DON'T PANIC

—or—

how to survive a PhD
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—or—
how to survive a PhD

Jilles Vreeken
Disclaimer

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Disclaimer

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2) Any advice you’ll get is useless.

Don’t ask **survivors** for advice.

“*Russian roulette is a great way to make money!*”
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3) This is not a scientific presentation.
Disclaimer

I used to think correlation implied causation.

Then I took a statistics class. Now I don't.

Sounds like the class helped.

Well, maybe.

xkcd.com/552/
1) I’m not the “useful” type of doctor.
2) Any advice you’ll get is useless.
3) This is not a scientific presentation.
4) I stand on the shoulders of giants.
Let’s start with

the **best** advice
you’ll *ever* get...
DON'T PANIC
I’m not afraid.
Yes...
you will be.
You will be.
Time of Disillusionment

I have some **bad** news for you

Doing a PhD will help you find out
- there are people who are better than you
- you are not good at everything
- being good at courses is not enough
- doing what you are told may not be enough

And, most prominently: **life is unfair**
- people less smart or hard-working will be luckier, get better results
- people who have done worse work will end up with better jobs
First things first

Why do a PhD?
It's gonna make me rich!
It's gonna make me rich!

NO.
Salary by Degree

![Graph showing yearly salary in EUR by years of experience and degree level.](payscale.com/research/DE/)
Variation in Salary

Years of experience explains 28% of the variation in salaries. Knowing whether you are a manager or have a PhD add another 4 percentage points.
Variation in Salary

Years of experience explains 28% of
5 extra years of experience worth more than a PhD!
PhD add another 4 percentage points.

measuringusability.com/usability-phd.php
Some degree-less people

- Bill Gates: $107bn
- Sergey Brin (Google co-founder): $60bn
- Steve Jobs: $10bn
- Jeff Bezos: $113bn
Some degree-less people

Skill sets and interpersonal skills vs. academic qualifications.
First things first, again

Why do a PhD?
Because my PhD is gonna change the world!

I’m going to change the world and this is my plan...
Because my PhD is gonna change the world!

NO.
Because my PhD is gonna change the world!

Big Problems are **Big** because they are **Hard**

**NO.**
Because my PhD is gonna change the world!

Big Breakthroughs are *rare*, very *rare*. Once-a-career rare, *if* you’re lucky.

**NO.**
Because my PhD is gonna change the world!

If you want to change the world, become a politician.

NO.
If you’re here for the right reasons...

Doing a PhD can be awesome

But, what is the right reason?
If you’re here for the right reasons...

The One and Only Right Reason to pursue a PhD:

you are **fascinated** by a topic,
you **need** to know all there is,
and **want to discover** even more.
You’ll have to like both the big results and the little ones.
Any Reasons Left...?
Well-being and education "go together"

By Angela Harrison
Education correspondent, BBC News

People who are better educated are more likely to say they are satisfied with their lives, a study suggests.

And they are more likely to say that the things they do are worthwhile, according to research by the Office for National Statistics.

The study is part of a £2m project launched by the prime minister to try to measure people's happiness and well-being.
Any Reasons Left...?

Office for National Statistics

Measuring National Well-being - Education and skills

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Any Reasons Left...?
Any Reasons Left...?

A PhD makes you feel *good*.
What’s Great about Working in Science

Freedom!
- set your own agenda, schedule, ...

You get to travel regularly
- to New York, Tokyo, Beijing, Vancouver, London...

What dress code?
- I’ve seen keynote speakers in pajamas

Invisible band uniting all geeks
- helpful, enjoy learning, similar language

Surrounded by people who never grew up
- smart kids who love to play
What’s Great about Working in Science

How Grad School is Just Like Kindergarten

All day napping is acceptable

There is constant adult supervision

You get cookies for lunch

Most common activity: Cutting and pasting

There are no grades (you just have to play well with others)

Crying for your mommy is normal

WWW.PHDCOMICS.COM
What’s Great about Working in Science

Working in science is **amazing** ... ... if you appreciate its benefits.
Perspective

Industry, according to academia

researchinprogress.tumblr.com
Perspective

Academia, according to industry

researchinprogress.tumblr.com
Perspective

Industry, according to academia
There’s stress everywhere. Just different kinds.

Industry, according to academia
What is a PhD?
What is a PhD? *science*?
What is a PhD? *science*

‘knowledge or a system of knowledge covering general truths or the operation of general laws especially as obtained and tested through scientific method’

(Merriam-Webster)
What is a PhD? science?
What is a PhD? *science*?

Because!

Science is about discovering things we didn’t know.
What is a PhD? *science*?

Because!

Science is about discovering new knowledge!
What is a PhD?
What is a PhD?

No, really, what is a PhD?
Don’t forget the bigger picture
and keep pushing.
Sometimes...
Sometimes…

You’re stuck.
Sometimes… you’re stuck.

I NEED AN ADULT
Sometimes...

You're stuck.

Don’t be afraid to ask for help.
...SO, PROF. JONES, I'M TOTALLY STUCK! WHAT SHOULD I DO?

HMMMM...

WELL, YOU SHOULD PROBABLY FIX IT.

THAT'S IT? THAT'S YOUR ADVICE?

YOU SHOULD DO IT SOON, TOO.
Choosing an Advisor

"Hey, that's just one omniscient guy's opinion."
Choosing an advisor

Research area matters ...
- ... but less than you might think

Big Name or Shooting Star
- depends on overall support network

Stability
- people move, change positions

Culture
- personality needs to click

Talk to current and former victims students
- how long did they take? did they enjoy it?
Choosing an advisor

Research area matters ...
  - ... but less than you might think

Big Name or Shooting Star
  - Whole environment matters. Find out by talking to students.

Culture
  - personality needs to click

Talk to current and former victims students
  - how long did they take? did they enjoy it?
What should I ask?

How is the working environment
■ what is the general attitude, hours, work week?

How is the group culture?
■ regular meetings, joint projects, outings, fun?

Are own ideas stimulated?
■ or are you pursuing their larger research agenda?

How much teaching will you have to do?
■ how much other community service will you have to do?

Are people acknowledged for their work?
■ are there free-rider co-authors or advisors?
Getting a position

PhD positions are much more abundant than you think
- often not advertised

PhD candidates are (much more) rare (than you think)
- especially good ones

If you have good grades, did relevant projects, and good recommendations, your chances are very good.
- publications don’t matter much (or at all)
- and even if your supervisor of choice has no money or time to supervise you, they’ll be happy to help you in your search!
Before you begin, let me just say I don't want to hear about any problems or difficulties you've been having.

I don't want to hear any excuses or extenuating circumstances.

The only thing I want to hear is what you're doing about it. What's your plan to resolve the situation?

My plan was to come here and have you tell me what to do. You need a new plan.
We’re explorers
- we may strike gold, or
- find dirt, dirt, and more dirt

We don’t know the way
- we follow intuition, and see where it leads us...
- soon, you’ll know ‘the way’ better than your supervisor

Are you afraid of the Dark?
We're explorers, we may strike gold, or find dirt, dirt, and more dirt. We don't know the way. We follow intuition, and see where it leads us…

soon, you'll know ‘the way’ better than your supervisor.

If you’re afraid of the dark research is not for you.

Are you afraid of the Dark?
You & Your Advisor

- You are 1 of $N$ students
- Your paper is 1 of $M$ papers
- They review $P$ papers a year and teach $Q$ courses a year
- They attend $X$ committee meetings a week
- They travel $Y$ times a year

Let’s do the math

$$\frac{(365 - 2 \times 52 - 25 - 5Y) \times \left(8 - \frac{X}{5} - 1\right) - 2P - 160Q}{52 \times (N + M)}$$

$N = 15, M = 8, P = 30, Q = 2, X = 3, Y = 8$

answer = 0.97
You & Your Advisor

- You are 1 of \( N \) students
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\[
\frac{(365 - 2 \times 52 - 25 - 5Y) \times \left(8 - \frac{X}{5} - 1\right) - 2P - 160Q}{52 \times (N + M)}
\]

Hours /week for you

\( N = 15, M = 8, P = 30, Q = 2, X = 3, Y = 8 \)

Answer = 0.97

Be realistic about your advisor's time (and hence, choice of advisor)
You & Your Advisor

Keep your advisor up-to-date, but don’t spam
- be interesting, not pestering

Agree on and check against SMART goals
- Specific, Measurable, Attainable, Realistic, Timely

Try to phrase suggestions, not questions
- “I think we should do X” vs. “Should we do X?”

There are other helpful people out there...
- officemates, postdocs, fellow students
You & Your Advisor

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Be proactive.
Agree on concrete goals.
Learn from fellow students.
What is a PhD about?

Learning how to do science, such that you become an independent researcher.

EVERYBODY'S PUBLISHING

AND I'M JUST SITTING HERE...
What is a PhD about?

Learning how to do science, such that you become an independent researcher.
What is a PhD about?

Learning how to do science,
such that you become
an independent researcher
What is a PhD about?

Learning how to do science.

Do not compare yourself to more senior people.

an independent researcher
All these papers are so nice...
All these papers are so nice...

and my research is not going anywhere...
All these papers are so nice...

Published papers are smooth representations of long and messy processes

and my research is not going anywhere...
Reaching the Goal
Reaching the Goal

The objective schema can lead to frustration when the project goes off track.
# Reaching the Goal

<table>
<thead>
<tr>
<th>The objective schema can lead to frustration when the project goes off track</th>
<th>The nurturing schema gives support and opens new directions</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="weizmann.ac.il/mcb/UriAlon/nurturing/HowToChooseGoodProblem.pdf" alt="Diagram" /></td>
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Reaching the Goal
A good problem is often worth more than a good solution!
Time to learn

As a grad student you have to learn a lot
- new students often think they know everything.
Penguins are black and white.
Some old TV shows are black and white.
Therefore, some penguins are old TV shows.

Logic: another thing that penguins aren’t very good at.
Time to learn

As a grad student you have to learn a lot

- new students often think they know everything.
- no bachelor student can immediately make a contribution
Time to learn

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Time to learn

As a grad student you have to learn a lot
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However, you’re being paid to learn

Find out what you need to know.
Time to learn
As a grad student you have to learn a lot
 new students often think they know everything.
 no bachelor student can immediately make a contribution

However, you’re being paid to learn
Find out what you need to know.

Where the magic happens

Your comfort zone
Time to learn

As a grad student you have to learn a lot

- new students often think they know everything.
- no bachelor student can immediately make a contribution

However, you’re being paid to learn

Find out what you need to know.
Learn what it is. Read about it. Take classes. Practice.
Time to learn

As a grad student you have to learn a lot

- new students often think they know everything
- no bachelor student can immediately make a contribution

You’re being paid to learn
How cool is that?

Find out what you need to know.
Learn what it is. Read about it. Take classes. Practice.
Scientific Writing – in English

Science means a *lot* of writing

A paper is a story, not a shopping list
- there needs to be a plot

Any draft can be shortened without loss
- don’t believe information theoretic lower bounds

Get help with concise but complete writing
- don’t forget reproducibility

Don’t have sentences being written in passive voice
- they will not be easily read

Hard to improve without detailed feedback
Scientific Writing – in English

- Don't have sentences being written in passive voice, they will not be easily read.
- Hard to improve without detailed feedback.
Scientific Writing – in English

Science means a *lot* of writing

A paper is a story, not a shopping list

For every word ask: is it *necessary*?

Train your language and writing skillz

Get help with concise but complete writing

- don’t forget reproducibility

Don’t have sentences being written in passive voice

- they will not be easily read

Hard to improve without detailed feedback
Notification

So you finished your masterpiece, submit it, wait...

■ and then the reviews come in

Reject
Notification

So you finished your masterpiece, submit it, wait...

and then the reviews come in
What is a PhD about?

Learning how to do science, such that you become an independent researcher.
Reject

So you finished your masterpiece, submit it, wait...

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Happens to the best

Getting something published can be hard

- 10 to 20% acceptance rate means
- 80 to 90% of the papers get rejected
Reject

So you finished your masterpiece, submit it, wait...

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Happens to the best

Getting something published can be hard

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Reject

So you finished your masterpiece, submit it, wait...

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**Happens to the best**

Getting something published can be **hard**

- 10 to 20% **acceptance rate** means
- 80 to 90% of the papers get **rejected**

Lots and lots and lots and lots and lots of noise in the review process

- take reviews seriously, re-evaluate, improve your paper, resubmit
So you finished your masterpiece, submit it, wait…

- and then the reviews come in.

Getting some reviews:

- 10 to 20% acceptance rate
- 80 to 90% rejection rate

Lots and lots and lots and lots and lots of noise in the review process

- take reviews seriously, re-evaluate, improve your paper, resubmit
Reject

So you finished your masterpiece, submit it, wait... and then the reviews come in.

Happens to the best.

Getting something published can be hard.

10 to 20% acceptance rate means 80 to 90% of the papers get rejected.

Lots and lots and lots and lots of noise in the review process.

Take reviews seriously, re-evaluate, improve your paper, resubmit.

Can take time to get publish.
Use reviews to improve your paper, don’t overfit.
YOUR HIGH HORSE

Get off it.
When you are the reviewer:
do your job well, don’t be that guy.
Everybody works differently

- find out what works for you
I'M NOT A MORNING PERSON
How to work

Everybody works differently
- find out what works for you

It’s not about how many hours — *stupid*!!1!!!one!eleven
- say no to peer pressure

Life is much more than just work
- have fun and do sports: a healthy mind lives in a healthy body
How to work

Everybody works differently

- Find out what works for you

It's not about how many hours — stupid!!

- Say no to peer pressure

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Create a stimulating environment

- Optimize your workplace
How to work

Everybody works differently
- find out what works for you

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Create a stimulating environment
- optimize your workplace
geek productivity at work

- how non-geeks think it works
- how it actually works

- sampling points likely to used by non-geeks to get a general picture of how geeks work

along the day:
How to work

Everybody works differently
- find out what works for you

It’s **not** about how many hours — *stupid!!1!!!one!eleven*
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Create a stimulating environment
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Focus
How to work

Everybody works differently
- find out what works for you

It’s not about how many hours — stupid!! one eleven
- say no to peer pressure

Life is much more than just work
- have fun and do sports: a healthy mind lives in a healthy body

Create a stimulating environment
- optimize your workplace

Focus
- and procrastinate when you can’t

PhD Goal: figuring out how you get your best ideas
I don't know man..

Sometimes, I don't want to move it move it.
Sometimes, it’s just not happening. No need to keep your chair warm, call it a day – go out, have fun. Who knows, maybe you’ll even get a good idea.
When You’re Feeling Low

It’s not so bad, really

- don’t get yourself down

Acknowledge the good times

- keep a folder with past accomplishments, with e.g., graduation photos, acceptance notifications, awards, conference visits, etc.
When You’re Feeling Low

Everyday mood and emotions after eating a chocolate bar or an apple

Michael Macht *, Dorothee Dettmer
When You’re Feeling Low

Everyday mood and emotions after eating a chocolate bar or an apple

Michael Macht *, Dorothee Dettmer

Diagram showing mood over time with different food intakes.
It's not so bad, really. Don’t get yourself down. Acknowledge the good times. Keep a folder with past accomplishments, with e.g., graduation photos, acceptance notifications, awards, conference visits, etc.

When You’re Feeling Low

[Graph showing mood over time with different food intake conditions]
When You’re Feeling Low

Who cares about “an apple a day …”, it’s: “a chocolate bar every 30 minutes”!

public.randomnotes.org/richard/PhDtalk.html
Celebrate Your Victories
Celebrate Your Victories

"Remember, winning isn't the only thing. You also need to develop a great victory dance."

http://www.cartoonstock.com/directory/v/victory_dance.asp
Celebrate Your Victories

“Success is not the key to happiness. Happiness is the key to success. If you love what you are doing, you will be successful.”

Albert Schweitzer

Some groups have “publication cakes”
- Make it chocolate, please!

Acknowledge everyone somehow involved
- Create a positive group atmosphere
Celebrate Your Victories

“Success is not the key to happiness. Happiness is the key to success. If you love what you are doing.

If you're happy and you know it, then you really ought to show it!

Some groups have “publication cakes

■ Make it chocolate, please!

Acknowledge everyone somehow involved

■ Create a positive group atmosphere
Imposter Syndrome is by far the most dangerous disease for any researcher to catch.

- Symptoms include thoughts such as “everyone could have done this”, “why is all other work better”, “my work is trivial”, etc.
- Deadly for the creative process
- Deadly for overall happiness
- Deadly for science
Who Feels Like an Imposter?

- People with Imposter Syndrome
- Other people with Imposter Syndrome
- Successful people you think have their shit together, but have Imposter Syndrome
Who Feels Like an Imposter?

Everyone feels like an imposter sometimes, and that’s okay, but just remember that you aren’t think have their shit together, but have Imposter Syndrome.
What do I Know?

what I think
what I know
others know
What do I Know?

what I know

what others know
What do I Know?

Everything is obvious once you know it!

what others know
Survival Checklist

Put yourself in the shoes of your audience
- your advisor, your readers, conference attendees, ...

Get your priorities straight
- define achievable short-term goals and stick to them

Learn when to say no
- don’t get involved in too many things

Be thoughtful about networking opportunities
- personal story

from “A PhD is not Enough!”, Feibelman
Some references

Good Books
- “A PhD is not Enough”, Feibelman
- “Mastering your PhD”, Gosling & Noordman
- “How to Get a PhD”, Philips & Pu
- “The PhD Grind”, Philip Guo

Informative Sites
- http://matt.might.net/articles/
- http://public.randomnotes.org/richard/

Great Slides
- Sue Moon “A few tips I wish I had before I met my advisor”
- Yannis Smaragdakis “PhD Rants and Raves – be afraid, be very afraid”
- Eamonn Keogh “How to do good data mining research, get it published, and get it cited”

Google [title] filetype:pdf
- “From Research to Manuscript”, Katz
- “Scientific Writing”, Peat
- “Writing for Science”, Goldbort

Funny Sites
- Research in Progress – researchinprogress.tumblr
- Piled Higher & Deeper – phdcomics.com

Special thanks to Ingmar Weber for his excellent talk
- “Advice for young Jedi knights and PhD students” at PIKM 2012
DON'T PANIC

For comments, praise, pointers to books, slides, sites, ...

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