PhD Student Orientation
Fall 2017

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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 – wlucas@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 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

Qualifying exams

CS 896 (optional)

Comprehensive exam

CS 990

CS 998

Proposal presentation

Advance to candidacy

No later than 6 years from enrollment in the PhD program

All degree requirements (except dissertation)

At least 1 day

Form dissertation committee

Find dissertation advisor

CS 999

Pre-defense

Defense

No later than 1 month

At least 1 month

No later than 5 years from advancement to candidacy

No later than 18 credits (30 credits if the student did not receive credit reduction for a master's degree)
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](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?