Grad Cohort Research II: Successfully Completing Your Thesis
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My Background
- PhD, University of Colorado, 1976
- University of Massachusetts, 1975-present
- Research: Software Engineering
  - Symbolic execution
  - Software testing
  - Software development environments
  - Verification of distributed system
- UMASS Chancellor’s Medal, ACM Fellow,
  2004 CU Engineering Outstanding Alumni Award, 2003 SIGSOFT Distinguished Service Award

Bringing it home
- Have an advisor
- Have a committee
- Have a topic
- Have financial support
- So, what is next?

Setting Research Goals
- Long term goal
  - What will constitute your thesis?
- Plan for how to get from here to there
- Short term subgoals
- Of course, this is research so plans are made to be broken
Long Term Goals

- When deciding your topic
  - Agree on what constitutes a thesis in this area
    - Formal model and analysis
    - System development
    - Experimentation and evaluation
- Revisit, Reevaluate and Revise these plans regularly
- Impact, difficulty, publications will affect the kind of job that you can obtain

Plan how to get *there* from here

- Map out a plan for what needs to be done and the order that you will pursue each part of your thesis
  - track your progress
- Plan for publishable results along the way
- Plan to make appropriate contacts along the way
  - Participate in workshops and conferences
  - Intern or visit with a research group (U or I)
  - Electronically communicate with researchers doing similar work
- Revisit, Reevaluate and Revise these plans regularly

Short term subgoals

- Plan how you will address the subgoal
- Meet with your advisor regularly
  - Arrive prepared
    - Prepare a report about your accomplishments
    - Send the report ahead of time
- Describe
  - What you have accomplished
  - What are the hurdles to be addressed
  - How you plan to proceed and why
- Listen to advice and agree on the next steps

Taking the Initiative in Your Own Research

- Usually start out taking advice
  - Advisor (and committee) set most of the goals and directions
- Want to end up being a colleague
  - Should know your research area better than anyone else (even your advisor)
  - Should be able to defend your work/decisions
  - Should set directions for next subgoals
- Practice
  - Start with short term subgoals, move to larger goals, then move to a broader view
Working through Problems

- Stuck on a research problem
  - Divide and conquer
  - Read the literature
    - Cast a wide net
  - Talk to your advisor, committee members about how to proceed
  - Take a break
    - Work on another part of the project
  - Reconsider the problem and your plans

Advisor Relationships

- Unlike marriage, advisor-advisee relationships are forever
- Want an advisor who will mentor you
  - As a student
  - After you graduate
- Who will help promote your career
  - Write letters
  - Advocate on your behalf
- Others on your committee/faculty can help as well
  - Can “adopt” a mentor

Presenting Your Research Results

- Develop good presentation skills
  - Orally and in writing
- Practice, practice, practice
  - Presentations to your research group
  - Presentations to your department
  - Presentations at conference

Presenting Research Results

- Presentation or Paper
- Develop an outline
- Motivate the work
  - Bigger context
    - What is the problem and why it is important
    - What needs to be done
  - Your piece of the problem/solution
    - Why it is important
    - Don’t over or under sell what you have done
- Introduction and conclusion often the most difficult to write/present
Ethical Considerations

- Do not present your research results without your advisor’s approval
- If you have made “intellectual” contributions then you should be given authorship
  - Support versus Intellectual Contributions
- If you have been the “main” contributor, then you should be the first author and presenter
- Discuss disagreements

A Start, Not the End

- PhD opens the door to a new career path
- Should know
  - How to select a difficult and interesting research direction
  - Form hypotheses that can be scientifically evaluated
  - Conduct research and report on the results
  - Obtain funding, run a research group, be an advisor and mentor to your own students
- Set long term goals
  - Plan for a research career, not just a project