Is grad school right for me?
If so, how do I get there?

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Undergraduate Faculty Advisor
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What is a PhD?

- Take some piece of knowledge about the universe from \((\text{frontier} - \varepsilon)\) to \((\text{frontier} + \varepsilon)\)

- Start out knowing nothing about a topic, and four years later you are the world expert

- “License to think” – allows you to write grants, direct research projects, teach @ college/univ
Why Go to Grad School?

Deeper understanding of a subject
Better/different job prospects
Participate in the excitement of the intellectual frontier

DON’T
- Assume automatic faculty position
- Drift into graduate school

You are here
Grad School
GOALS
Get a PhD and Become ... 

- A researcher
- A communicator
- A visionary
- A problem solver
- A politician
- The smartest homemaker on the block
- ....
Where to Go? What Field?

What Subject for your Advanced Degree?

- Medicine
- Law
- Chemistry
- Engineering (Electrical, Materials, Chemical, ...)
- Physics
- Astronomy

2012 MCAT

<table>
<thead>
<tr>
<th>Major</th>
<th>Phys Sci</th>
<th>Bio Sci</th>
<th>Verbal</th>
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<tr>
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<td>9.7</td>
<td>8.7</td>
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<td>9.9</td>
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2012 LSAT

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<th>Mean</th>
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<tr>
<td>Physics</td>
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<td>Political Sci</td>
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\[
\frac{228 + 126}{6776} = 5.2\% 
\]

http://www.aip.org/statistics
What else could I do?

Trends in initial outcomes of physics bachelor’s Classes of 1995 to 2014 (1 year post degree)

Status of Physics Bachelors One Year After Degree, Classes 1995 through 2014

- Employed
- Physics or Astronomy Graduate Study
- Graduate Studies in Other Fields
- Unemployed

Degree Class

http://www.aip.org/statistics

National 2013-14
- Work 41%
- Other Grad 22%
- Phys Grad 32%

UW 2015
- Work 58%
- Other Grad 10%
- Physics Grad 13%

Other 19%

Unemployed 5%

http://www.aip.org/statistics
Who hires physics bachelor’s?

Washington Employers that recently hired new physics bachelor recipients

https://www.aip.org/statistics/washington

- Amazon
- Areva
- Bainbridge Parks & Recreation
- Battelle
- Best in Class Education Center
- Blue Box Group
- Bombsheller
- Bruker Elemental
- Cascade Gasket, Inc.
- Chipton Ross
- Corvus and Columba LLC
- David Evans and Associates, Inc.
- Det Norske Veritas
- Device Inside, Inc.
- Eagle Harbor Technologies, Inc.
- Electroimpact
- Exotic Metals Forming Company
- Financial Partners, Inc.
- Flexasoft
- Google
- Gravity Jack, Inc.
- HopeSource
- Hewlitt Packard
- Intentional Software
- L&S Engineering.
- Lockheed Martin
- Logos Bible Software
- Marchex, Inc.
- Micro Encoder, Inc.
- Microsoft
- Milliman
- NAVSEA
- NW Medical Physics Ctr
- Octapharma Plasma, Inc.
- PNNL
- Pellego
- Physio-Control
- Procure Treatment Centers
- PSC Biotech
- Puget Sound Naval Shipyard
- RAFI USA
- Randstad
- Red Head Steering Gears
- Schneider Electric
- Schweitzer Engineering Labs.
- Seattle Children's Research Inst.
- Space-X
- Tableau Software
- TecAce Software Limited
- Telect, Inc.
- TigerStop
- US Navy
- University of Washington
- Woodruff Scientific Computing
- X2 Biosystems
- Zulily

What’s a Bachelor’s Degree Worth?

Typical Salaries for Bachelor’s Degree Recipients, Class of 2015

Bachelor’s Field
- Computer Science
- Aerospace Engineering
- Physics
- Chemical Engineering
- Electrical Engineering
- Mathematics
- Mechanical Engineering
- Finance
- Civil Engineering
- Registered Nursing
- Accounting
- Business Admin/Mgmt
- Chemistry
- Psychology
- Biology

Note: Typical salaries are the middle 50%, i.e. between the 25th and the 75th percentiles.

Reprinted from the Spring 2016 Salary Survey, with permission of the National Association of Colleges and Employers, copyright holder.
How many people get a PhD?

Will PhD Programs expand with rise in B.S.?
Newly Hired Faculty Growth < PhD

2008 Hire /2004 PhD = 40%
2010 Hire /2006 PhD = 26%
2014 Hire /2010 PhD = 30%

Jobs like mine: 10%?
General Academic: <30%
What else can I do with a PhD?

• Self-employed
• Finance
• Gov’t Contractors
• Health & Medicine
• Industry
  • Engineering
  • Computer Science
  • Physics
  • Other STEM
  • Non-STEM

Most Common Activities:
• solving complex problems
• managing projects
• writing for a technical audience
PhD 10-15 Years Post Degree

Data include US-educated physicists who earned their PhDs 10-15 years earlier and were working full-time in the US in 2011. Respondents were asked to provide their current annual salary excluding bonuses, overtime, and additional compensation. Typical salaries are the middle 50%, i.e. between the 25th and 75th percentiles. “N” represents the number of physicists who responded to the survey, were full-time employed, and provided salary data.

Classes of 1996-7 and 2000-2001
Polled by AIP in 2011
So if I do go to grad school …

- What happens?
- How long does it take?
- How do I finance it?
- How do I figure out where to go?
- What are grad schools looking for?
“Standard Path” to the Ph.D.

Take Classes

Dream New Ideas

Take Data

Analyze Data

Present work

Read other people’s ideas, get trained

GRADUATE

Publish results
“Standard Path” to the Ph.D.

1. Take Classes
2. Read other people’s ideas, get trained
3. Dream New Ideas
4. Take Data
5. Analyze Data
6. Present work
7. Publish results

2-3 years

2-4 years

GRADUATE
How long does it take?

AIP Statistics

UW Statistics

Classes of 2010-2011

Number of PhD Students

Pre-qual  Pre-General  Post-General  Ph.D.  Left
So if I do go to grad school …

- What happens?
- How long does it take?
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- How do I figure out where to go?
- What are grad schools looking for?
You get **PAID** to go to grad school!!

**PLUS:** Your tuition gets paid & you don’t have to pay off student loans until you graduate

*You don’t add to your savings, but you don’t deplete them, either.*

**Current UW Rates:**
$2228-$2572/mo ($27-31k/yr)

**Current NSF Fellowship:**
$2833/mo ($34k/yr)

**Roommates**
Used Car, New Computer

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**Primary Type of Support for Physics Doctoral Students**

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<th>Time (yrs)</th>
<th>Fellowship</th>
<th>RA</th>
<th>TA</th>
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*Source: AIP Graduate Student Survey, 2006*
So if I do go to grad school …

- What happens?
- How long does it take?
- How do I finance it?
- How do I figure out where to go?
- What are grad schools looking for?
GradSchoolShopper.com

Find your graduate program in the physical sciences.

Sort Graduate Programs by:
- Acceptance rate
- Financial aid package
- Research budget
- Grants & research expenditures
- Department size
- Faculty, enrollments, and degrees granted

Browse Graduate Programs by:
- GRE requirements
- TOEFL requirements
- Admission deadlines
- Financial aid deadlines
- Specialties for degree program
- Departmental research specialties
- Institutional & Department location

Rice University
M.S. in Nanoscale Science/M.S. in Space Studies
Houston, Texas

Learn more about this program

AIP | American Institute of Physics
© 2016 American Institute of Physics
Information Available

- Description of University
- Deadlines; Average GRE scores, GPA
- Information by subfield:
  - Number of grad students
  - Number of Ph.D. granted
  - Number of faculty
  - Research $$$
- Fraction TA/RA/Fellowship
- Requirements
  - e.g. Qualifying Exam, Foreign Language
Top Tier? Big? Close to home?

- **Ranking:**
  - “Top12” hire each other’s grads
    - Hardest to get into
  - Next tier = schools like UW
  - Lower ranked departments often have pockets of top-ranked subfields

- **Size:**
  - Large comprehensive department lets you change sub-fields easily
  - Small lets you be a bigger fish in a smaller pond

- **Geography**
So if I do go to grad school …

- What happens?
- How long does it take?
- How do I finance it?
- How do I figure out where to go?
- What are grad schools looking for?
What do they know about me?

- **GRADES**
  - GRE
    - Physics + General
- **Letters of Recommendation**
- **Your Essay + Cover Letter**

- Weighting Varies
- Deadlines IMPORTANT -- usually January
- Schools offer by 4/1; You decide by 4/15
- FOLLOW INSTRUCTIONS
- CHECK SPELLING and GRAMMAR
- TYPE YOUR ESSAY
Physics GRE of US Admits:
- Averages in the low 800s (out of 990)
- Admission rare below the mid 600s

Average GPA:
- Average 3.75 (3.85 last two years)
- Admission rare below ~ 3.4
- UW UG Physics: 25% > 3.5; 10% > 3.75

ADVICE from our Admissions Chair
- Study for the GRE
- Get research experience
Study for them!!
- Can increase score >100 points
- Figure out your best balance of speed and accuracy

UW physics grad admissions averages:
- Verbal 606
- Quantitative 726
- Analytical 779
- Physics >800 (and RISING)
Letters of Recommendation

GET TO KNOW 3-4 FACULTY NOW!!

Choose people who KNOW you well

Ask if they’re willing to write you a good letter

Provide background information

Give plenty of time

Gently verify/remind as deadline approaches
Personal Statement

- Be honest and sincere
- Connect to the target department
  - Mention specific research areas, faculty
- Speak to your strengths and goals
- Address any irregularities in your record
- EDIT for grammar, spelling, coherence
- Have someone read your essay
  - Professor, Catherine, TA, ...
- Keep your goals in mind
Research Experience

- VERY HELPFUL to your application
- The vast majority of accepted students have some research experience as undergrads
- It will be expected of someone from UW
  - OK here or via an REU elsewhere
  - OK during year (Phys 499) or summer
Finding a Research Home

- NSF REU site
- Talk to Margot
- Talk to your TAs
- Ask around at SPS
- Talk to your profs in physics and elsewhere
- Search Grad school part of our website
- Mary Gates, NASA Space Grant
Enclosures

- **Don’t** weigh down your application
- **DO** include any published paper or its abstract/citation
Overall Advice

- Consider applying to about 10 places
- Don’t apply anywhere you aren’t willing to go, but remember to include a safety school
- Get applications in EARLY
- Stand out from the rest
  - Visit
  - Phone call/email someone appropriate
    - (but don’t bug them too much....)
- Check that file is complete
  - Contact Grad Assistant by email
  - Follow up on late letters, transcripts, etc.
What happens to it now....?

GREs
Letters
Transcripts

Graduate Secretary

Your application (Arrive first!!)

Complete Files

Chair, Grad Admissions

Fantastic ADMIT
Awful DENY

2-3 Readers Rank Applicant

Admit
Wait and See
Deny

Normal

Incomplete Files
Selection Criteria

Probable success depends on traits such as:
- Commitment
- Creativity
- Maturity
- Leadership
- Being able to communicate

Good match between your goals and research in the department of interest

Successful research experience

Your UG academic performance

Mixed interests (spread out over whole dept) for entering class
Summary

- UG preparation in physics is a solid foundation for a variety of post-graduate programs.
- Grad study in Physics/Astronomy can be a grand adventure.
- Grad school is an opportunity to acquire skills and perspective that are broadly applicable to many fields.
- If it is what you want, then GO FOR IT!