Dissertation and beyond: Ph.D. in CS/SE at UTD

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The University of Texas at Dallas
Goal of a Ph.D. program

• Perform significant research which represents original and “substantial contribution to Science”

• Demonstrate technical “maturity”

• Acquire expertise on a particular topic and general knowledge of the impact of the topic on related fields

Note: Courses are not a goal per se; knowledge learned there to be seen as tools for doing successful research
Timeline

- Year 1: Coursework, qualifying exams, exploration of research areas. Find a research adviser.
- Year 2: Read papers, identify problems to solve, start working on research
- Year 3: Form dissertation committee, complete thesis proposal, start publishing papers
- Year 4: Continue publishing papers, write and defend dissertation, look for a job
Course work

- 5 Core classes from a chosen MS track plus
- CS 6382: Theory of Computation plus
- at least 5 courses at the 6000 level and
- 2 approved 7000 level CS/SE courses
- Other classes and research/dissertation hours
  approved by your adviser
- Total of 75 hours beyond B.S. degree
  - Excluding Pre-requisite graduate hours
- Up to 36 hours can be transferred from M.S.
  degree from other institutions; if approved.
Prerequisites

- All prerequisites marked in your admission email corresponding to the chosen M.S. track (of core courses) must be completed within the first year of study.
- Apply for waiver of prerequisites that you believe have been completed in your prior coursework.
- Transfers/waivers are processed only once each semester (around the second month of each semester). Watch for email announcements.
- All requests for transfers/waivers must be made in the first two semesters.
Prof. Pushpa Kumar  ECSS 4.407  972.883.6904  pkumar@utdallas.edu
MS (not Thesis) last names A – J

Prof. Laurie Thompson  ECSS 3.701  972.883.6326  lthomp@utdallas.edu
MS (not Thesis) last names K – P

Prof. Tim Farage  ECSS 3.609  972.883.4836  tfarage@utdallas.edu
MS (not Thesis) last names Q – Z

Prof. Shyam Karrah  ECSS 3.907  972.883.4197  skarrah@utdallas.edu
All PhD  All MS - Thesis, and IA and SE Tracks  All MS-Fast Track

No advising can be done by PHONE...DO NOT call...Thank You.
Qualifying exams

- Qualifying exams (QE) for any 3 core areas:
  - Object Oriented Software Engineering (6329)
  - Performance of Computer Networks (6352)
  - Database Design (6360)
  - Software Architecture and Design (6362)
  - Computer Algorithms (6363)
  - Artificial Intelligence (6364)
  - Software Testing, Valid’n & Verific’n (6367)
  - Advanced Programming Languages (6371)
  - Machine Learning (6375)
  - Advanced Operating Systems (6378)
  - Advanced Computer Networks (6390)

- Must attempt each of the 3 QEs within first 2 long semesters.
  - A fail in a QE must be redone (only one chance!) in the next semester
  - Rules are in the Department’s web page (read them!)

- Plan your QE schedule **carefully**.

- Prepare well and pass the exams in the first attempt.

- Each core course is guaranteed to be offered once every academic year, and once every calendar year in the evening, but NOT guaranteed once every semester.

- Learn to structure your answers well: intuitive explanation followed by a full analysis
Choose an area based on your interests, strength, and career prospects.

You are likely to work in this area for the next 10 years, if not 30-40 years.

Don’t decide solely based on who is able to offer an assistantship.

Choose a compatible adviser, who is a good match to your working style.
Areas of strength in UTD-CS/SE

- Networking and Telecommunications
  - Wireless networks, protocols, optical networks, distributed systems

- Software Engineering
  - Embedded systems, Verification & testing, Requirements engineering

- Intelligent Systems
  - Artificial intelligence, Computer Vision, Natural language processing, Expert systems

- Computer Systems
  - Databases, Computer/Human Interfaces, Multimedia systems, Computer Graphics, Computer security

- Data Science
  - Combines parallel and distributed systems, efficient data management and analytics, and applications of statistics and machine learning.

- Algorithms and Applications
  - Algorithms, Optimization problems, Computational geometry, Computational biology

Surf the faculty home pages
Getting started in your research

- Literature survey: study the results in your area. You cannot create new knowledge without knowing what is already known.
- Find new, interesting problems in which you can do research. Guidance of your adviser is very important in choosing the “right” problem.
- Learn to read research articles quickly.
- Continue to read new papers in journals and conferences in your area regularly.
- Keep looking for new problems to solve.
You are making good progress if ...

- You are publishing in:
  - reputed journals (ACM / IEEE / SIAM)
  - reputed conferences

- Your work is cited by other leading researchers

- Your work spawns follow-up papers

- Balance quality and quantity

- Your Faculty Supervisor says so!
Balance quality and quantity

- Publish good quality work, often
- Always have several problems on which you are working
- Spend a lot of time (in concentrated doses) working on your research
- Discuss your ideas with your colleagues
- Keep on the lookout for new papers/ideas/problems

**Publish or Perish!**
Improving the chances of getting an Assistantship

- Get good grades
- Make steady progress
- Pass 3 qualifying exams (QEs)
- Publish papers in reputed conferences and journals
- Try to graduate in 4 years
- Find a Faculty Supervisor who is not over extended!
Finding an academic job

- It may be better to find a postdoc position first in a reputed place.
- Need publications in prominent places, in areas where there are openings.
- Meet other people in conferences and workshops and make friends (network!)
- Give invited talks in other universities, labs
Getting more information

- Dean of graduate studies:  
  http://www.utdallas.edu/ogs/
- Graduate catalog  
  http://www.utdallas.edu/student/catalog/index.html
- CS Department Web site  
  https://cs.utdallas.edu/  
  https://cs.utdallas.edu/education/graduate/
- Ph.D. information in CS Catalog Web site:  
  http://catalog.utdallas.edu/now/graduate/programs/ecs/
- Frequently Asked Questions  
  http://cs.utdallas.edu/education/graduate/graduate-faq/  
  Dr. Jorge Cobb (cobb@utdallas.edu)  ECSS 4.208
Steps

- Course work
- Qualifying exams
- Choosing area of research and adviser
- Getting started on research
- Dissertation committee
- Dissertation proposal
- Dissertation submission
- Finding a (academic) job
Useful Skills

- Time management
- Speed-reading of technical articles
- Deep understanding of state-of-the-art and current methods
- Formulation of new problems
- Quick evaluation of new problems and solution methods (to decide if they are worth pursuing)
Any Questions?