

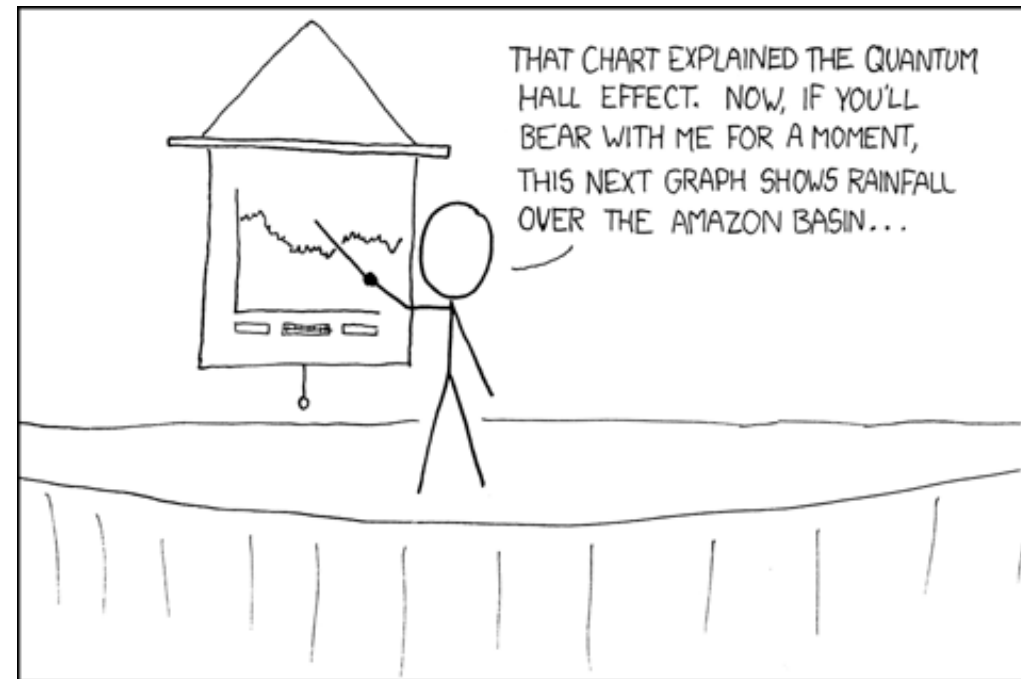
# Introduction to Graduate School

## Westley Weimer



# This Talk

- What is grad school?
  - MS? PhD?
- Why grad school?
- **Funding**
  - TA, RA, Fellowship
- Advisor Interactions



IF YOU KEEP SAYING "BEAR WITH ME FOR A MOMENT", PEOPLE TAKE A WHILE TO FIGURE OUT THAT YOU'RE JUST SHOWING THEM RANDOM SLIDES.

# Is Grad School Necessary?

- Many smart people go right to **industry**
  - Learn on the job
  - Advance within one company or hop jobs
  - Entrepreneurs cannot afford to wait
- For some, **grad school** provides
  - A way to one-up UVA on the resume (**degree as status symbol**)
  - A fast track to a good job (**faster than working your way up**)
  - Unique opportunities (**only way to be a professor**)
  - A great time to focus on and pursue your interests

# What's Grad School Like? (1)

- One professor's perspective ...
- Intellectual entrepreneurs: every professor runs **a small company**
  - Product: invents and develops long-range research
  - Customer: typically Federal Government (National Science Foundation, Defence Advanced Research Projects Agency, National Institutes of Health) and other academics
  - Annual Revenue: \$300,000 - \$1,000,000
  - Employees: Grad students (you)

# What's Grad School Like? (2)

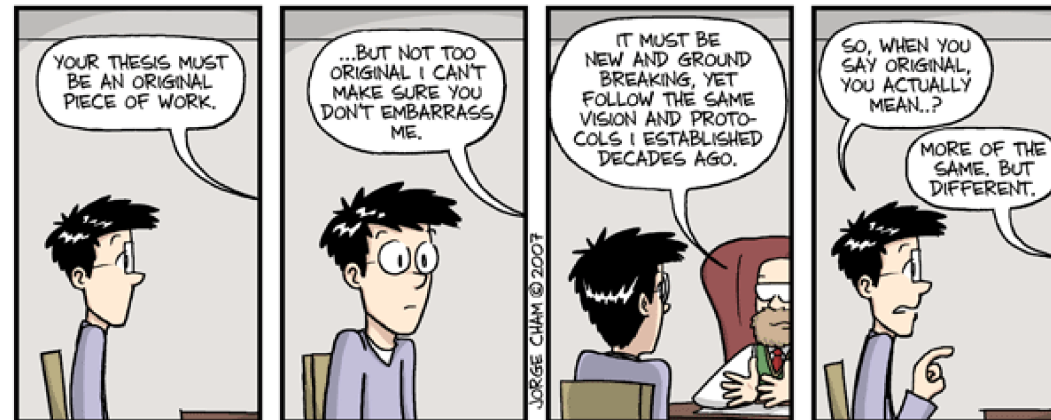
- One student's perspective ...
- **Job of ultimate mastery**: plenty of freedom, few deadlines
  - After the first year of taking classes, grad school is very cyclic: downtime between paper deadlines
  - Host dinner parties, take long weekends to go skiing, learn ballroom dancing and sailing, LAN parties and German board games, watch Bollywood movies, eat Ethiopian food, ...
  - And then pull an all-nighter before the deadline

# Degree Options: MS

- **The Master of Science Degree:** 1.5 - 2 years
- **Coursework** similar to senior-level undergrad
- Usually gives an opportunity to specialize
  - Can easily start without selecting a focus area
  - Good schools provide opportunities to take many focused classes in your favorite area
- Research (a thesis) may be required
- Tuition and stipend are possible
  - Varies from school to school
  - **Beware** of diploma mills and buy-your-own-MS

# Degree Options: PhD

- **Doctorate of Philosophy**: 4 - 7 years
- MS Coursework + a few seminars
- **Research** is required (papers plus thesis)
- Standard: **they pay** your tuition, your health insurance, and give you a stipend
  - Say, you make \$16k every 9 months
- Required to **specialize**

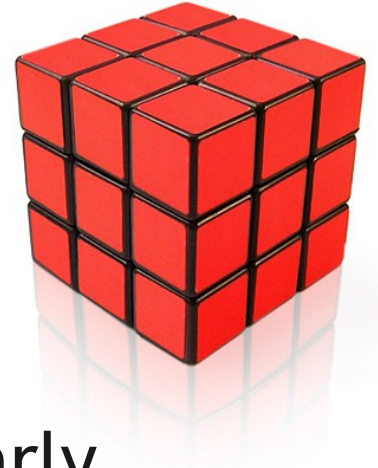


# Should I Stay Or Should I Go?

- What are your **career goals**?
  - Sick of school? Learn on the job? Entrepreneur? Manage engineers? Professor? Don't know?
- Do you enjoy **learning** and being an **expert**?
  - A PhD makes you the world expert in *YourThing*
- Do you like being a big fish in a small pond?
- Do you prefer change or constancy?
  - Higher degrees are an entrance into management and provide you with more control
- What's your current financial situation?



# BA/BS Pros and Cons



- **Bachelor's Degree**

- ✓ Good starting salary (\$60k) but peaks early
- ✓ Many job openings
- ✓ Can swap jobs or move to management
- But many jobs are entry-level
- Less **control** of day-to-day tasks
- Employer usually benefits from not promoting you
- May become **bored** and have to hop jobs
- Less job **security**

# Show Me The Money

- Class of 2011 BA/BS Salaries (all America)

- Chemical Eng	66,886
- Computer Science	63,017
- Mechanical Eng	60,739
- Electrical Eng	60,646
- Computer Eng	60,112
- Industrial Eng	58,549
- <b>Overall Average</b>	<b>50,462</b>

UVA CS  
11% higher

- National Association of Colleges and Employers Survey

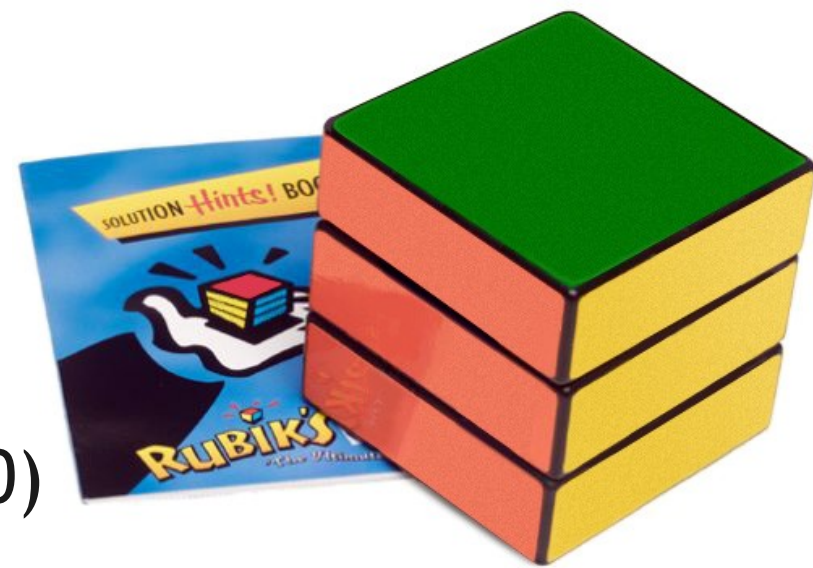
- [http://www.nacweb.org/Research/Job\\_Outlook/Job\\_Outlook.asp](http://www.nacweb.org/Research/Job_Outlook/Job_Outlook.asp)



# MS Pros and Cons

- **Master's Degree**

- ✓ Better starting **salary** (\$80,000)
- ✓ Many job openings
- ✓ Potential to start at **management** level
- ✓ Opportunity to swap jobs
- ✓ More control of day-to-day tasks
- ✓ Only takes two years to get degree
- Still not in charge of project
- May become bored by repetitive tasks
- May become frustrated by poor employees and lack of support from upper-level management



# PhD Pros and Cons

- **Doctorate of Philosophy**

- ✓ Better starting salary (\$120,000)
- ✓ Large amount of **control** over work
- ✓ Opportunity to **teach** at university
- ✓ Be the world's **expert** in *YourThing*
- Long hours, hard work
- Management skills assumed
- 3 - 4 years of income beyond MS is lost
- Overqualified to make large jumps between fields
- 30% go off to teach, 30% go to industry



# Industry vs. Academia

- Very different lifestyles
- Both are intense!
- Professor
  - Tenure and funding struggles
  - Tenure security
  - More control over activities
- Industry
  - Survive in an era of downsizing and project shakeups
  - Product focus for research



# Funding Paths

- Teaching Assistant
- **Research Assistant**
- Fellowship Student
- No Funding

## DEPARTMENT RECRUITMENT STATISTICS



## HARD TO BELIEVE? NOT ACCORDING TO THE OFFICIAL DEPARTMENT BROCHURE!



JORGE CHAM © 2006



# Teaching Assistantship

- A full-time graduate **TA officially works 20 hours** each week (on TAing; more hours on research)
- In exchange, the department pays your tuition, health insurance, and stipend
- This can happen automatically for your **first few semesters**
- You can be picked up “early” as an RA

# Research Assistantship

- A **professor must agree** to take you on
  - It's not automatic
- In exchange for doing whatever the prof says
  - The prof pays your tuition, health insurance and stipend out of grant money
- This is the **norm for CS grad school**





# Fellowships





- An **external source pays** your tuition, health insurance and stipend
  - For a few years
  - Or it just gives you some money
- This makes you very attractive
  - Your advisor does not have to find money for you
- Fellowships are relatively rare

# Not Funded

- If you are not funded, you must officially pay your own tuition
  - And cover your other expenses, including health
- Usual cause: **summer internships**
  - They pay you much more than we do
  - No tuition over the summer, etc.
- Very very rare: unfunded normal student

# Hidden Costs

## Online stores

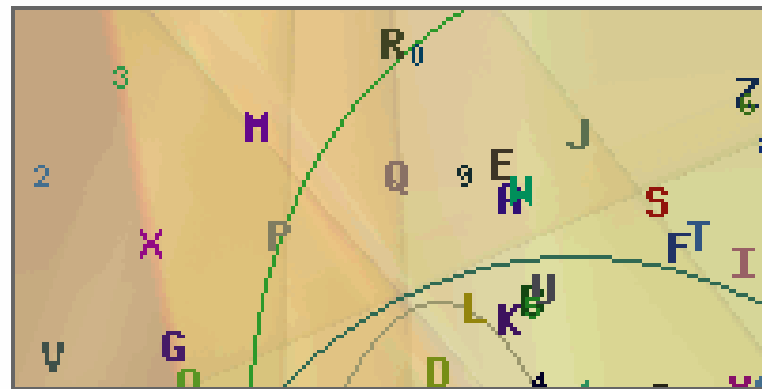
Store	Certified rating	Inventory	Price	Total price
 800-617-4686 Your Trusted Source since 1983	★★★★★ <a href="#">Rate this store</a> <a href="#">See store profile</a>	In stock Great Accessory Prices	Price: \$65.00 Tax: \$0.00 Shipping: Free	<b>\$65.00</b> <a href="#">Shop now</a>
	★★★★★ <a href="#">Rate this store</a> <a href="#">See store profile</a>	In stock Free Shipping on Orders \$24 and up	Price: \$69.99 Tax: \$4.55 Shipping: Free	<b>\$74.54</b> <a href="#">Shop now</a>
	★★★★★ <a href="#">Rate this store</a> <a href="#">See store profile</a>	No Order Now-Ships Today	Price: \$68.99 Tax: \$4.48 Shipping: \$875,720,000,100.00	<b>\$875,720,000,173.47</b> <a href="#">Shop now</a>
 JR.com	★★★★★ <a href="#">Rate this store</a> <a href="#">See store profile</a>	In stock	Price: \$69.00 Tax: \$0.00 Shipping: \$6.95	<b>\$75.95</b> <a href="#">Shop now</a>

# Keeping Advisors Happy

\*City you require vehicle:

\*Comment/Query

**Due to increased security, in order to complete your submission please copy the contents of the box OR calculate the mathematical problem into the box below the image.  
Your answer is CASE SENSITIVE.**



Result from image:

Submit

Reset

# Faculty Expectations of Grad Students

- A recent straw list from a CS faculty member:
  - Should be working 70-80 hours a week
  - Should be at UVA even between semesters and the summer
  - Need to work in the office
  - Need to establish a research culture
  - Need to attend talks: have broad interests and be inquisitive
  - Participate in department social activities
  - Contribute to department: e.g., open house
  - Improve your English quickly
  - Take writing courses
  - TAing is very important
  - Pay for your coffee!

# Advisor Interactions

- You pick your advisor based on “trial research projects” and classroom experience
- Once-a-week or twice-a-week meetings
  - One hour of directed interaction
  - Possibly “entire research group meetings”
- Advisor: propose and evaluate research topics, help with experimental design, choose publication venues, help with paper writing
- You: perform experiments, come up with ideas, write up results, (classes, TA, RA, exams, ...)

# Questions?

