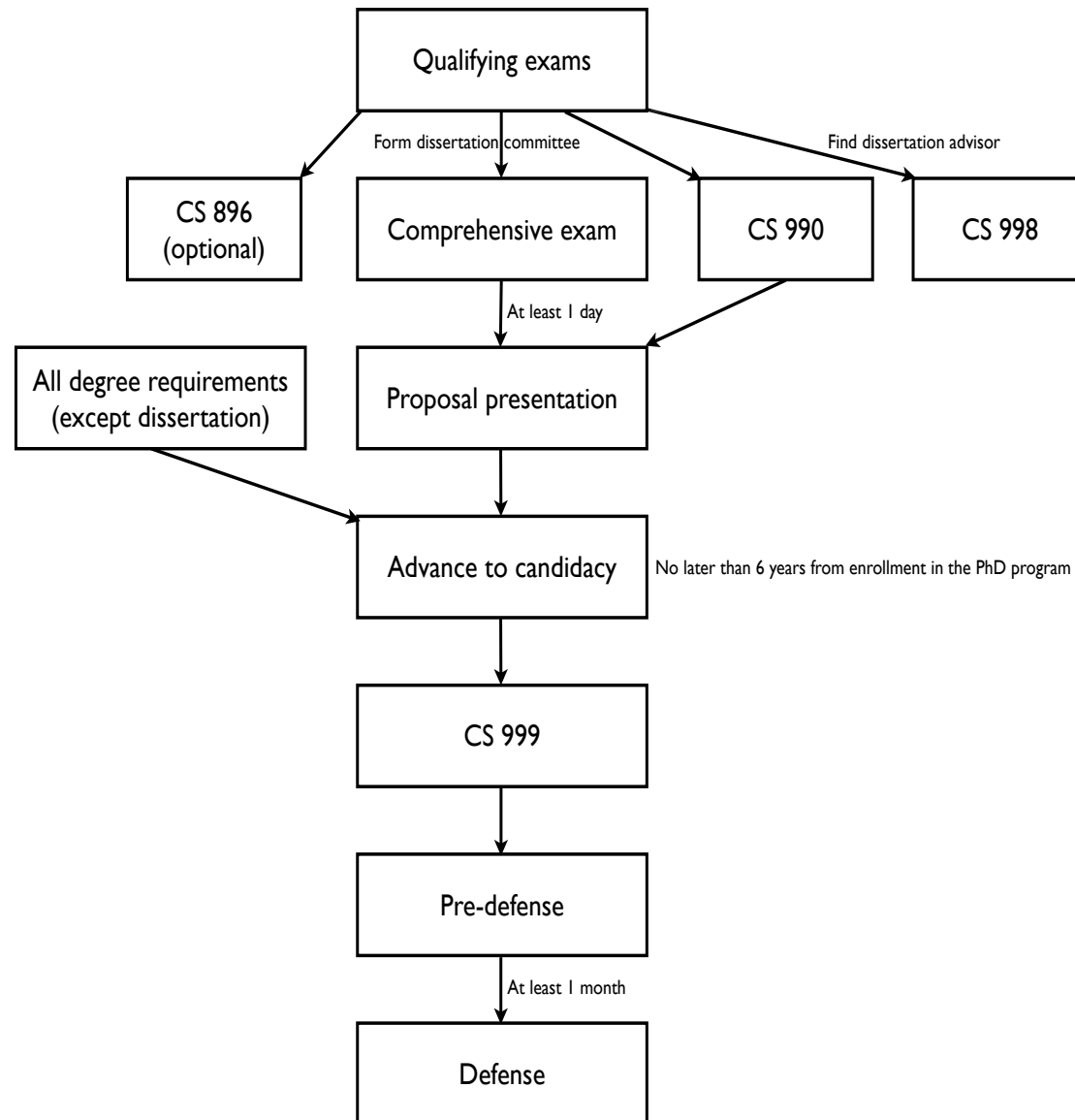
5. Dissertation (cont.)

- Dissertation
 - Must make significant contributions to its area
 - Must be publishable in quality journals or conferences.
- Dissertation Defense is oral and open to all
 - Two chances to pass

Other Requirements

- CS 800 Computer Science Colloquium
 - Take 2 semesters (0 credit)
 - Each semester, attend about 12 seminars
 - Purpose:
 - Help to choose a research area.
 - Broaden knowledge of cutting-edge research.
 - See examples of “new research results”.
 - Learn presentation techniques.

Overall Picture



Graduate Assistantships

- **Graduate Teaching Assistants (GTAs):** Participate directly in instructional activities, such as giving recitations, grading, holding office hours. Funded by the school /department.
- **Graduate Research Assistants (GRAs):** Participate in a research project administered by the GMU faculty. Funded by the sponsored research project.

Graduate Assistantships

- We expect that the doctoral GTAs will
 - Become gradually research active
 - Transition to GRA positions funded by the specific CS faculty
- The department cannot guarantee funding as GTA after two years.
 - Three years is the maximum limit.

Time Frame for Graduation

- GMU rules:
 - Maximum time from starting PhD program to advancement to candidacy – 6 years.
 - Maximum time for the entire PhD – 9 years.
- This does not distinguish between full-time and part-time students.
- Expectation from full-time students:
Complete the program in 4-5 years.

International Students

- Students with F-1 or J-1 visas must be full-time students
 - At least 9 credits per semester
 - 6 credits for GTAs and GRAs
 - May not switch to part-time status.

Annual Progress Report

- Submit report by the end of September every year (you will be contacted).
- Helps us monitor the progress of each individual, advise students of upcoming “milestones”, etc.
- Students who fail to submit are blocked from enrolling in classes.

Resources

- GMU email will be used for communicating with you.
- Computing:
 - VS&E Computing Labs: <http://labs.vse.gmu.edu>
 - Follow online procedure for obtaining account.
- Workspace:
 - All GRAs and GTAs are assigned space in research centers or labs, or in departmental rooms designated for supported students.

Thanks for your attention...

QUESTIONS?