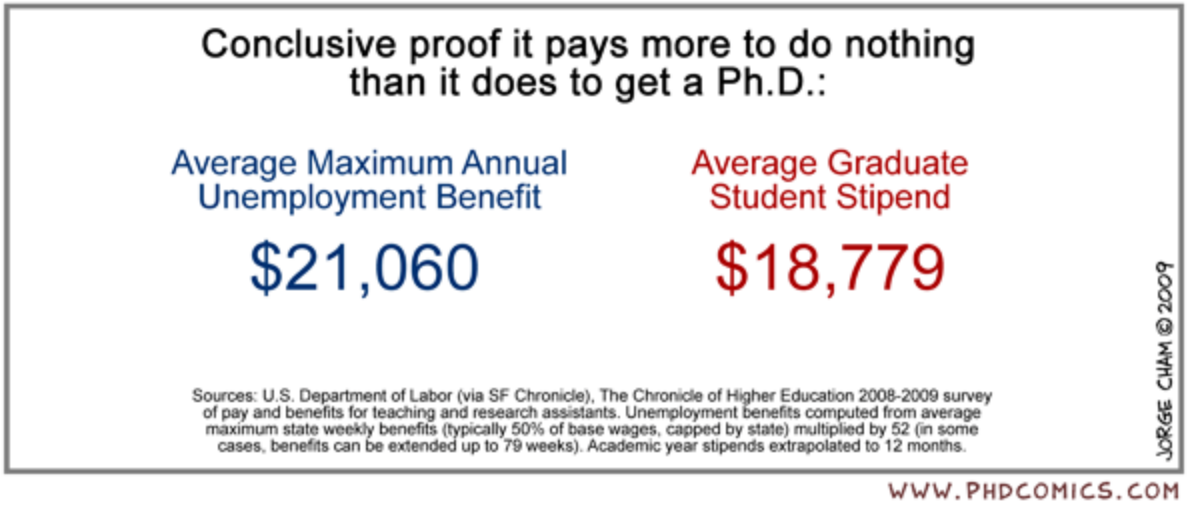
Roadmap to Ph.D. Success

Wilson Rivera, PhD
CISE Coordinator

Agenda

- **Why a PhD?**
- Roadmap to PhD Success
  - Phase I (2-3 year)
  - Phase II (3-5 year)
  - Phase III (5-6 year)

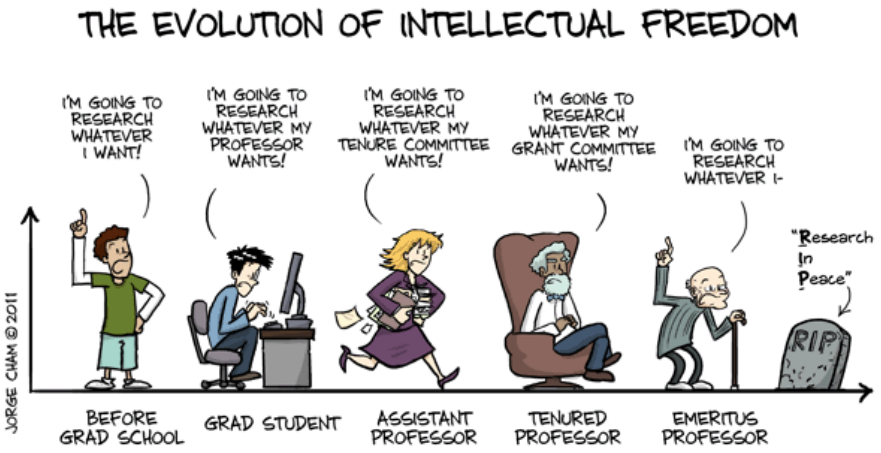
Why a PhD?

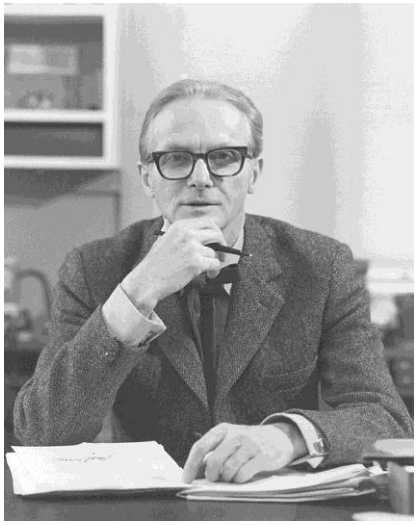


PayScale Salary PhD Computer Science
Salary Assistant Professor in Computer Science

Why a PhD

- "With a Ph.D. you will have a better chance of spending the rest of your life doing what you want to do, instead of what someone else wants you to do."





William Nunn Lipscomb
Novel Prize in Chemistry 1976

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Phase I

- Core courses + deficiency courses
- Qualifiers
- Read papers
- Strong computing foundations
- Help others
- Attend seminars and workshops

PhD is not about courses

Grades Don't Matter, Sources Say

Palo Alto, CA (AP) - Documents obtained by the Associated Press indicate that grades achieved in post-graduate classes have no effect on future prospects for students enrolled in academic institutions.

According to interviews with several current and past graduate students, "grades don't count," said former grad student and now billionaire Jerry Yang, co-founder of Yahoo! Inc. "I got mostly B's in grad school, which at Stanford was really really bad."

A poll conducted by the Los Angeles Times showed that over 85% of first year grads believe getting high marks "is worth the effort" and "a valuable way to spend my time". Fewer than 10% of fifth year students felt the same way.

In reality, neither employers nor your parents appear to care if you get an A or a B in your advanced Nonlinear Optimization class. "I'm just glad I don't have to pay for tuition any more," said a mother who wished to remain anonymous.

Reaction among graduate TA's was mixed, with some expressing shock that their late hours grading amount to nothing, while others showed visible relief that losing a student's final exam will not really ruin their life.

Sources close to academic faculty reveal that this fact is well known among professors. "Of course grades don't matter," said Prof. Smith, "we only care about the lab work." Grades only serve to "feed the ego of the smart students, and break the spirit of the mediocre ones."

NOW you tell me?? A grad student expresses frustration over the revelation

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PhD = Coursework(10%) + Qualifier/Prelim (10%) + Research (80%)

Qualifiers

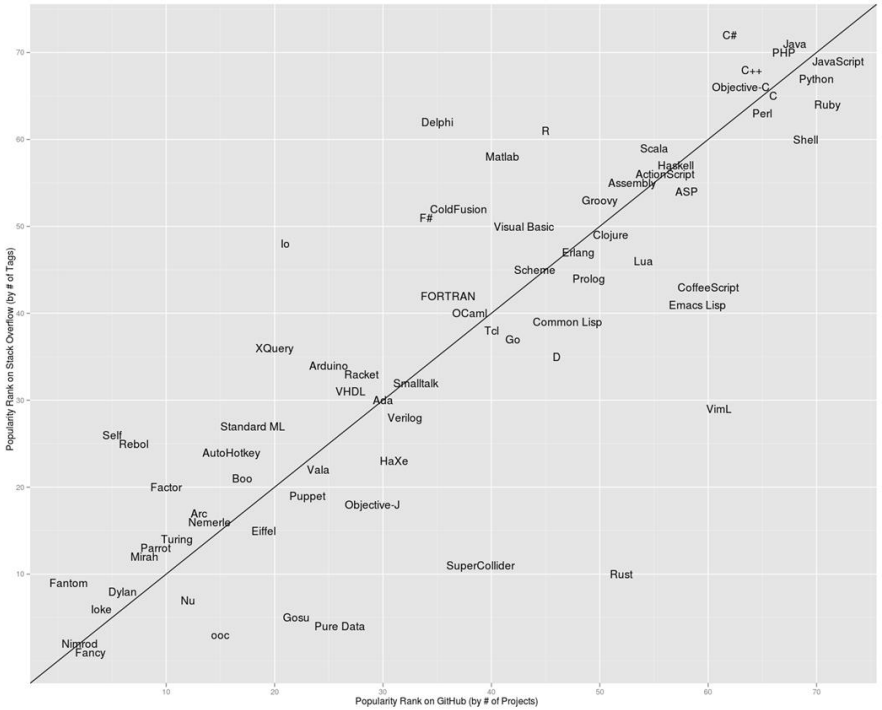
- Plan for qualifier exams
  - Syllabus and previous exams available
  - Algorithms (Fall)
  - Theory and Architecture (Spring)
  - Review (Summer)
  - Procrastination (delay taking exams)
- Individual study + group discussion
- Schedule meeting with professors who teach core courses
  - Get feedback on problem solutions

Read, Read and Read

- Choose you area of expertise early
- Make yourself an expert
- T-Shaped Skills
  - Broad: General knowledge
  - Deep: Disciplinary Skills
- Get a reference manager
  - Mendeley

Strong Computing Foundations

- Math
  - Modeling
  - Numerical analysis
  - Complexity
  - Probability
  - Data analysis
- Computer Science
  - Data structures
  - Algorithms
  - Operating systems
- Learning platforms
  - Coursera, edx, udacity



Help Others

- Volunteer yourself to help
  - Advanced PhD students
  - Faculty
  - External projects
- Associations and Community
  - ACM at ECE
  - Community development
- Undergraduate research
    - You may lead a group of undergraduate students

Seminars and workshops

- Do not discriminate on seminar talks and workshops
- The “three things” exercise
- Opportunities
  - Professional Enrichment Center (CEP)
  - North East Alliance (NEA)
  - CISE Lectures

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Phase II

- Advanced courses
- Research ownership
- Poster and conferences
- Help your advisor with proposals
- Publish one peer-reviewed paper
- Candidacy exam
  - Research Proposal

Advanced Courses

- Again it is not about course
- But If you have to take advanced courses
  - Target to your research
  - or create new opportunities
    - A genetic algorithm for Euclidean distance metrics

Research Ownership

Poster and Conferences

- Poster Framework
  - Problem statement
    - Description
    - impact
  - Technical Approach
    - Definitions
    - Architecture
    - Results
  - Experimental Evaluation
    - Test bed Description
    - Performance metrics
  - Conclusion and future work

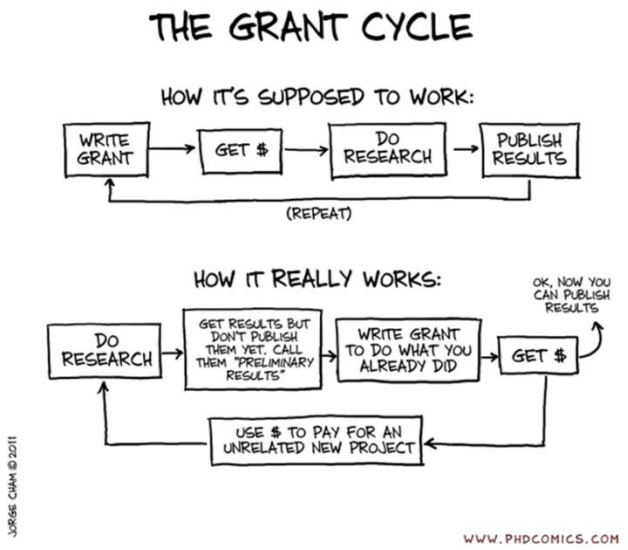
- Can you explain the problem in 30 sec?
- Can you say why is so important to solve this problem?

Research Proposal

- Proposal Summary
  - Intellectual Merit
  - Broader Impact
- Problem Statement
  - Why does this research study need to be conducted?
  - What specific issues does this study raise that have not been observed in other literature pertaining to the topic?
- Background
  - Discuss the theoretical framework underlying the proposed research
  - Define terminology and relevant concepts.
  - How existing approaches compare to your proposed research. Consider only peer-reviewed papers on well-known journal and conference proceedings
- Research Objectives
  - State clearly the hypothesis
- Research Plan
  - Explain with detail the steps you will take in order to test the hypothesis including instruments, experiments, and metrics
- References
  - Include bibliographic citations only
  - Include peer-reviewed scientific publications only.

Candidacy Exam

- Demonstrate quality of research
- Publish one peer-reviewed paper
- Help your advisor with proposals
  - Has your project potential for funding?



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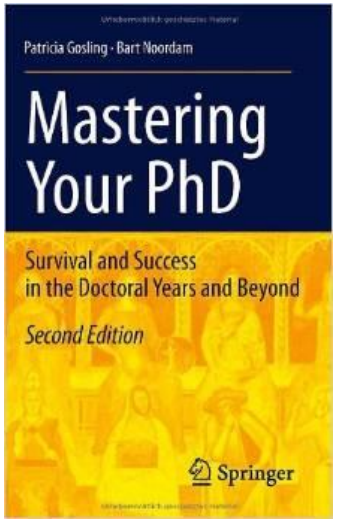
Phase III

- Research
  - Solid theoretical background
  - Good empirical evaluation
- Give talks
  - Networking
  - Job seeking
  - Postdoctoral opportunities
- Don’t leave writing for the end

Contents of your thesis

- Chapter 1: Introduction to the field of research
- Chapter 2: Methodology, research instruments
- Chapter 3: Research project 1
  - Already published as journal article
- Chapter 4: Research project 2
  - manuscript submitted for publication
- Chapter 5: Research project 3
  - data available, no conclusions drawn yet
- Chapter 6: Research project 4
  - The new project
- Chapter 7: Conclusions/summary



Conclusion

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