

Based on talks by [Jilles Vreeken](#)
and [Pauli Miettinen](#)

STEFAN NEUMANN

HOW TO SURVIVE A PH.D.

ABOUT ME

- ▶ Since February 2024:
 - ▶ Assistant Professor at TU Wien
- ▶ 2020-2024:
 - ▶ Post-Doc and then Assistant Professor at KTH Royal Institute of Technology in Stockholm, Sweden
- ▶ 2016-2020:
 - ▶ **Ph.D.** at Uni Wien with Monika Henzinger
 - ▶ Published 14 papers during that time, and several wrote some manuscripts
 - ▶ Won the **Heinz-Zemanek-Award** from the ÖCG (best Austrian Ph.D. thesis in CS in 2 years)
 - ▶ Won an **Award of Excellence** from the Austrian Federal Government



-
- ▶ I survived a Ph.D. and won awards
 - ▶ The next 45 minutes:

How you can do the same
survive and come out top

WRONG

DISCLAIMER

- ▶ I survived a Ph.D. and won awards
- ▶ The next 45 minutes:

How you can do the same,
survive and come out on top

- ▶ Lottery winners will tell you to play the lottery
- ▶ They will even explain you their “strategy” to win the lottery

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- ▶ Lottery winners will tell you to play the lottery
 - ▶ They will even explain you their “strategy” to win the lottery
- ▶ Any advice you’ll get is useless
 - ▶ What worked for me doesn’t have to work for you
 - ▶ Take my input, see what works for you

A close-up, black and white photograph of a lion's face. The lion has a dark mane and is looking slightly to the right with a serious expression. The background is blurred.

MY MAIN ADVICE

**DON'T
PANIC**

BUT WHY WOULD ANYBODY PANIC?

- ▶ During a Ph.D. **everybody** learns that
 - ▶ there are people who are smarter than you
 - ▶ you're not good at everything
 - ▶ and being good at courses isn't enough
 - ▶ doing what you're told may not be enough
 - ▶ life is unfair (but you knew that already from kindergarten)
 - ▶ others will be luckier and get better results or better jobs

BAD NEWS

LACK OF WORK-LIFE BALANCE

IMPOSTER SYNDROME

INDUSTRY PEOPLE EARN MORE \$\$\$

DOING A PHD IS TO LEARN TO COPE WITH FRUSTRATION

SLOW RESEARCH PROGRESS

PAPER REJECTED

BUGGY ALGORITHMS

TEACHING DUTIES

**DON'T
PANIC**

HOW TO AVOID PANICKING

- ▶ Manage expectations
- ▶ Remind yourself of the great aspects of doing a Ph.D.
- ▶ Control your (research) process
- ▶ Get help when you need it

MANAGING EXPECTATIONS

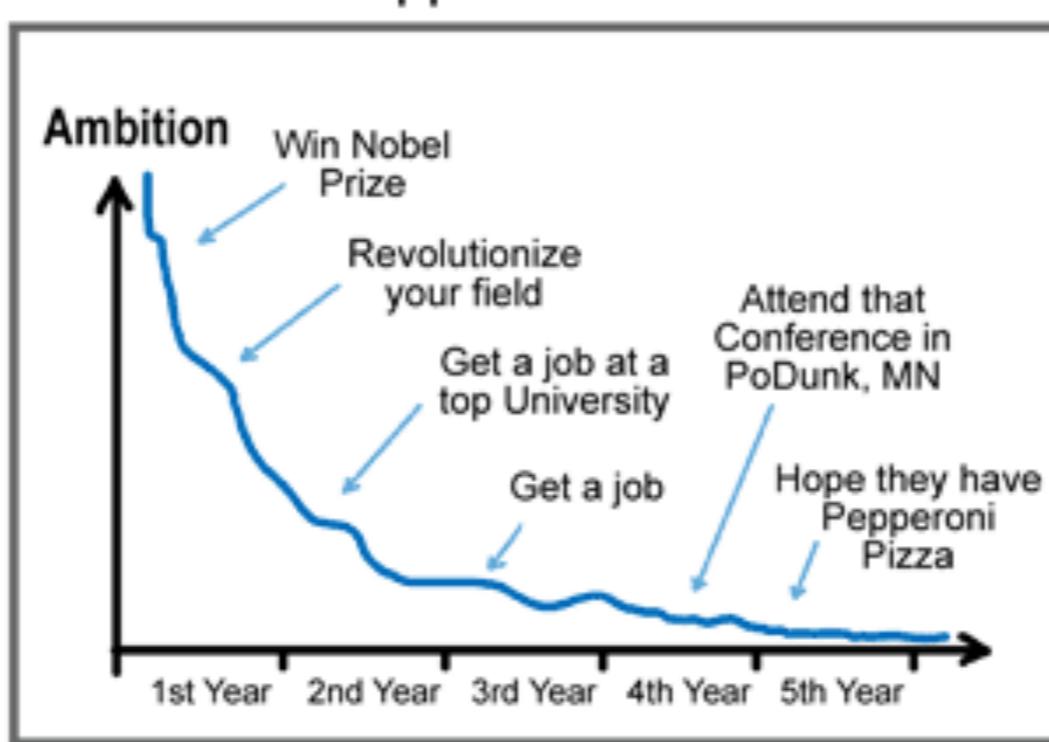
I'm going
to change
the world
and this is
my plan...

I'M GOING
TO CHANGE
THE WORLD!

I'm going
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and this is
my plan...

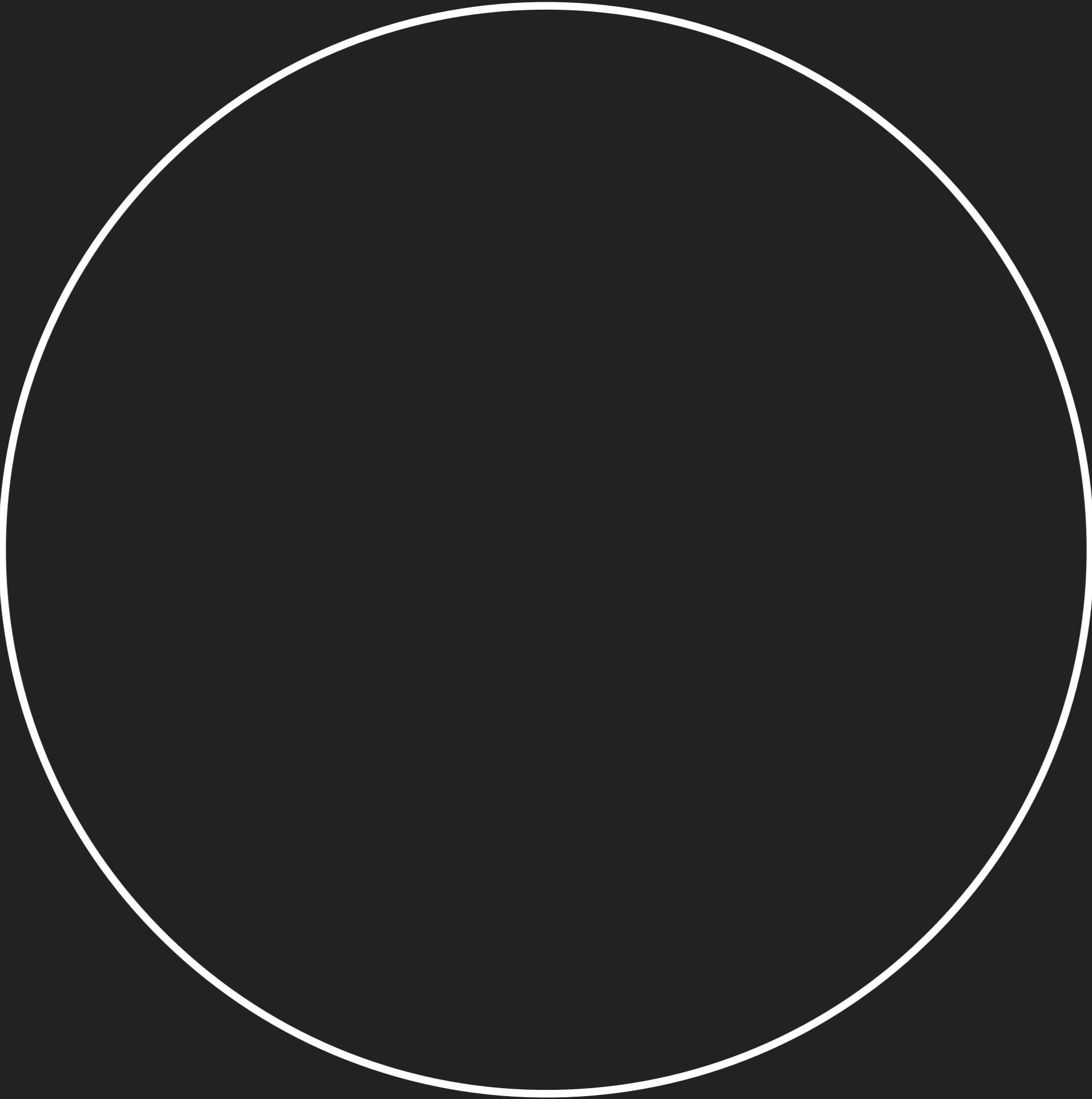
~~WRONG~~ **CHANGE THE WORLD!**

YOUR LIFE AMBITION - What Happened??

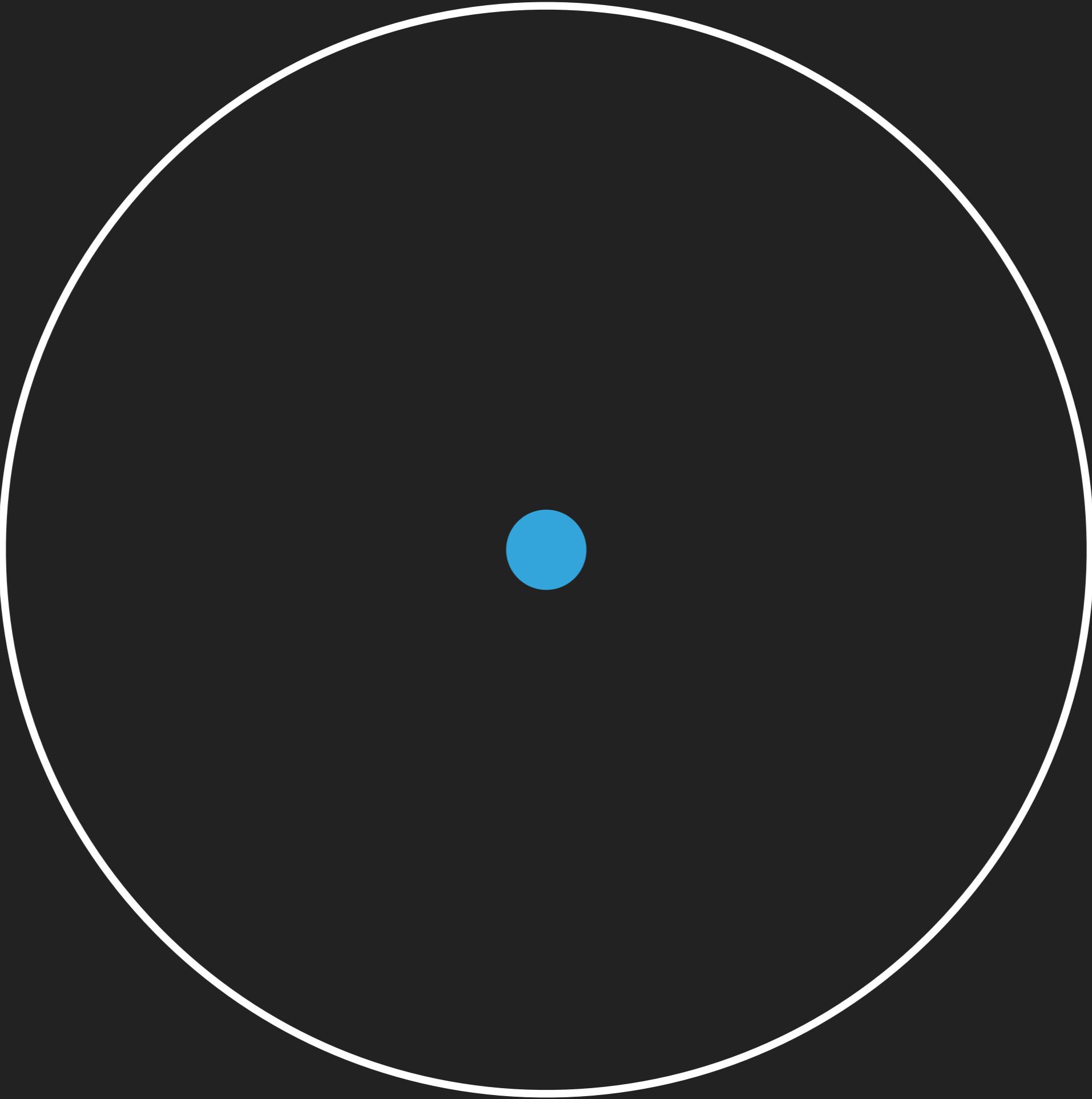


JORGE CHAM © 2008

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Imagine a
circle that
contains all
of human
knowledge



Imagine a
circle that
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of human
knowledge

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Imagine a
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of human
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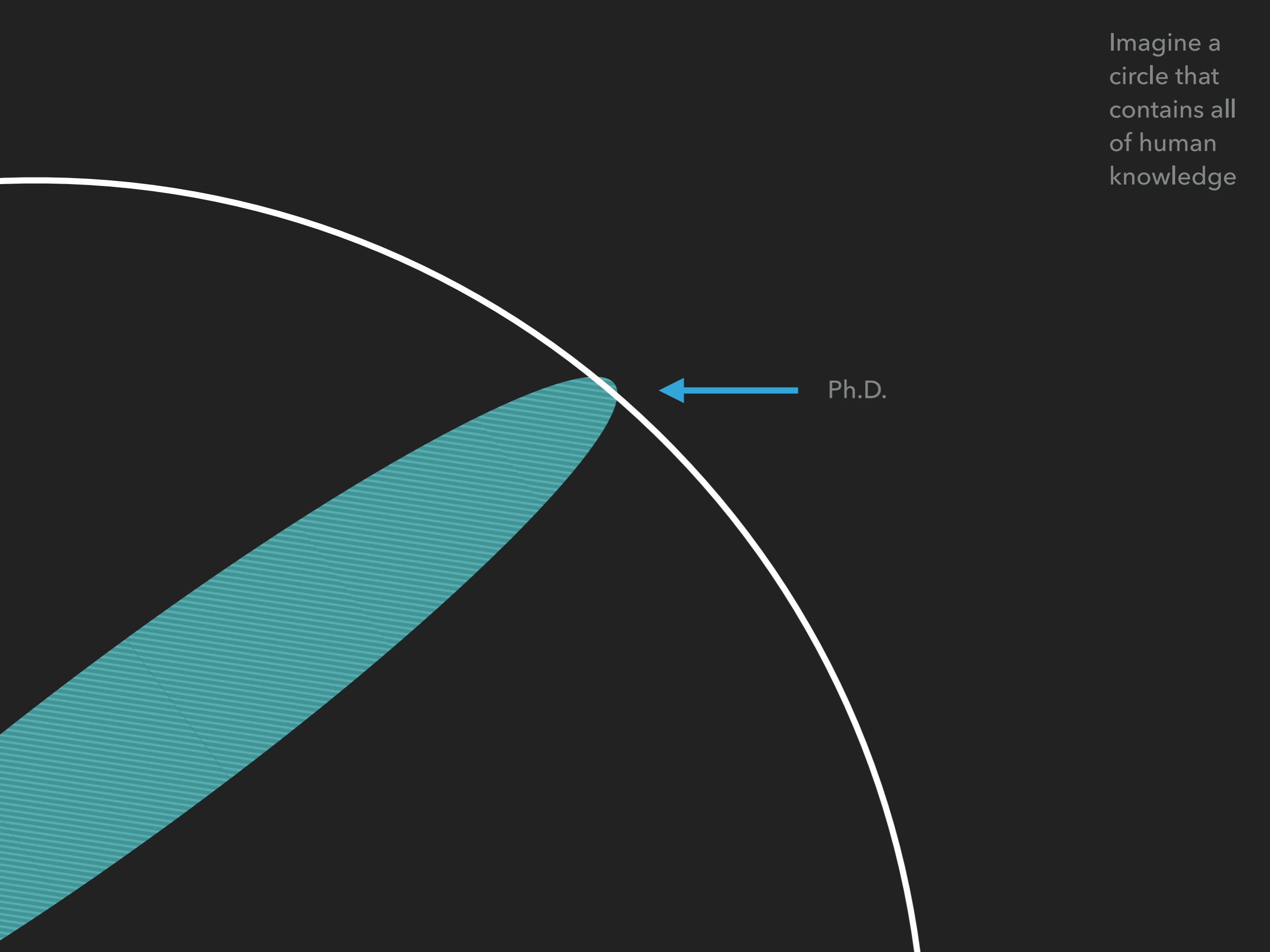
Imagine a
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Ph.D.

WHY YOU PROBABLY WON'T CHANGE THE WORLD

- ▶ World-changing results are rare, really rare
 - ▶ Science is postmodern: many small steps rather than few big ones
 - ▶ Big problems are big because they're **hard**
- ▶ You **should** work on big problems
 - ▶ Just don't be upset if you can't solve them
 - ▶ Once, I couldn't solve a problem and got mad.
A senior colleague's reply: "Oh, you still take it personally?"
- ▶ Most people publish around ~4 papers during their Ph.D.
 - ▶ Expect 1 year of work per paper
 - ▶ This is still a great achievement, because writing papers is hard!

**WHAT IS GREAT
ABOUT DOING A
PH.D.**

YOU WANT TO KNOW MORE

- ▶ You're fascinated by the topic
- ▶ You're a curious person
- ▶ You want to know more
- ▶ With a bit of luck, you can increase the knowledge of the human kind
- ▶ You learn so much about yourself
(what motivates you, what fascinates you, etc.)
- ▶ You get paid to think about problems that fascinate you
- ▶ Once-in-a-lifetime opportunity for many people



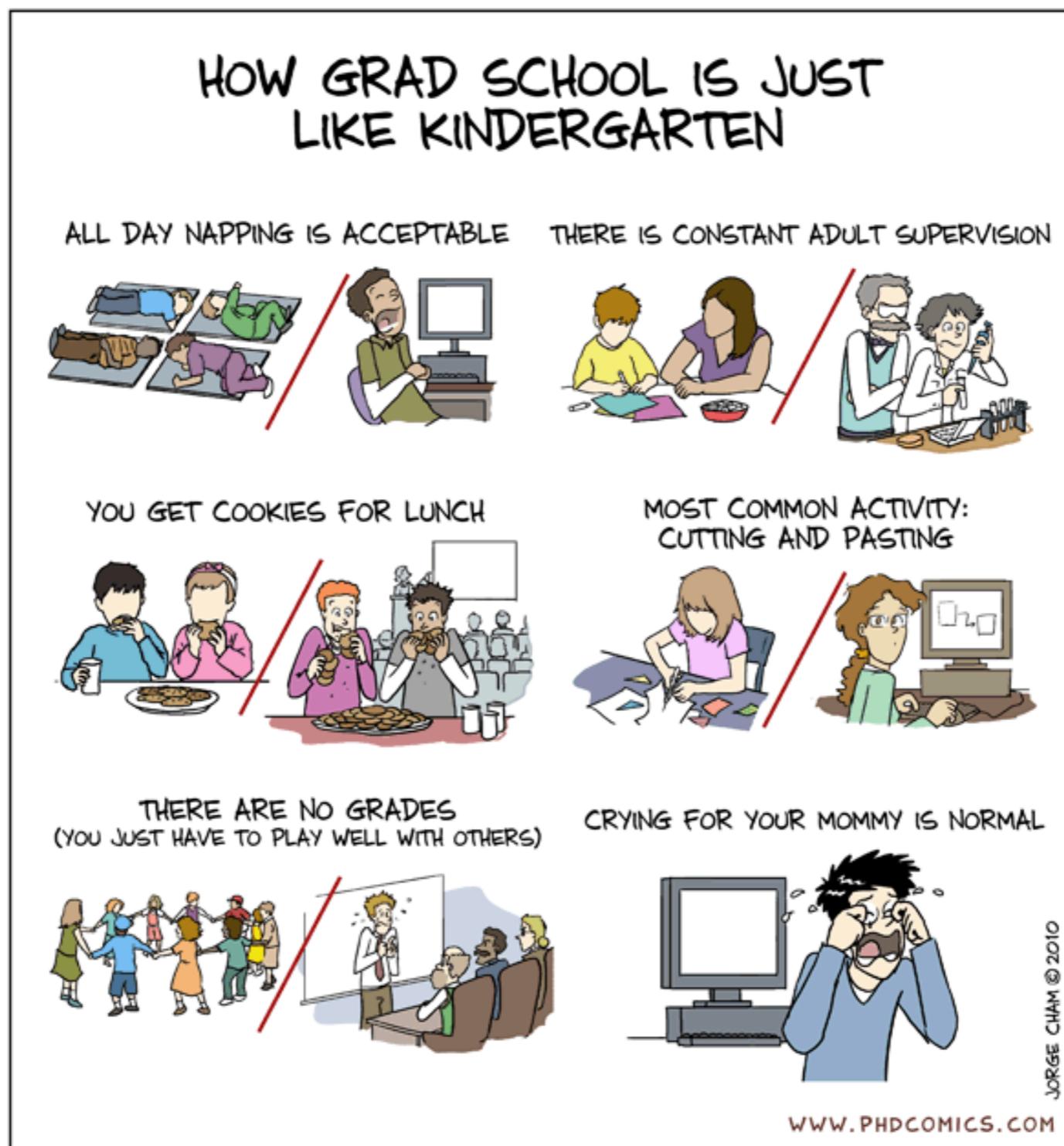
WHAT'S COOL IN GRAD SCHOOL/ACADEMIA

- ▶ The freedom
 - ▶ You can control what you do and when you do it
- ▶ The travel
 - ▶ Join the academia, see the world
- ▶ The other grad students
 - ▶ Fascinated on the quasi-polynomial graph isomorphism algorithm? You'll never walk alone!

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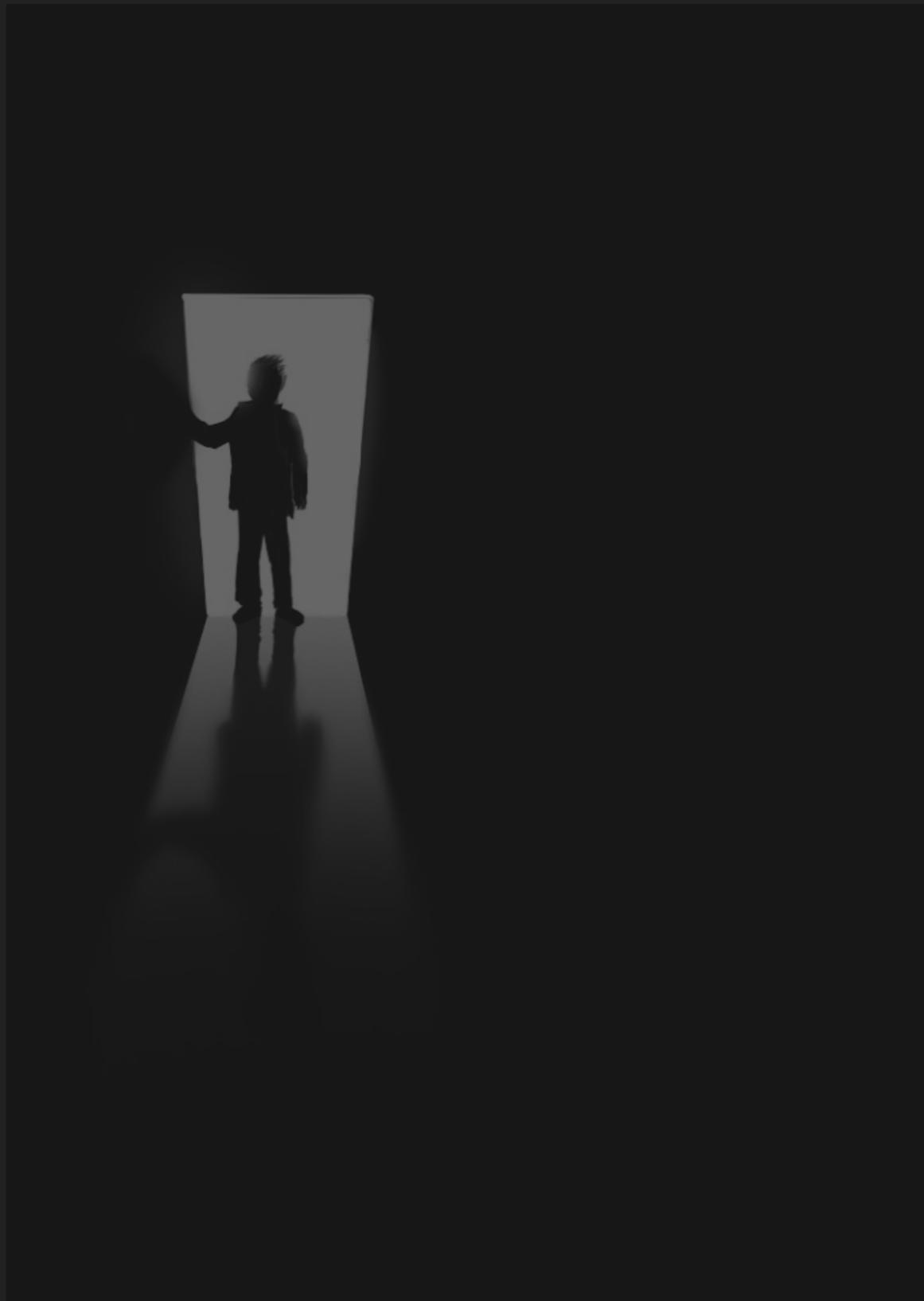
WHAT'S COOL IN GRAD SCHOOL



**WHAT YOU
CAN (NOT)
CONTROL**

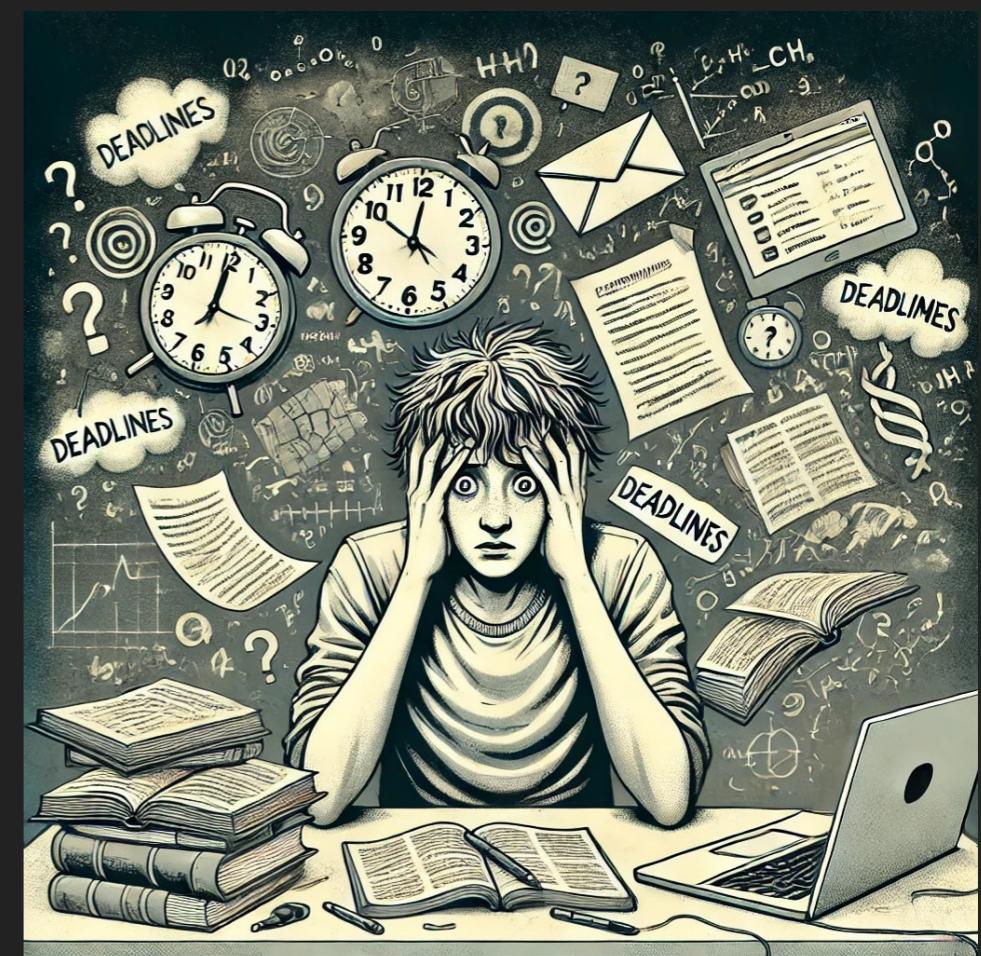
ARE YOU AFRAID OF THE DARK?

- ▶ To do science is to be in the dark
 - ▶ We may strike gold
 - ▶ Or we find dirt, dirt, and more dirt
- ▶ We don't know the answers we're looking for
 - ▶ We don't know if the answers even exist
 - ▶ Heck, we don't even know the correct questions



MANY THINGS ARE OUT OF YOUR CONTROL

- ▶ Whether you solve the problem you work on
 - ▶ It might be too difficult or unsolvable
 - ▶ Somebody else might solve it before you
- ▶ Whether your paper gets accepted or rejected
 - ▶ Peer review can be quite random
- ▶ Whether you get a lot of citations
 - ▶ Very hard to predict which works will have impact
- ▶ “Out of control” doesn’t mean you have no influence
 - ▶ It just means that ultimately external factors will determine the outcome
- ▶ Focussing on outcomes can make you very unhappy very quickly



THINGS YOU CAN CONTROL

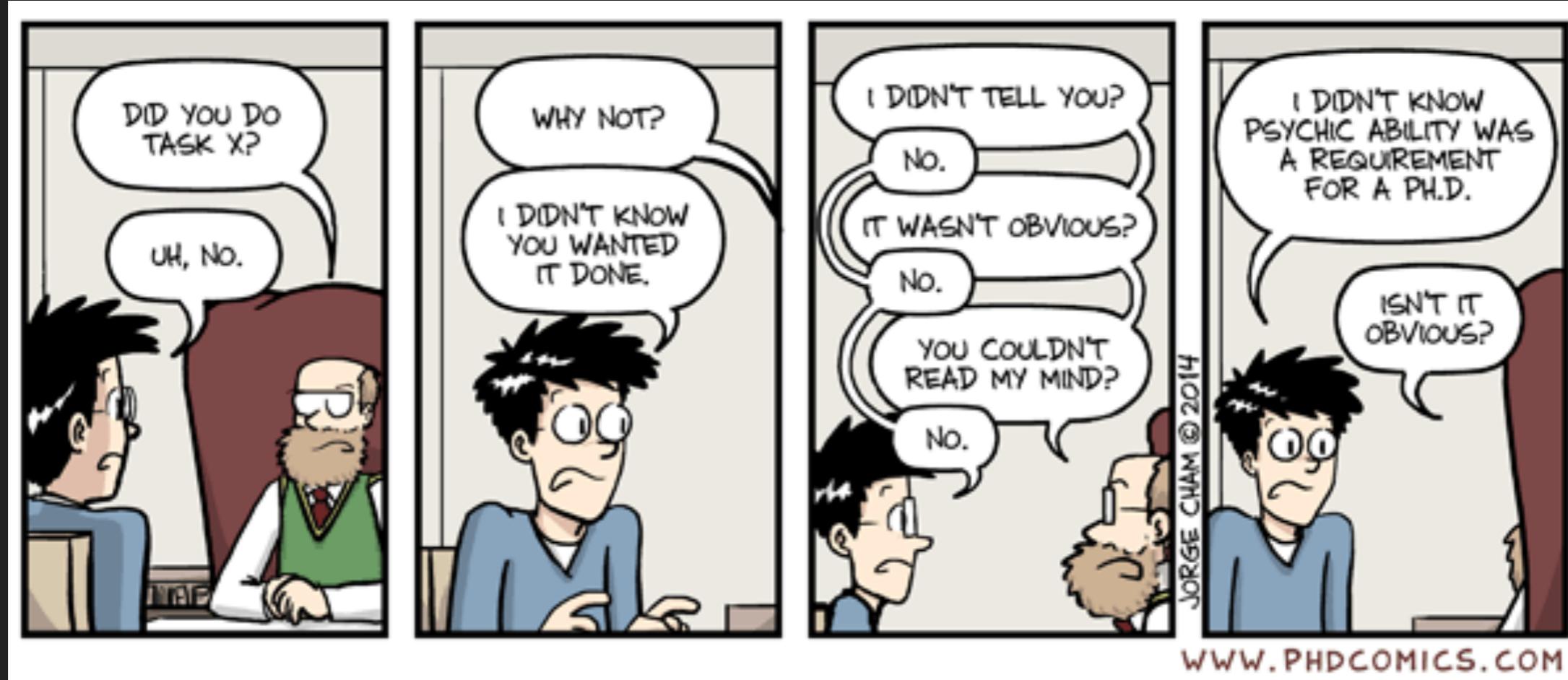
- ▶ You can't control the outcomes,
but you can **control the process**
- ▶ Ensure that every day you do the best work you can
 - ▶ Ensure that every day you make progress
 - ▶ Some days you go in the right direction,
some days you don't. That's OK.
- ▶ Submit papers when you cannot improve them further
 - ▶ You have done all you can, the rest is not up to you
- ▶ If you focus on the process, there are **no regrets**
 - ▶ You did your best, you cannot do better
 - ▶ Typically, good processes lead to **good outcomes**



**CONTROLLING
THE PROCESS**



WHO KNOWS WHAT YOU SHOULD DO?



FINDING THE RIGHT THINGS TO DO

WRITING SCHEDULES

- ▶ Maintain a writing schedule

- ▶ Helps you stay organized and keep track of your progress
- ▶ Plan one week ahead
- ▶ Each day ε progress $\implies 200\varepsilon$ progress after 1 year!
 - ▶ In the real world, constants matter!
- ▶ Forces you to be honest with yourself

Writing Schedule

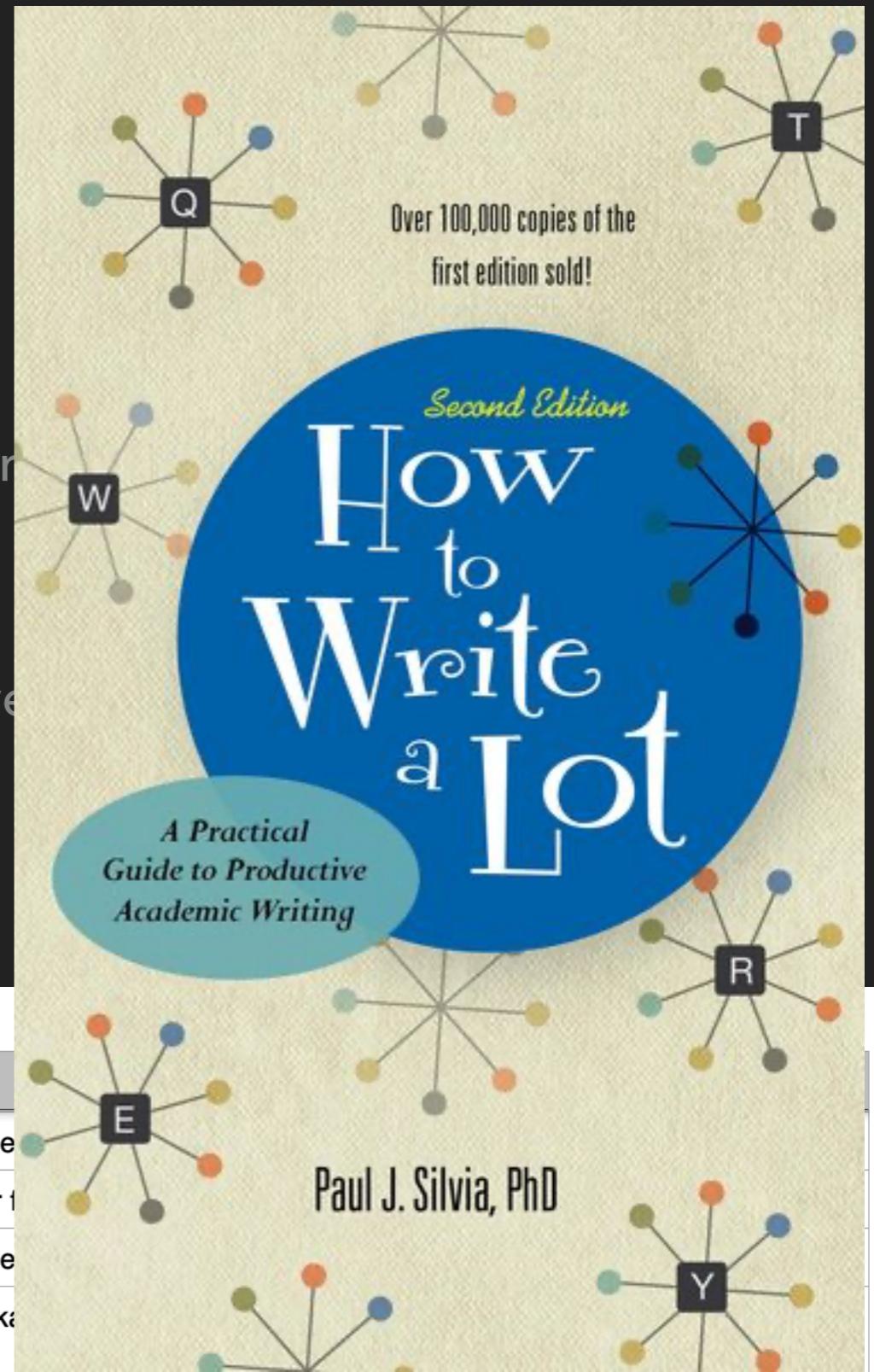
| Date | Project | Done | Task | Comment |
|------------------|------------------------|-------------------------------------|---|---|
| Mon, 16 Sep 2019 | Dynamic ISI | <input checked="" type="checkbox"/> | Continue incorporating Monika's comments. | Done. |
| | FIS Lower Bounds | <input checked="" type="checkbox"/> | Prepare presentation of Trevisan paper for Holger. | Done. |
| Tue, 17 Sep 2019 | Dynamic ISI | <input checked="" type="checkbox"/> | Continue incorporating Monika's comments. | Done. |
| | Repartitioning | <input checked="" type="checkbox"/> | Take notes about discussion with Monika. | Done. Also contains notes about old meeting with Harald and Stefan. |
| Wed, 18 Sep 2019 | Streaming Biclustering | <input checked="" type="checkbox"/> | Take note that asymmetric Hamming distances satisfies triangle inequality and the consequences of this. | Done. |
| Thu, 19 Sep 2019 | Dynamic ISI | <input type="checkbox"/> | Continue incorporating Monika's comments. | Procrastinated. |

WRITING SCHEDULES

► Maintain a writing schedule

- Helps you stay organized and keep track of your progress
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DEALING WITH YOUR ADVISOR

- ▶ Keep your advisor up-to-date
- ▶ Don't expect your advisor to remember the things you say on the hallway
- ▶ Figure out how you best work together
 - ▶ Some people like email, some don't
 - ▶ Make your communication short and precise
 - ▶ Train your communication!





BUT EVEN WITH THE BEST PROCESS...
SOMETIMES YOU'LL BE STUCK

**DON'T
PANIC**

WHO YOU'RE GONNA CALL WHEN THE PROBLEMS COME?

YOU'RE STUCK – WHAT TO DO

- ▶ Ask your advisor

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- ▶ Ask your advisor
- ▶ Ask your fellow students & postdocs, too!

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YOU'RE STUCK – WHAT TO DO

- ▶ Ask your advisor
 - ▶ Ask your fellow students & postdocs, too!
- ▶ Keep banging your head?

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YOU'RE STUCK – WHAT TO DO

- ▶ Ask your advisor
 - ▶ Ask your fellow students & postdocs, too!
- ▶ Keep banging your head?
 - ▶ Sometime it helps

WHO YOU'RE GONNA CALL WHEN THE PROBLEMS COME?

YOU'RE STUCK – WHAT TO DO

- ▶ Ask your advisor
 - ▶ Ask your fellow students & postdocs, too!
- ▶ Keep banging your head?
 - ▶ Sometime it helps
 - ▶ Sometimes its best to just take a break. No need to keep your chair warm. Do other things or call it a day. Who knows, you might even figure it out that way.

WHO YOU'RE GONNA CALL WHEN THE PROBLEMS COME?

YOU'RE STUCK – WHAT TO DO

- ▶ Ask your advisor.
- ▶ Ask your friends.
- ▶ Keep banging your head against the wall.
- ▶ Sometime it's good to just sit there.
- ▶ Sometimes you just need to bang your chair very hard. Who knows, you might find a way.



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way.

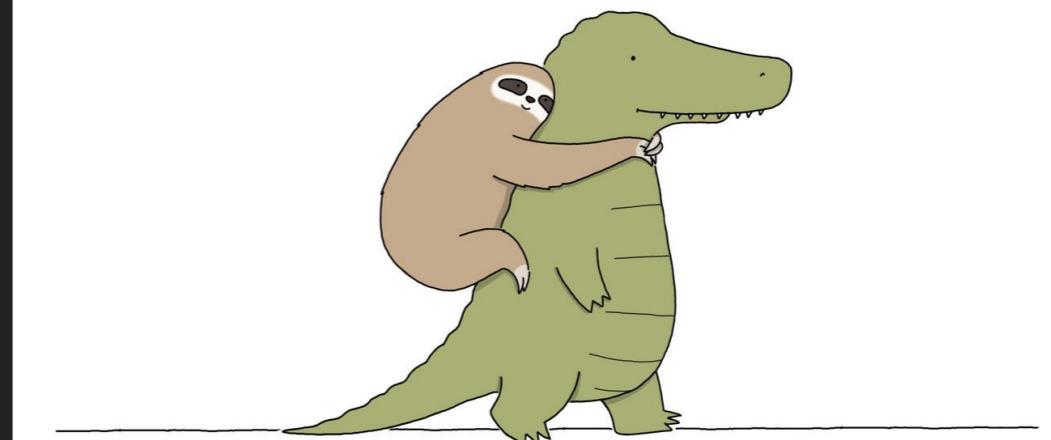
DEALING WITH STRESS

- ▶ Doing a Ph.D. can be very stressful
 - ▶ You have to navigate the darkness
 - ▶ You do many things for the first time
 - ▶ Competitive people put themselves under a lot of pressure
 - ▶ Many of you even live in a new country



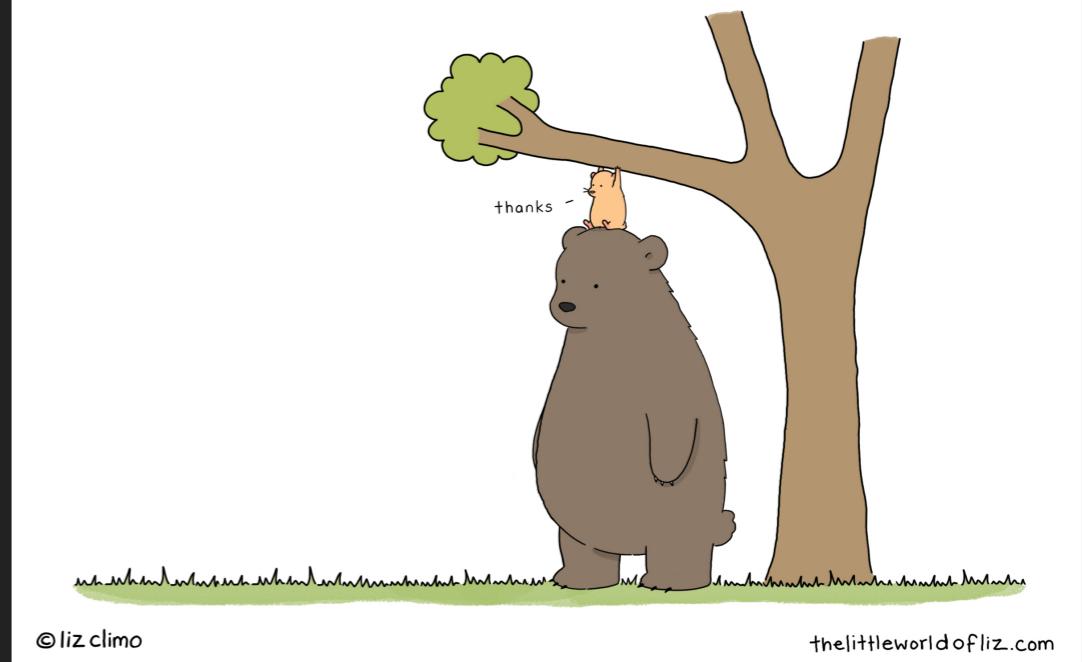
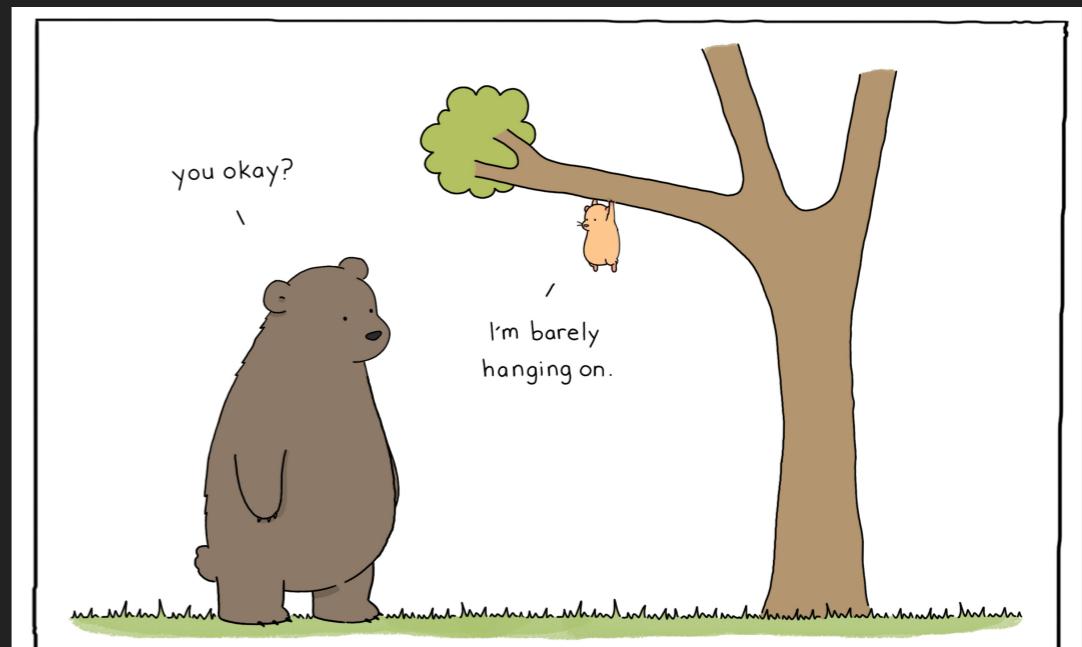
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 - ▶ You do many things for the first time
 - ▶ Competitive people put themselves under a lot of pressure
 - ▶ Many of you even live in a new country
 - ▶ Find some friends inside and outside of academia
 - ▶ Meditate if that's your thing



GET SOME HELP IF YOU NEED IT

- ▶ Depression levels among Ph.D. students are high
- ▶ TU Wien offers help:
 - ▶ Individual counseling ([Link](#))
 - ▶ The ombuds office helps you deal with conflicts and abuse ([Link](#))
 - ▶ There is no pride in suffering and getting no help



RESOURCES

- ▶ “Don’t Panic” talks by [Jilles Vreeken](#) and [Pauli Miettinen](#)
- ▶ This talk is based on their talks, see also references therein
- ▶ Liz Climo ([thelittleworldofliz.com](#))
- ▶ Piled Higher & Deeper ([phdcomics.com](#))
- ▶ 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”

ALL THE BEST WITH YOUR PH.D.

- ▶ How to survive a Ph.D.?
 - ▶ **Don't panic**
 - ▶ Focus on the process
 - ▶ Maintain a writing schedule
 - ▶ Make friends and support each other
 - ▶ Aim to become the best researcher you can be, don't just measure outcomes
- ▶ Don't listen to me, do your own thing
- ▶ Slides available online:
neumannstefan.com/files/survival.pdf

