Advice for a Successful PhD Experience

ICDAR Doctoral Consortium
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Acknowledgements

Much of this presentation is derived from these sources:

- How To Write A Dissertation – or – Bedtime Reading For People Who Do Not Have Time To Sleep
  http://www.erp.wisc.edu/profdev/how_to_write.pdf
- Dissertations
  http://www.unc.edu/depts/wcweb/handouts/dissertation.html
- How To Write a Good (no, Great) PhD Dissertation
  http://www.cs.cmu.edu/~priya/ICSOC-PhDSymp-2006-dist.pdf
- How to Write Up a Ph.D. Dissertation
  http://www.cs.jhu.edu/~jason/advice/how-to-write-a-thesis.html
- Success in Graduate Student Research
  http://www.cse.lehigh.edu/~lopresti/Resources/GradSuccess.pdf

Disclaimers

- The comments / rules / opinions / philosophies you will hear today reflect my own personal biases.
- Biases are strongly field-specific (e.g., CS vs. biology).
- Biases are often even subfield-specific (e.g., robotics vs. networking vs. bioinformatics vs. AI).
- Biases are also country-specific (e.g., U.S. vs. Japan).
- In the end, your most important guide is your advisor.

Some things I say may sound harsh – this is serious business.

What is a PhD?

- A substantial body of original, ground-breaking work (can be in one field or interdisciplinary).
- Proposes a hypothesis and provides arguments to substantiate or refute that hypothesis.
- Evidence you can do research that matters (work that makes a difference in the field, that people care about).
- Should contain 2-3 key ideas you can articulate at the drop of a hat (think "elevator speech").
- A significant piece of independent writing that you want to be proud of for years – or even decades – to come.

From http://www.cs.cmu.edu/~priya/ICSOC-PhDSymp-2006-dist.pdf

What will you learn?

- All scientists need to communicate their discoveries; the PhD dissertation provides intensive training in communicating with other researchers.
- Writing a dissertation requires a student to think deeply, to organize technical discussions, to muster arguments that will convince fellow scientists, and to craft rigorous, formal arguments.

From http://www.erp.wisc.edu/profdev/how_to_write.pdf

What makes a great dissertation?

A document that allows you to claim you …

- … made your mark in your chosen field …
- … fundamentally changed the way something is done …
- … introduced a new concept others continue to "mine" …
- … solved a problem that has plagued people for years …
- … will continue to influence (and be cited by) others.

A truly great dissertation will be accessible to everyone in computer science/engineering, not just to specialists.

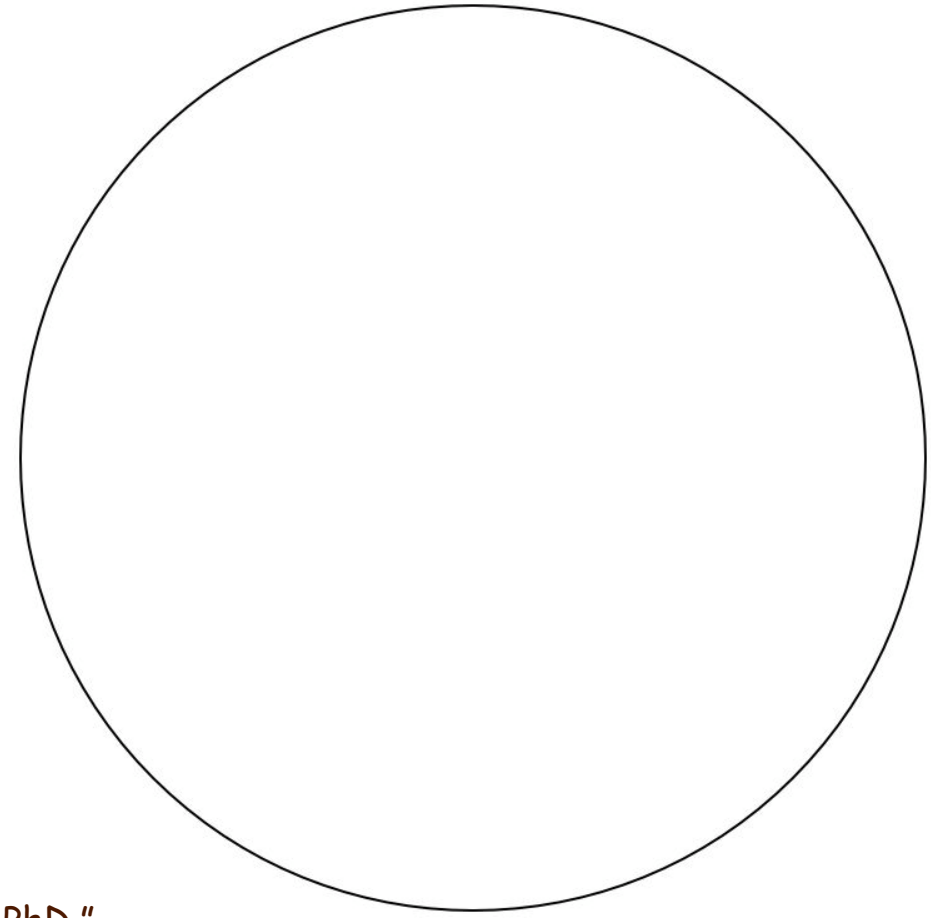
From http://www.cs.cmu.edu/~priya/ICSOC-PhDSymp-2006-dist.pdf

Just to be clear

A dissertation is not a personal voyage of self-discovery.

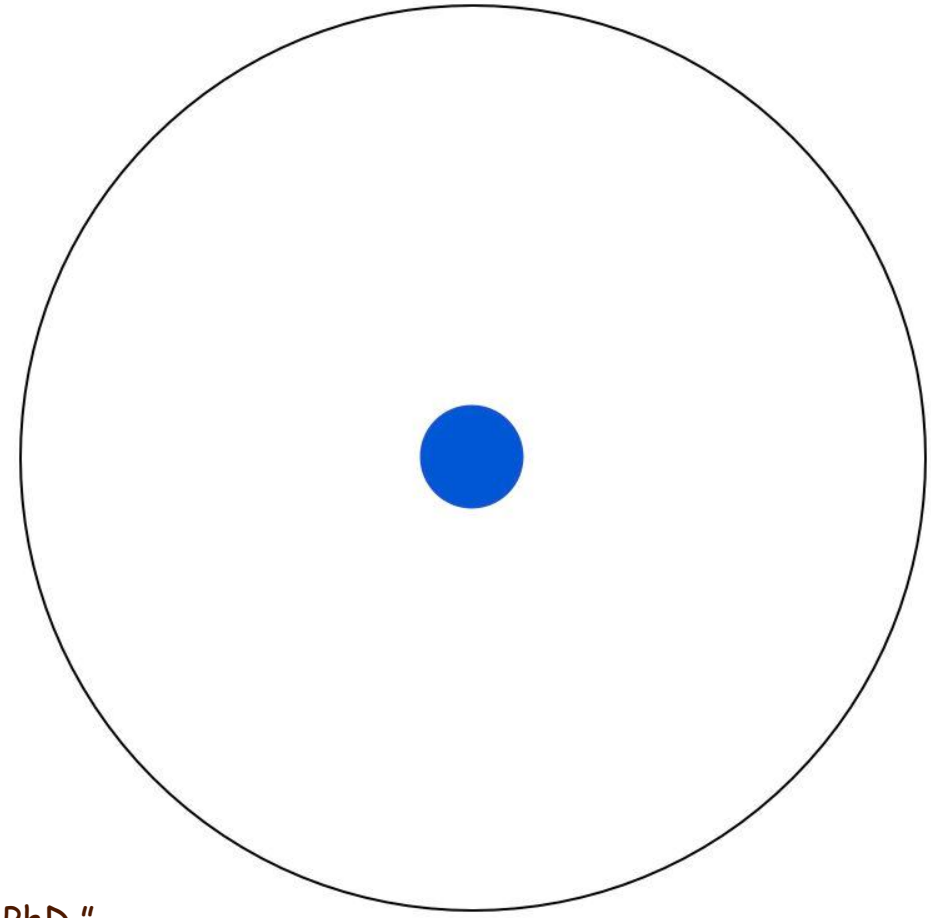
- It is to be assumed you are learning something – that by itself is not sufficient.
- It is to be assumed you are working hard – that by itself is not sufficient.
- The entire field – including the very smartest people who practice in it – must learn something significant in reading your dissertation.
- The world does not need mediocre dissertations that sit on a shelf gathering dust.

This circle contains all of human knowledge



From "Matt Might's Illustrated Guide to a PhD."

When you finish elementary school



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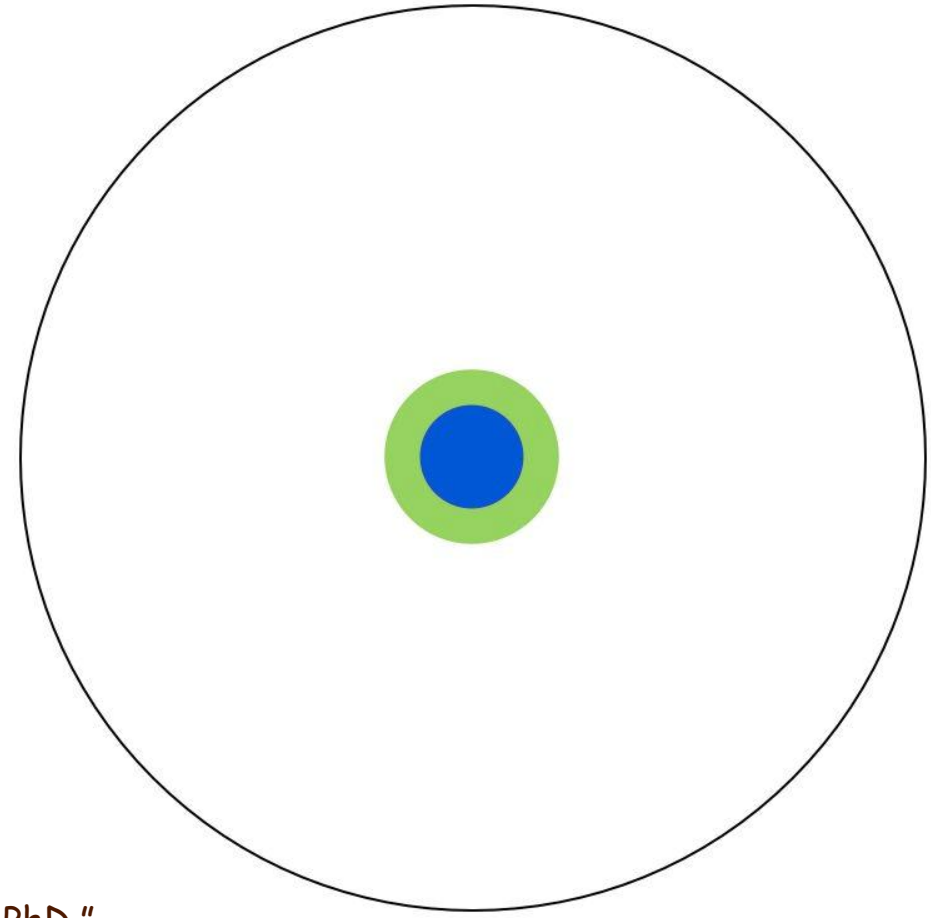
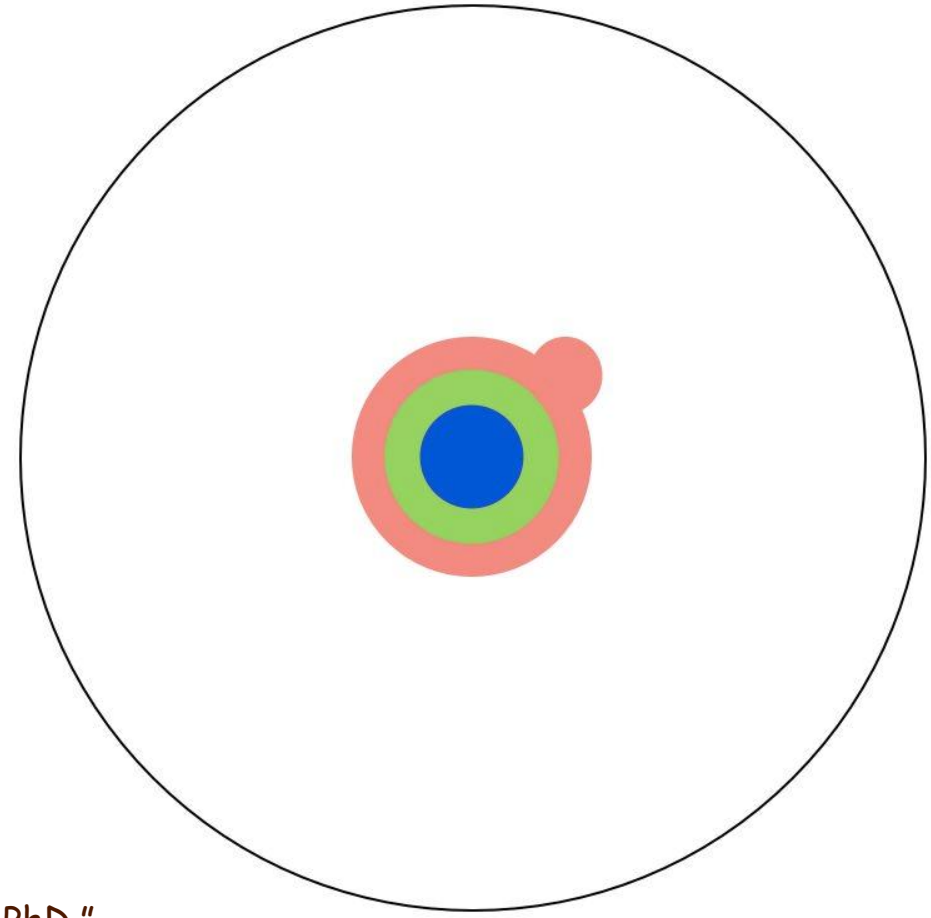
When you finish high school



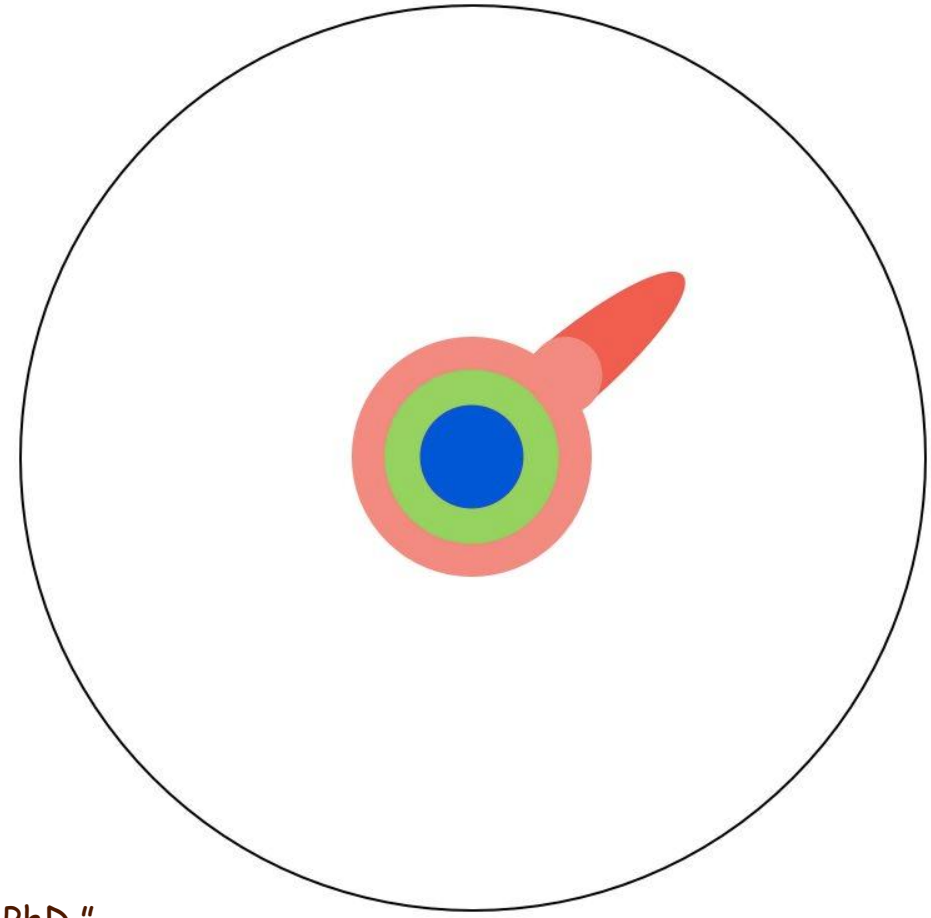
From "Matt Might's Illustrated Guide to a PhD."

When you finish undergrad



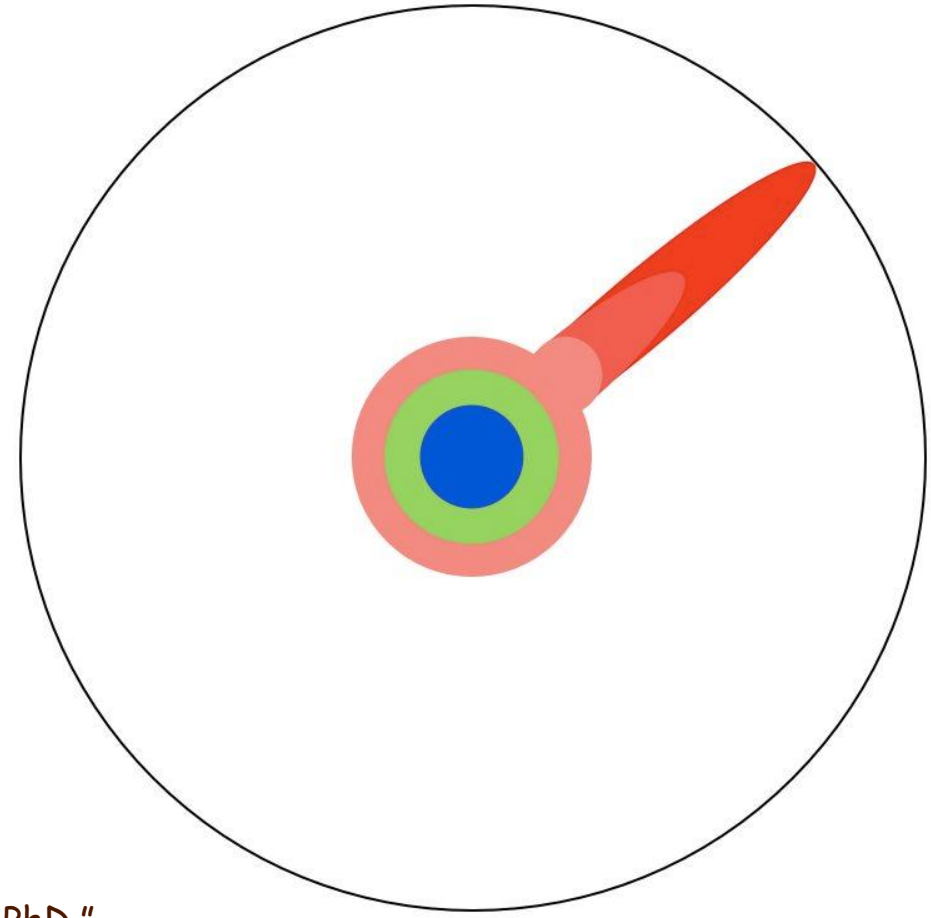
From "Matt Might's Illustrated Guide to a PhD."

When you finish a Master's degree



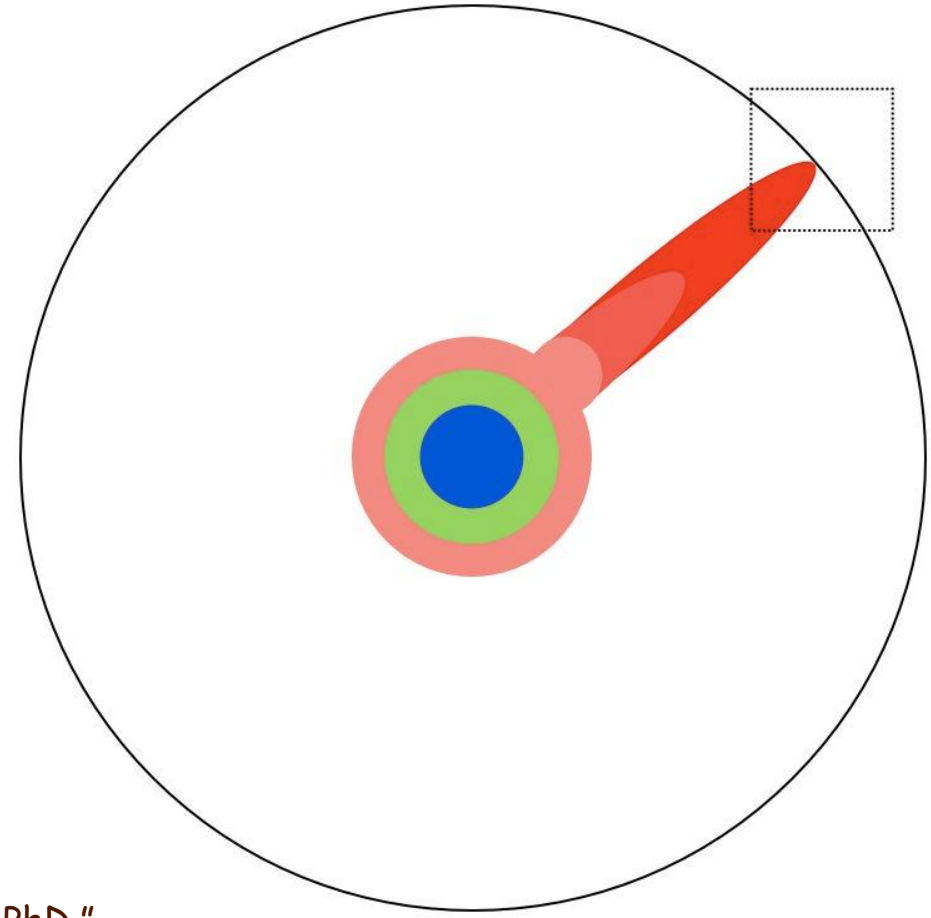
From "Matt Might's Illustrated Guide to a PhD."

Reading research papers takes you to the edge



From "Matt Might's Illustrated Guide to a PhD."

At the boundary, you focus

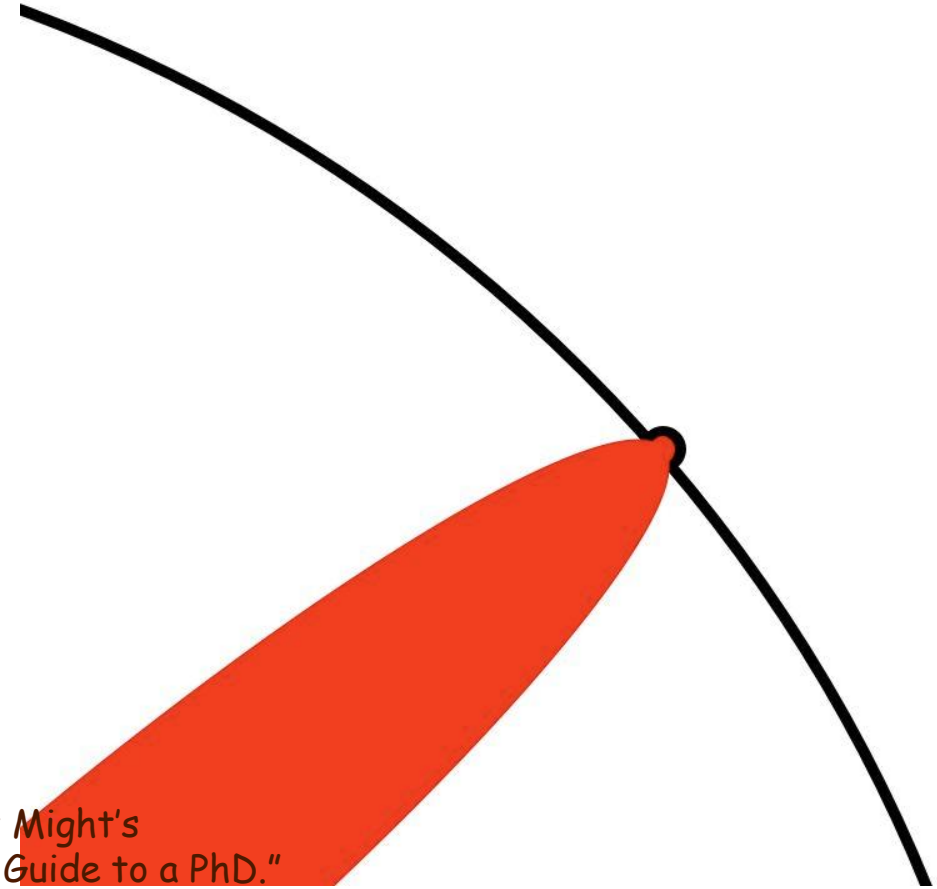


From "Matt Might's Illustrated Guide to a PhD."

You push at the boundary for several years…

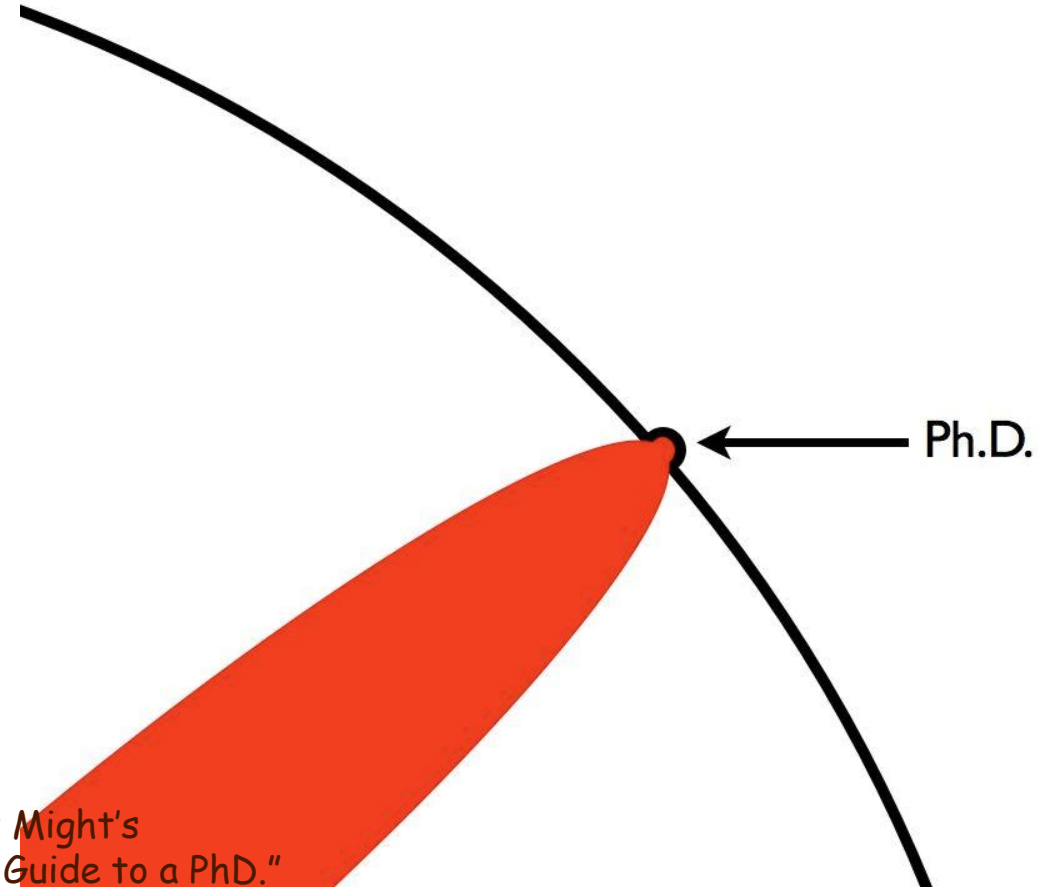
From "Matt Might's Illustrated Guide to a PhD."

One day, the boundary gives way



From "Matt Might's Illustrated Guide to a PhD."

That dent is your PhD



From "Matt Might's Illustrated Guide to a PhD."

The basic idea

- The essence of a dissertation is critical thinking, not experimental data. Analysis and concepts are key.
- A dissertation concentrates on principles: it states the lessons learned, and not merely the facts behind them.
- Every statement must be supported by a reference to the scientific literature or by original work.
- A dissertation does not repeat details found in published sources; it uses these results and refers the reader to the original work for further details.

From http://www.erp.wisc.edu/profdev/how_to_write.pdf

Draw only warranted conclusions

- Even if the cause of some phenomenon seems obvious, do not draw conclusions without solid evidence.
- For example, if programs run much slower on computer A than on computer B, you cannot conclude that the processor in A is slower than the processor in B unless you have ruled out all differences in the computers' operating systems, input and output devices, memory size, memory cache, and internal bus bandwidth.
- You must refrain from such judgments until you have conducted carefully controlled experiments.

From http://www.erp.wisc.edu/profdev/how_to_write.pdf

Commerce and science

- In a scientific dissertation, you should never draw conclusions about the economic viability or commercial value of an idea.
- A scientist must remain objective about the merits of his/her work independent of its commercial impact.
- In particular, a scientist never assumes that commercial success is a valid measure of merit.
- Statements like "method Y is used in products by over two hundred vendors" do not belong in a dissertation.

From http://www.erp.wisc.edu/profdev/how_to_write.pdf

Politics and science

- Avoid all political influences when assessing ideas.
- It should not matter, obviously, whether government bodies, political parties, religious groups, or other organizations endorse an idea.
- More subtle and easier to miss, it should not matter whether an idea originated with a scientist who has won the Nobel prize or with a first-year graduate student.
- Always assess an idea independent of its source.

From http://www.erp.wisc.edu/profdev/how_to_write.pdf

Managing your thesis topic

- Your thesis topic is not carved in stone.
- Many students change their topics as they work, paring down certain parts of the project or adding others.
- While you want to keep your advisor and committee informed about major changes, in most cases it is not necessary to be strict in following the research and writing plan you described in your dissertation proposal.
- Research is unpredictable: a smart researcher needs to be flexible and adaptable.

From http://www.unc.edu/depts/wcweb/handouts/dissertation.html

Managing your advisor

- By the time you start working on your thesis in earnest, you should expect to assume some independence.
- By the time you finish your project, you will know more about your subject than your advisor or your committee.
- The student/teacher relationship you have with your advisor will necessarily change as you take this big step toward becoming more of a colleague.
- Believe it or not, this is what your advisor wants to see, just as parents want to see their children succeed.

From http://www.unc.edu/depts/wcweb/handouts/dissertation.html

The big "no-no"

- One subject never open to debate is the level of work necessary for an acceptable dissertation.
- Earning a PhD requires making a significant contribution to the field. Graduate students do not have the perspective to know what qualifies as "significant;" this determination falls within the realm of the advisor.
- By itself, the fact that you believe you have done a lot of work means nothing. When you receive direction from your advisor, you should give it serious consideration and, in nearly every case, act on it.

From http://www.cse.lehigh.edu/~lopresti/Resources/GradSuccess.pdf

Publication

- At the same time you are working on a problem, there is an international research community also working on it.
- Your goal is to gain acceptance into the community by making contributions that are valued by the community.
- How do we determine whether other researchers value your work? By their willingness to include papers you have written in their conferences and journals.
- Substantial portions of your dissertation should be published (or accepted for publication) by the time you defend your thesis.

From http://www.cse.lehigh.edu/~lopresti/Resources/GradSuccess.pdf

Dissertation anxieties

The dissertation marks the transition from student to scholar and is stressful as a result:

- When you embark on this large, independent project, you may begin to ask yourself questions about your future in academia.
- When you finish your dissertation, you have to change your life pretty dramatically – you may go on the job market, begin work as an independent scholar, develop classes, move out of a community that you have grown to love, and so on.
- You may also feel like your dissertation will begin to define your professional identity. You may feel like your research interests, your theoretical influences, and your skill as a writer may all be evaluated by this first piece of serious scholarship

From http://www.unc.edu/depts/wcweb/handouts/dissertation.html

Maintaining sanity (1)

Do some soul-searching:

- This may be a time to ask yourself what the PhD means to you.
- Remember that what it means to you and what it means to your partner, family, or friends may be very different.
- You might make a list of all the reasons you want to get the PhD and all the reasons you would rather not. You might try free-writing about your topic and the reasons it inspires you.
- You might plan out your life's possible courses for the next 2, 5, 10, or 20 years if you do and if you do not proceed with the degree.
- Through all this, ask yourself "What will make me happy?"

From http://www.unc.edu/depts/wcweb/handouts/dissertation.html

Maintaining sanity (2)

Seek help from other sources of advice:

- If you are too close to your own graduate school anxieties to think critically about them, visit campus resources that can help you sort out your thinking on this difficult and important issue.
- Your advisor or colleagues in your department may be able to help you if you have a good relationship with them.
- Other graduate students, especially those who are about to finish or have finished, may be particularly helpful.
- University counseling services may prove helpful as well. They regularly talk with students about just this issue.

From http://www.unc.edu/depts/wcweb/handouts/dissertation.html

Maintaining sanity (3)

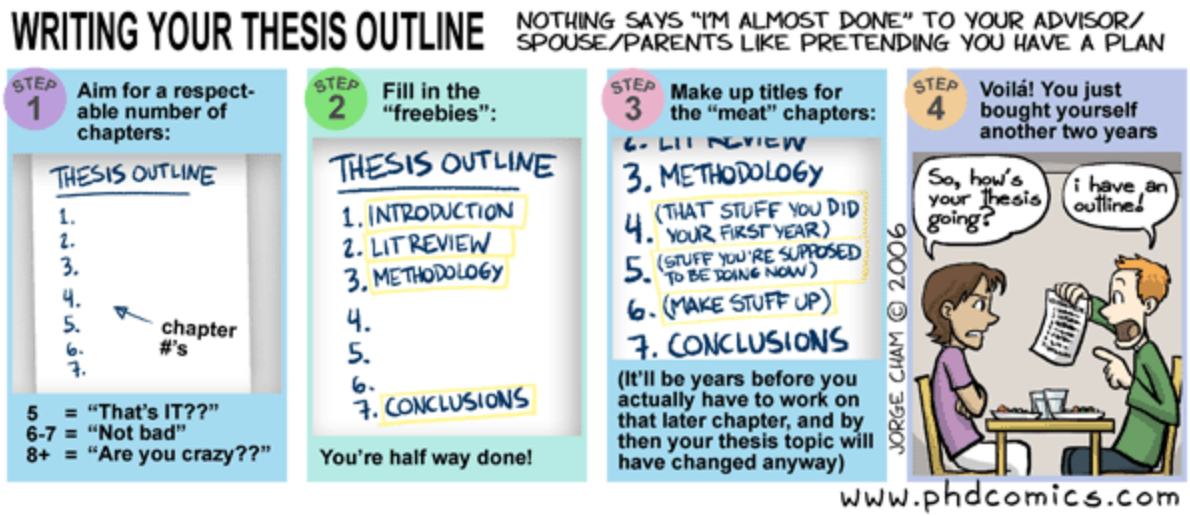
Remember there is no shame in not completing a PhD:

- Many, many people lead happy, fulfilling lives, build lucrative and rewarding careers, make important contributions to knowledge, share interesting ideas with others, and generally get along just fine without three letters after their names.
- Deciding not to continue with a PhD does not mean that you have "quit" or that others who remain in the program are smarter, more driven, or more virtuous than you are.
- It also does not mean that you have wasted the time and money that you invested in the degree up to the ABD stage.
- It simply means you decided this career choice was not for you.

From http://www.unc.edu/depts/wcweb/handouts/dissertation.html

Conclusion

Best Wishes for Success in Your PhD Studies!



When you need a dose of humor: http://www.phdcomics.com/comics.php