DON'T PANIC

The Grad Student's Guide to Surviving your PhD
Don’t Panic
– or –
how to survive your PhD

Jilles Vreeken
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.
Disclaimer

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...
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?
Its gonna make me rich!
It's gonna make me rich!

NO.
Salary by Degree

Years of Experience

- <1
- 1-4
- 5-9
- 10-19
- 20+

Yearly Salary in EUR

BA/BSc

PhD
Salary by Degree

[Graph showing salary progression by years after BA/BSc and PhD degrees.]

Years of after BA/BSc:
- <1
- 1-4
- 5-9
- 10-19
- 20-29
- 30+

Yearly Salary in EUR:
- <1
- 1-4
- 5-9
- 10-19
- 20-29
- 30+
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

$72bn

$10bn

$28bn

$27bn
Some degree-less people

Skill sets and interpersonal skills vs. academic qualifications.

$28bn

$10bn

$72bn

$10bn

$27bn
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.
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 want to know all there is, and need 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.
Measuring National Well-being - Education and skills

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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. People who learn as adults are also more likely to rate their well-being as high.
Any Reasons Left...?
Any Reasons Left...?

A PhD makes you feel *good*.

- NVQ3 and above
- NVQ2
- Below NVQ Level 2
- No qualifications
What’s Great about Working in Science

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

You get to travel regularly
- to Beijing, to Paris, to Barcelona, to New York, how cool ...

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

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
Perspective

Academia, according to industry
Perspective

Industry, according to academia
Perspective

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? \textit{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.
DON'T PANIC
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 that you might think (especially in CS)

Big Shot vs. Young and Exited
- depends on overall support network

Stability
- people move, change positions

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

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Big Shot vs. Young and Excited
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Stability
- people move, change positions

Whole environment matters. Find out by talking to students.

Talk to current and former students
- how long did they take? did they enjoy it?
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 matter much less than you’d think
- and even if your choice supervisor has no money or time to supervise you, she’ll be happy to help you in your search
You & Your Advisor

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, so 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?

If you’re afraid of the dark research is not for you.
You & Your Advisor

- You are 1 of \(N\) students
- Your paper is 1 of \(M\) papers
- (S)he reviews \(P\) papers a year
- (S)he teaches \(Q\) courses a year
- (S)he attends \(X\) committee meetings a week
- (S)he travels \(Y\) times a year

Do the math!!! (S)he only has

\[
\frac{(365 - 14 - 52 \times 2 - 5Y) \times \left(8 - \frac{X}{5}\right) - 4P - 3 \times 16Q}{52 \times N \times M}
\]

\(N=5, \ M=10, \ P=20, \ Q=2, \ X=5, \ Y=4\)

answer = 0.54 hours /week for you
You & Your Advisor

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hours /week for you

$N=5$, $M=10$, $P=20$, $Q=2$, $X=5$, $Y=4$

answer = 0.54

Be realistic about your advisor’s time (and hence, choice of advisor)

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, you know?
- officemates, postdocs, fellow students
You & Your Advisor

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

Agree on concrete goals.
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Try to phrase suggestions, not questions
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There are other helpful people, you know?
- officemates, postdocs, fellow students

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.
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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>
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<td><img src="image1" alt="Diagram A" /></td>
<td><img src="image2" alt="Diagram B" /></td>
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weizmann.ac.il/mcb/UriAlon/nurturing/HowToChooseGoodProblem.pdf
Reaching the Goal

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weizmann.ac.il/mcb/UriAlon/nurturing/HowToChooseGoodProblem.pdf
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.
- 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.
Time to learn

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

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Find out what you need to know.

Where the magic happens

Your comfort zone
Time to learn

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Time to learn

As a grad student you have to learn a lot
- new students often think they know everything
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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

Even if sentences are 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
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...

- 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
So you finished it, wait...

- and then the reviews come in

...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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Getting something published can be hard.
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
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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 rejection is common:

- 10 to 20% acceptance rate
- 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 there's the reviews.

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.

Can take time to get published. 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.
How to work

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!

- say no to peer pressure

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:

effect of a 5-min interruption (or a meeting!)

recovery

5 min

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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
- optimize your workplace

Focus
- and procrastinate when you can’t
How to work

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- find out what works for you

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- 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

-1
0
1
Food Intake

Mood

Chocolate
Apple
Nothing

Minutes

-5 5 30 60 90
It's not so bad, really. Don't get yourself down. Acknowledge the good times and keep a folder with past accomplishments, e.g., graduation photos, acceptance notifications, awards, conference visits, etc.

When You’re Feeling Low

See public.randomnotes.org/richard/PhDtalk.html for more information.
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, you will be successful.”

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

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

Acknowledges everyone somehow involved
- Create a positive group atmosphere
Attending a Conference
Attending a Conference

(Ping) The captain has turned off the seat belt sign...

So... are you travelling for business or for fun?

Me? Well...

I'm going to a research conference so... it's... uh... sort of... um...

None of the above?

It's not for fun, that's for sure.
Attending a Conference
Attending a Conference

Talk to people at all occasions
- after presentations, in coffee breaks, in rest rooms

Plan which sessions/presentations to attend
- combination of topic and presenter

Make the most out of a poster presentation
Attending a Conference

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- engage people, offer free candy and advertise it
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- universities and institutes nearby
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Be as active as possible. It is boring if you’re not.
Giving a Presentation
What is a PhD about?

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

Just a few things to remember

The **medium matters** as much as the message
- it is all about **confidence**

Realise that **you** are the expert
- attendees want to **learn** what **you** discovered

It is **not** a competition (anymore)
- your paper was accepted, now it is about **advertising**
The Body shapes the Mind

How you feel influences how you behave.
The Body shapes the Mind

How you **behave** influences how you **feel**.
The Body shapes the Mind

How you **behave** influences how you **feel** influences how you **behave**

The Body shapes the Mind

Only **two** minutes of power posing reduces stress levels **and** changes behaviour

Power Posing

Amy Cuddy (2012) Your Body Language Shapes Who You Are, TEDglobal
Power Posing

Amy Cuddy (2012) Your Body Language Shapes Who You Are, TEDglobal
Power Posing
Giving a Presentation
DEATH BY POWERPOINT
Giving a Presentation

Don’t overestimate your audience
- Go sloooow on technical details – or leave out

Don’t overestimate your time
- 90-100 seconds per normal slide

Who on earth invented overview slides?!?
- Introduction, ... Experiments, ... Conclusions

Clearly emphasize the key points
- Visually and audibly

Think about the take-home message
- say thanks on the last slide, keep the conclusion visible

Get feedback on all aspects and practice
Giving a Presentation

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Clearly emphasize the key points
- Visually and audibly

Highlight the key points.

Think about the take-home message
- say thanks on the last slide, keep the conclusion visible

Get feedback on all aspects and practice
You’re taking an elevator with Donald Trump

- Donald: “So, what are you working on?”
- You: ...
You’re taking an elevator with Donald Trump

Donald: “So, what are you working on?”
You: ...
You’re taking an elevator with Donald Trump
- Donald: “So, what are you working on?”
  You: ...

Forces you to focus on the essential, see the big picture, get others excited, and remember you & your work
You're taking an elevator with Donald Trump

Donald: “So, what are you working on?”

You: …

Forces you to focus on the essential, see the big picture, get others excited, and remember you & your work

The Pitch
The Pitch

Perhaps even more important: **Cocktail Party Pitch**

- Next family reunion
- “My child does something with computers.”

So, how is your work useful?
The Pitch

Perhaps even more important: Cocktail Party Pitch

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So, how is your work useful?
The Pitch

Perhaps even more important: Cocktail Party Pitch

- Next family reunion
- “My child does something with computers.”

Think of a 60 sec summary of your work. Ask jilles@mpi-inf.mpg.de for feedback.
The Thesis

In CS, typically a collection of papers
- in the best case on a related topic

Rewrite per-paper introductions
- there’ll be a long introduction

When you don’t know what to write
- just write something

It will take longer than you think
- even if you expect it to take longer than you thought
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In CS, “easy” if you have published. But, takes longer than you think.
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

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

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

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

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”

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, …

jilles@mpi-inf.mpg.de