

NSF Graduate Research Fellowship Program

(...and some general grad school application advice)

Molly O'Neil
REU Summer 2016



The rising STAR of Texas

NSF GRFP

- Oldest graduate research fellowship of its kind
 - And one of the most well-known
 - Some programs make all 1st-year grad students apply
- ~50,000 Fellowships awarded since 1952
 - Including 40 Nobel Laureates
- 2016: 2,000 Fellowships
 - ~12% success rate
 - Also some Honorable Mentions



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NSF GRFP Fellows have...

- * Higher Ph.D. completion rates
- * More diversity

Financial Details

- 5 year award
 - 3 years of support
 - Can be deferred up to 24 additional months
- Annually:
 - \$34,000 stipend
 - \$12,000 cost-of-education allowance
 - This one is to the university, not the student!
 - A reason to choose an inexpensive state school
 - Professional development opportunities
 - XSEDE access



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Some schools let you spend the extra \$\$ on things like...

- * Computers and other equipment
- * Workshop and tutorial registration
- * Conference travel



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Finishing my thesis in flawless 73°F
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Macbook Pro bought with GRFP CoE



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- Portable
 - Can be awarded at any accredited U.S. institution (and can transfer between schools)
 - Can start in M.S. program, bring award to Ph.D. at another school



Eligibility

- U.S. citizens, nationals, permanent residents
- Pursuing a Master's or Ph.D. in an NSF field
 - No medical, public health, law, education (except STEM research), business management
- Early career
 - Senior year of undergrad
 - Between undergrad and grad school
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New this year:
Only 1 application in
grad school!

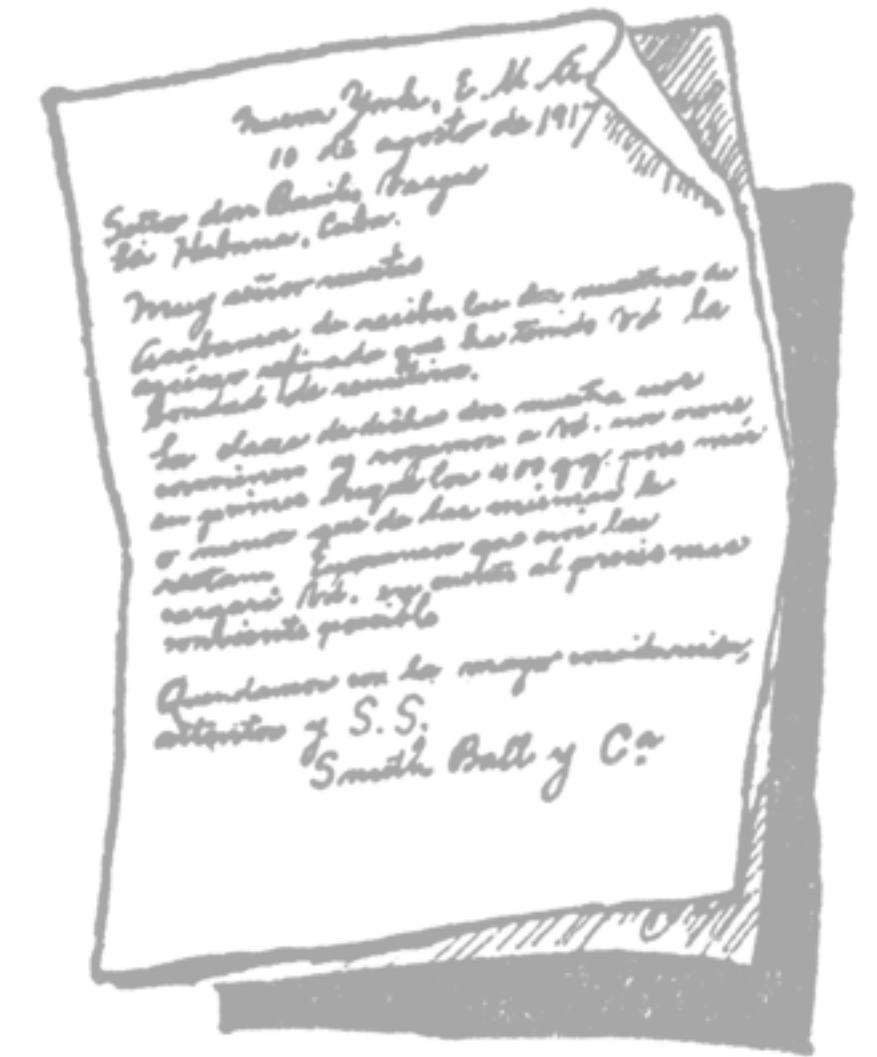
Application Cycle

- Application usually online in August
 - <https://www.nsfgrfp.org>
 - Tracked via NSF FastLane
- **Deadline**: late October to early November
 - Varies by field
- Awards announced: Late March to early April
- 2016 application screenshots online if you want to start early



Application

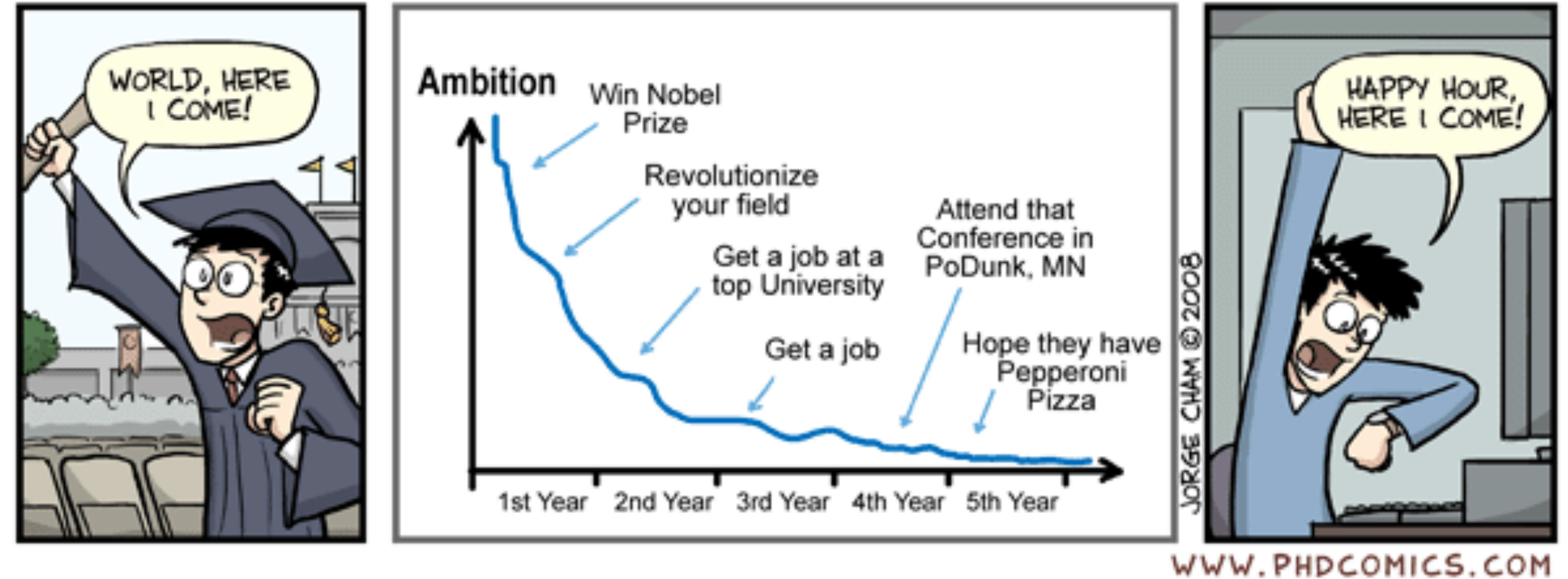
- Online application
 - Education/work experience
 - Proposed graduate program
 - Tentative — you can change your project/school choice later
- Two essays
 - Personal Statement, Background, & Future Goals (3 pages)
 - Proposed Research (2 pages)
- Three letters of reference



Essay #1 (3 pages)

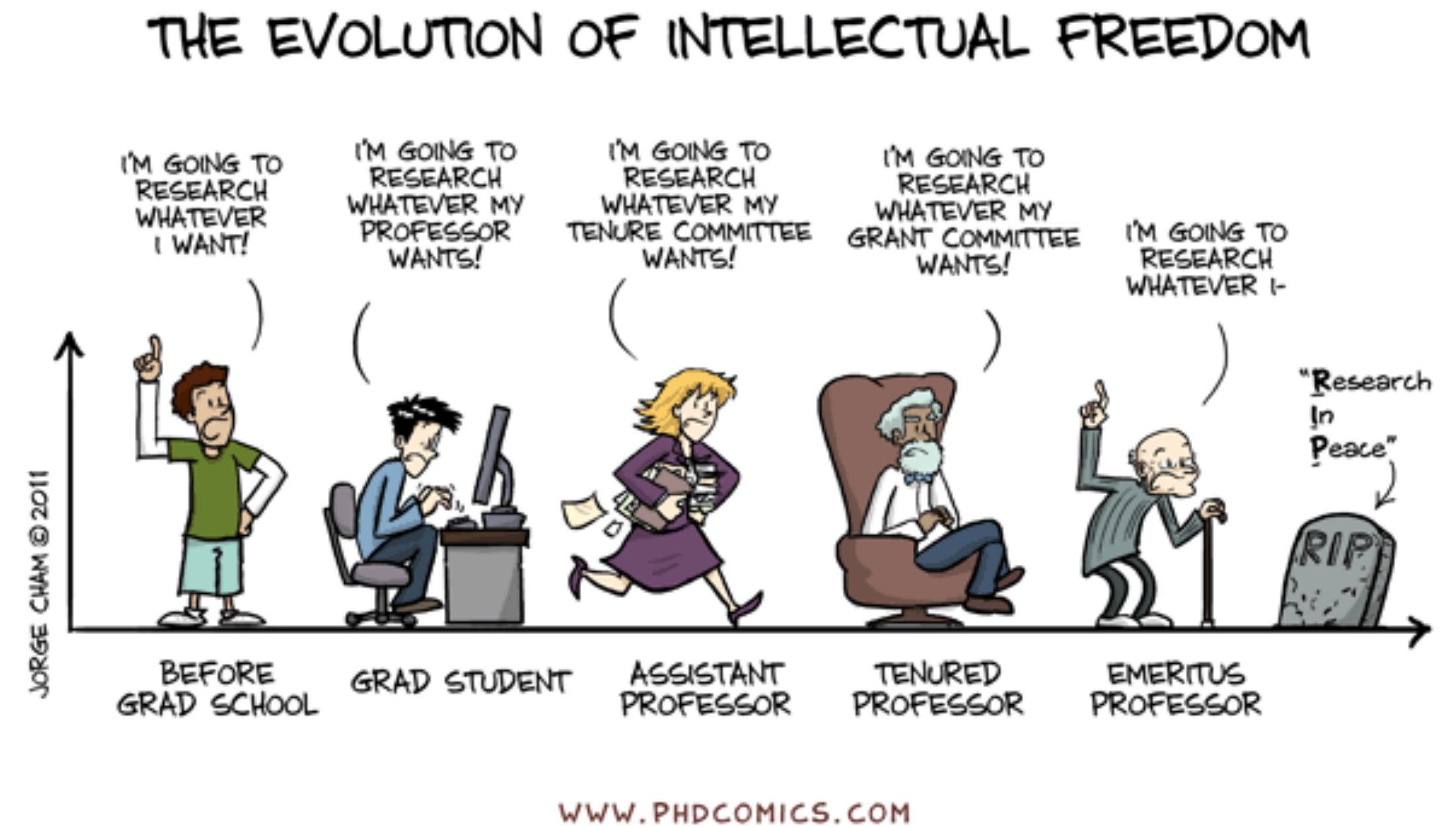
- Personal Statement, Relevant Background, and Future Goals
 - Outline your career goals. How will grad school prepare you to contribute to science/society?
 - Describe personal, educational, professional experiences motivating your goals
 - Describe activities, highlight results
 - Discuss independent work vs. where you worked as part of a team
 - Describe how activity advanced knowledge or contributed to society
 - How did these activities prepare you for graduate school?
- Order this however best tells your story

YOUR LIFE AMBITION - What Happened??



Essay #2 (2 pages)

- Graduate Research Statement
 - Present original research topic you would like to pursue in graduate school
 - Describe your approach
 - Describe any unique resources needed
 - Address the potential of the research to advance knowledge and understanding and its broader impact on society
- Get a trusted professor's help with this!
- Cite sources (related literature)



NSF Review Criteria

- Intellectual Merit
 - The potential to advance knowledge
- Broader Impacts
 - The potential to benefit society and contribute to the achievement of specific, desired societal outcomes
- **Important**: include separate statements for both criteria in BOTH essays!!



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 - Does the applicant have the potential to advance knowledge based on previous research and educational experience?
 - What are the applicant's qualifications for the specific proposed project?

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 - Does the applicant have the potential to advance knowledge based on previous research and educational experience?
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- Proposed Research
 - How would the proposed project advance science?
 - Is there a detailed plan with realistic objectives and measurable outcomes?

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- Personal Statement
 - How do applicant's personal/educational/professional experiences indicate potential for societal benefit?
 - Does applicant have demonstrated record of service to the community, commitment to encouraging diversity, K-12 outreach?
 - Do applicant's future plans suggest future broader impacts?
 - The identity of an individual does not in itself constitute a broader impact!

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- Proposed Research

- How will this research contribute to desired social goals?
 - E.g., bring low-cost/low-energy supercomputing to the masses allowing transformative advances across broad scientific domains
- Why should the government fund your project (with tax dollars!) over everyone else's?

Broader Impacts

Google "Broader Impacts"
for more help!

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- *Panelists don't care about undergrad course projects*
 - But... My large, entire-class research project course definitely helped: real research component, I had a leadership role
- *Off-topic work doesn't help you*
 - But... My public policy double major was cited by reviewers as an indication of future broader impacts (experience thinking about societal impact of tech)

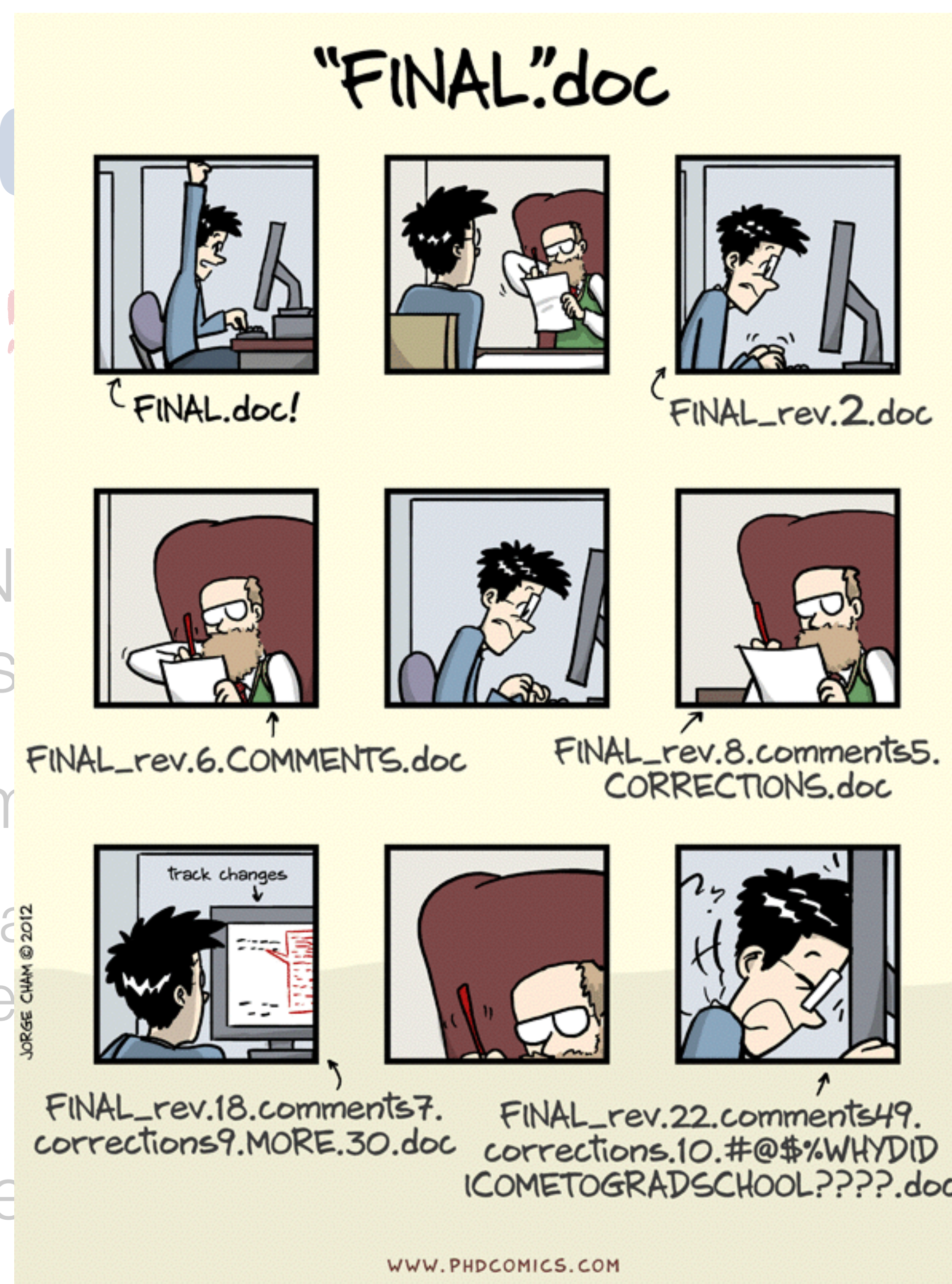
One More Time...

!!! Intellectual Merit !!!
!!! Broader Impacts !!!

- Panelists are ONLY allowed to score your application (including background, essays, and letters!) on the 2 Review Criteria
- Don't make them synthesize this information on their own!
 - My application had bold headings at the bottom of each essay summarizing a few bullet points for each criterion
- Last bit of advice: **START EARLY!**

One More Time

- Panelists are ON background, essentially
- Don't make them
- My application has summarizing a few
- Last bit of advice



Some General Grad School Application Advice

How to Get Good Letters of Reference



- Recommendation letters should be personal!
 - Don't choose the famous name or impressive letterhead who barely remembers you and will send generic boilerplate
- Provide a written list of things you want your letter writer to mention
 - For NSF GRFP, include the Review Criteria — they should clearly address Intellectual Merit and Broader Impacts
- Choose letter sources so letters confirm the narrative in your personal statement
- Preferably multiple professors
- Give your letter writers lots and lots of time (and send reminders!)

How to Find Potential Programs

- Decide a broad area you're interested in (e.g., machine learning, robotics, programming languages)
- Find the top academic conferences in that sub-field
 - Profs in your department who research in the same area can probably help with this (as well as with connections to researchers in your area of interest)
 - Look through the last few years of conference proceedings
 - Who's doing the work you're most interested in?
- Go to conferences and talk to people around you!
 - Conversations during session breaks at conferences have yielded most of the academic connections I have (even when I wasn't a speaker)



* the obligatory plug for my Masters research lab...

How to Choose an Advisor

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- It's important to work on something you're interested in
 - After all, it's 5-6 years of your life!
 - Really hard (on both you *and* your advisor) to work with someone who isn't **excited about the same things** you are

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- But there are other factors to consider...
 - ***Personality matters!*** (...and is too often overlooked until much too late.)
 - How much direction do you want? Do you want to be given a project or be left to design your own? Do you like or abhor constructive confrontation? How much mentoring do you expect/want outside of direct technical suggestions? Do you want a boss or a collaborator?
 - **Early career vs. tenured**
 - I once read the advice: "Choose someone just starting out and be their first child"
 - Professor's career stage will determine amount of pressure to publish



How to Email a Research Professor



- Top research professors get 100s of unsolicited emails from students hoping to be let into their university or lab
 - It's still OK to send that email, but...
- Don't send a form letter!
- Demonstrate you've researched their research: ask an intelligent question or two about one of their recent papers
 - Or at the very least tell them what (specific thing) they're working on really interests you
- Read their entire website first!
 - I've seen professors filter out the form emails by burying somewhere on their website a specific subject-line to use for "I want to work with you" emails
 - E.g., "Apple Juice Is Good For You"?! (<http://users.ece.utexas.edu/~derek/ProspectiveGraduateStudents.html>)

Grad School: Now vs. Later

- Common graduation refrain: "I'll work for a few years and then go back to grad school."
 - ...I'm the only one I know who actually did it.
- Why?
 - The money in industry is really, *really* good
 - Real life hits fast, and real life can be hard to balance with grad school
 - (But not impossible, obviously)
- If you think you're interested in research... now not later!



vs.



???

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