

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

STEFAN NEUMANN

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# 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 on top

**WRONG**







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# DISCLAIMER

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- ▶ 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



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



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

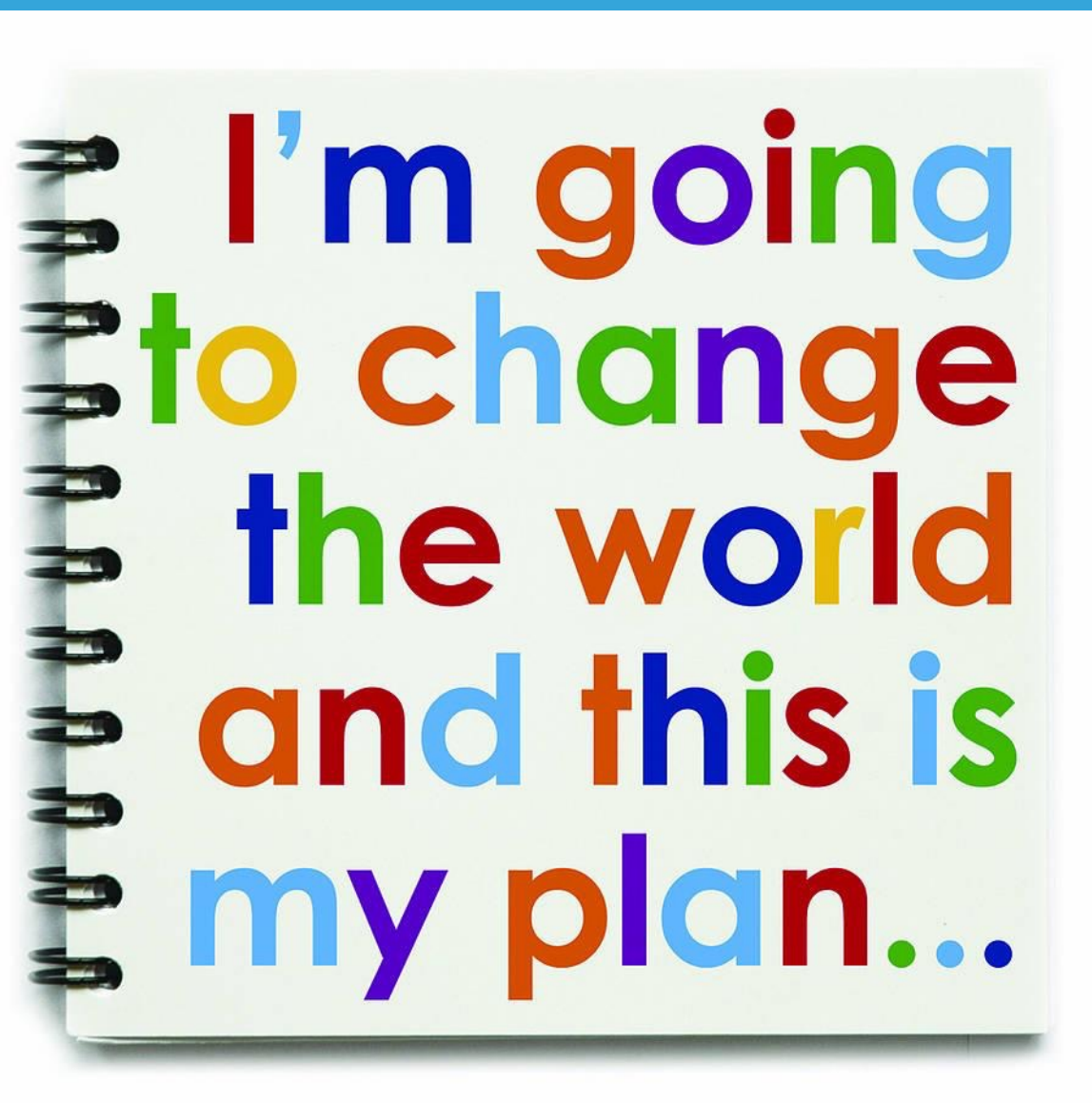
**DON'T  
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## HOW TO AVOID PANICKING

- ▶ 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

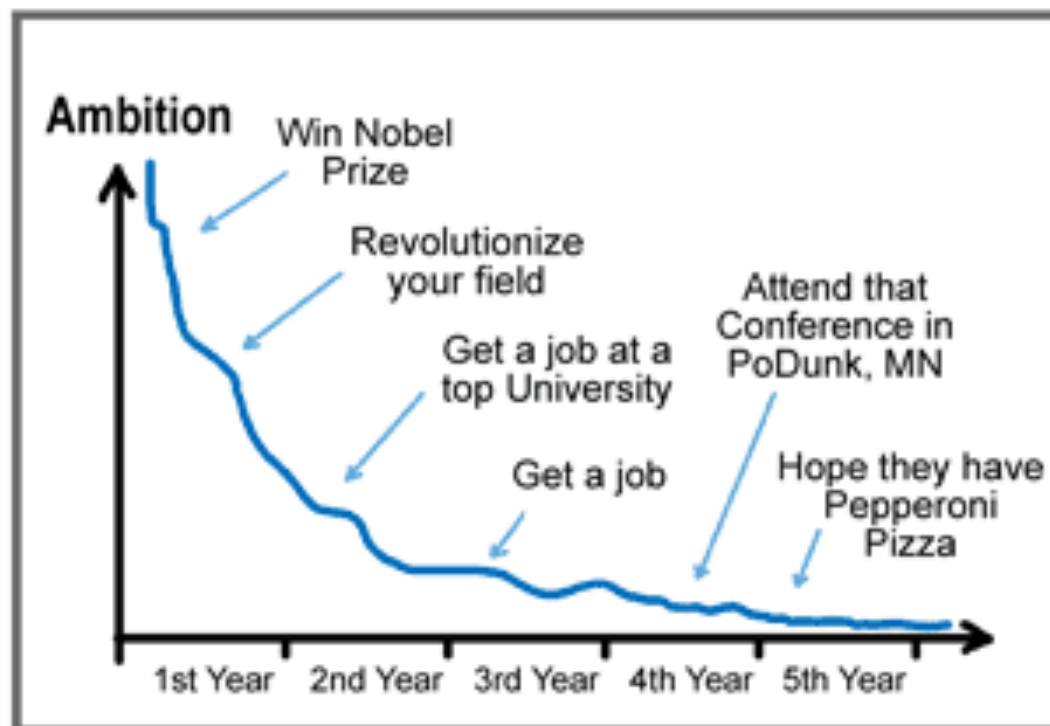


I'M GOING  
TO CHANGE  
THE WORLD!

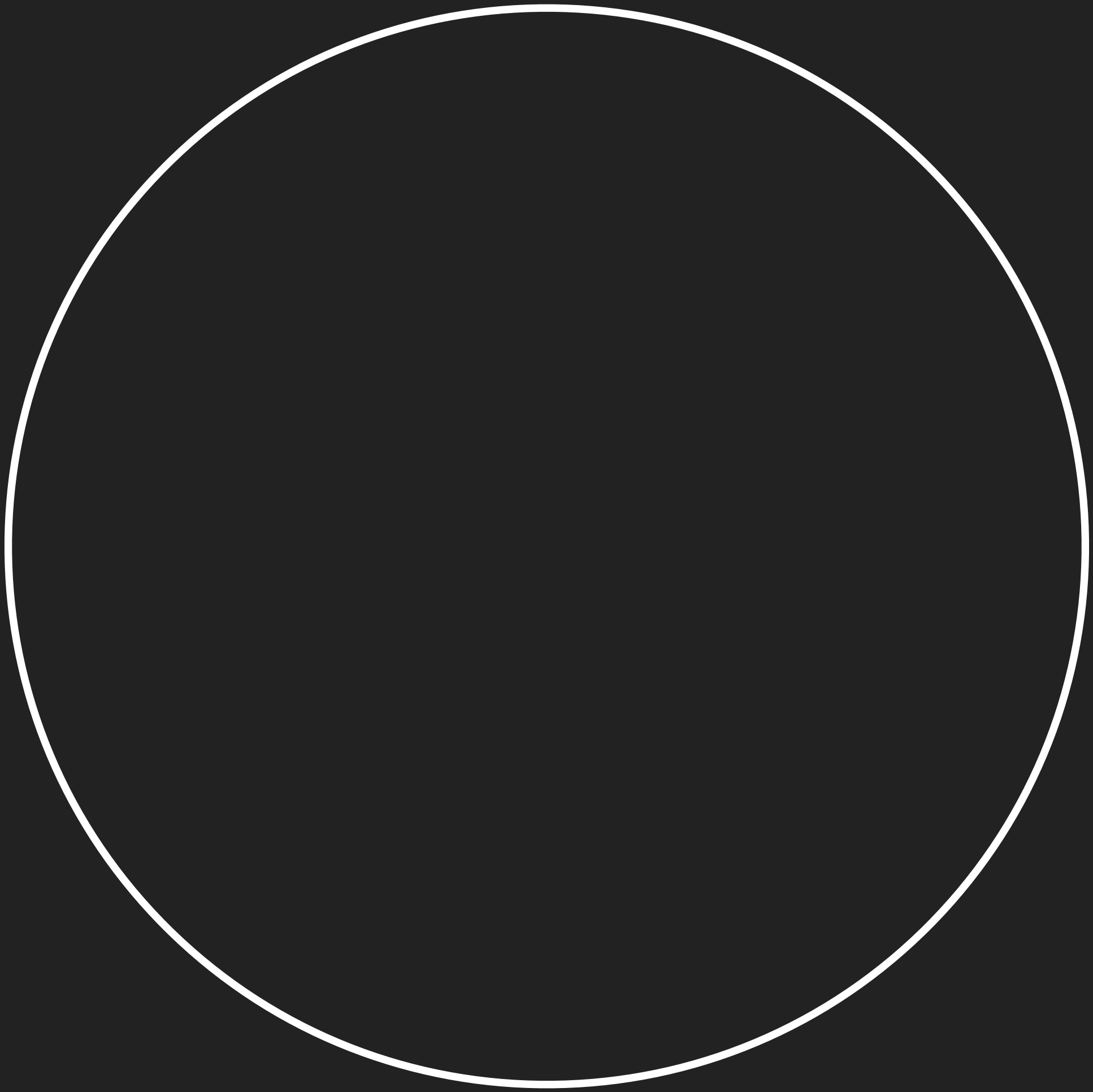


I'M GOING  
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## YOUR LIFE AMBITION - What Happened??



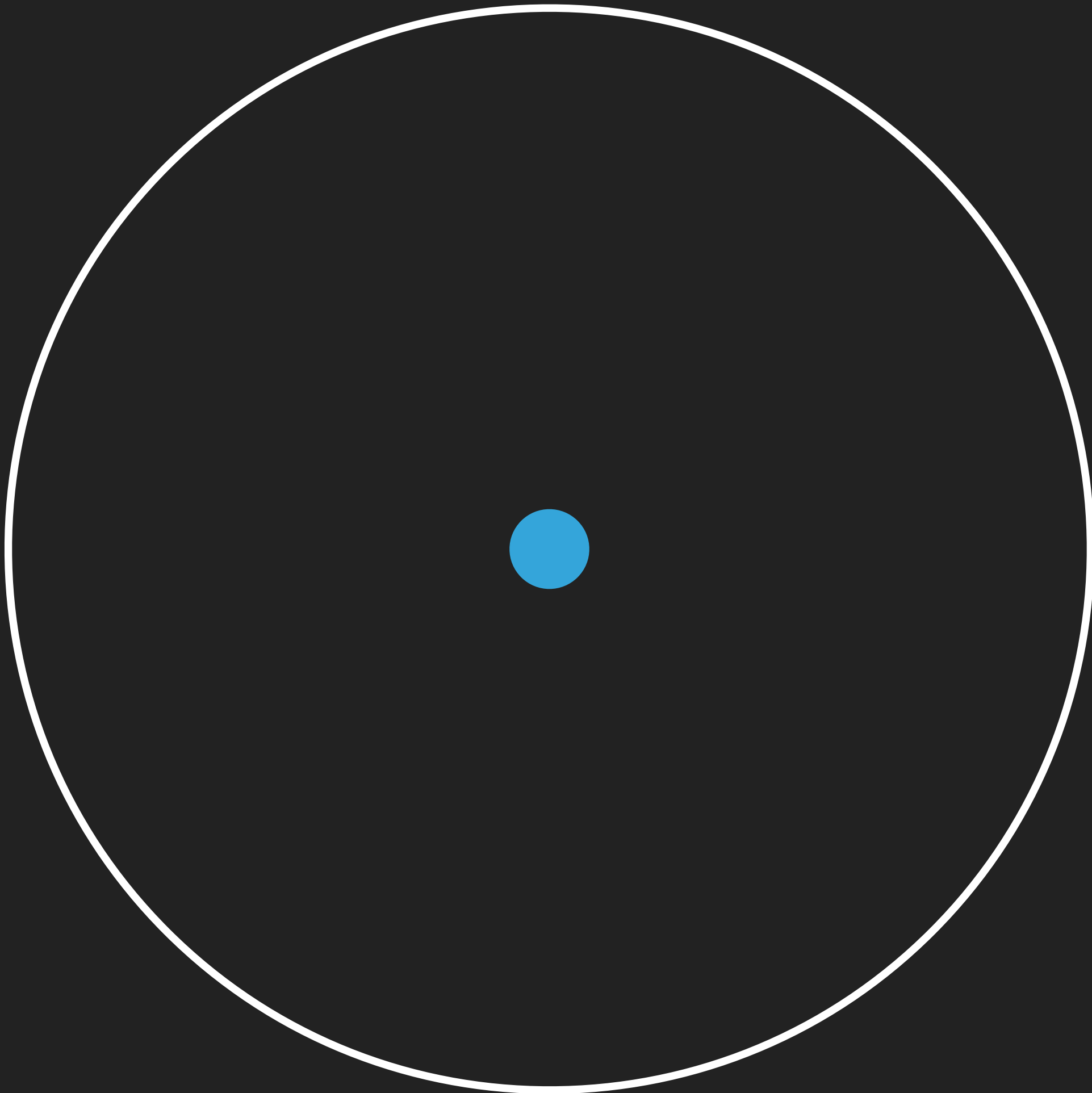
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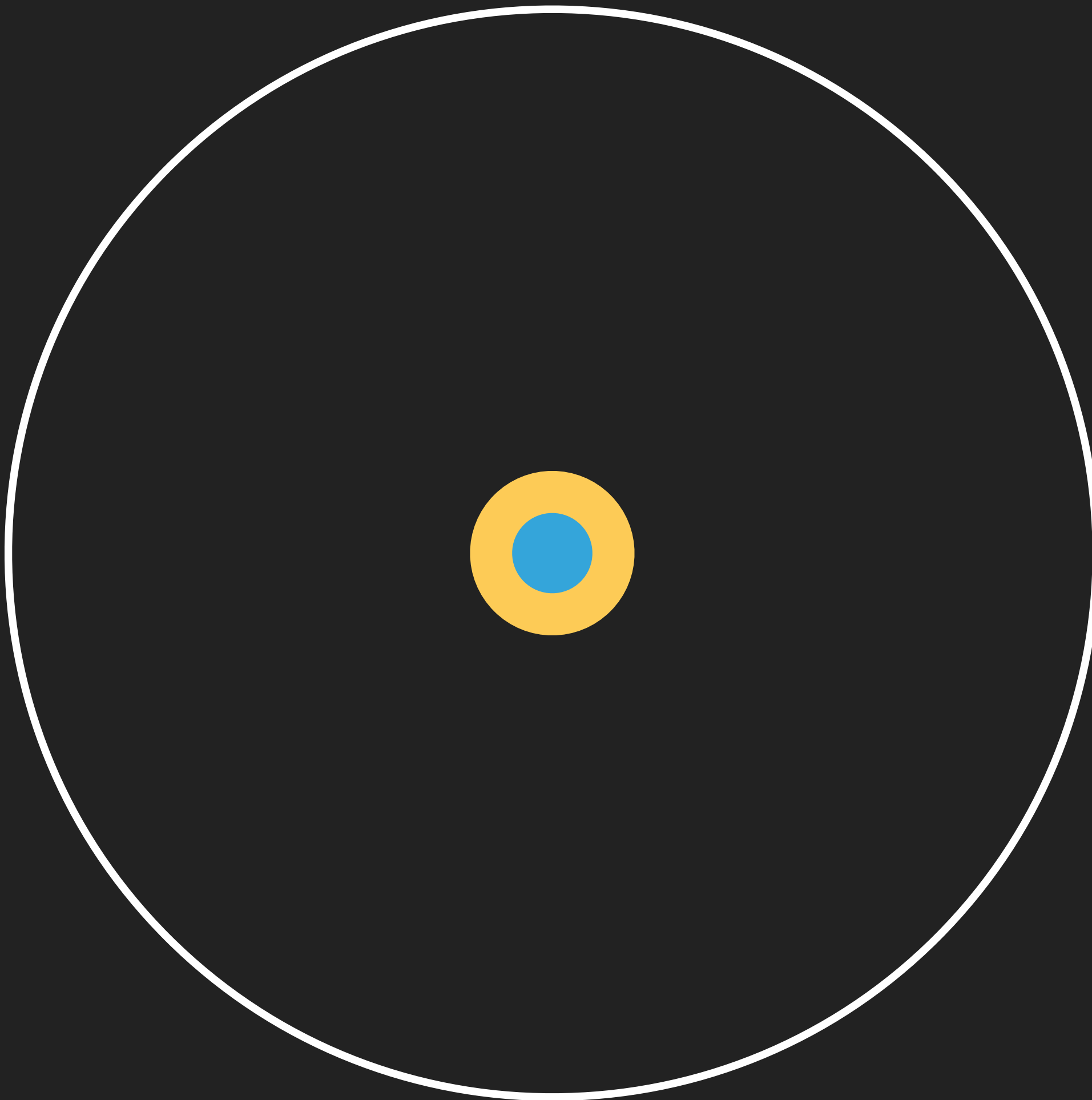
Imagine a  
circle that  
contains all  
of human  
knowledge



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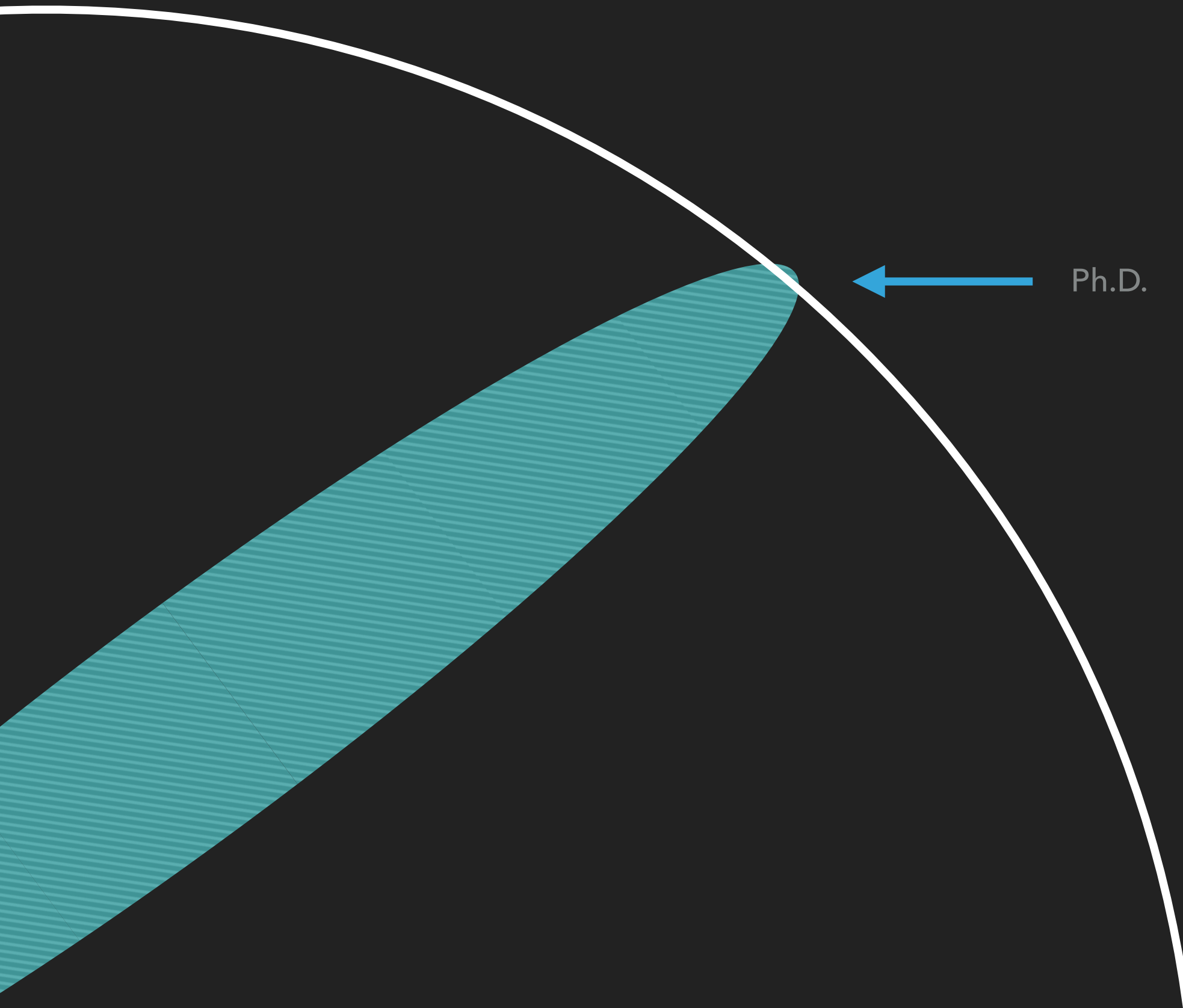
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Ph.D.

# 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!

# WHAT'S COOL IN GRAD SCHOOL/ACADEMIA

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# WHAT'S COOL IN GRAD SCHOOL

## HOW GRAD SCHOOL IS JUST LIKE KINDERGARTEN

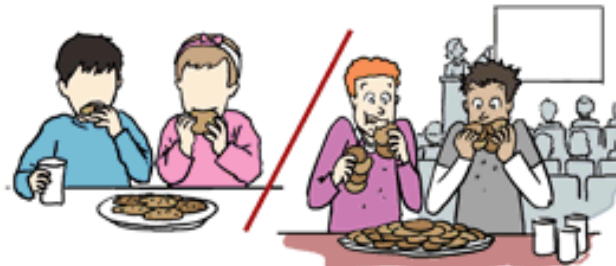
ALL DAY NAPPING IS ACCEPTABLE



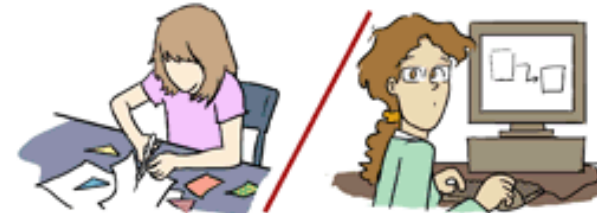
THERE IS CONSTANT ADULT SUPERVISION



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



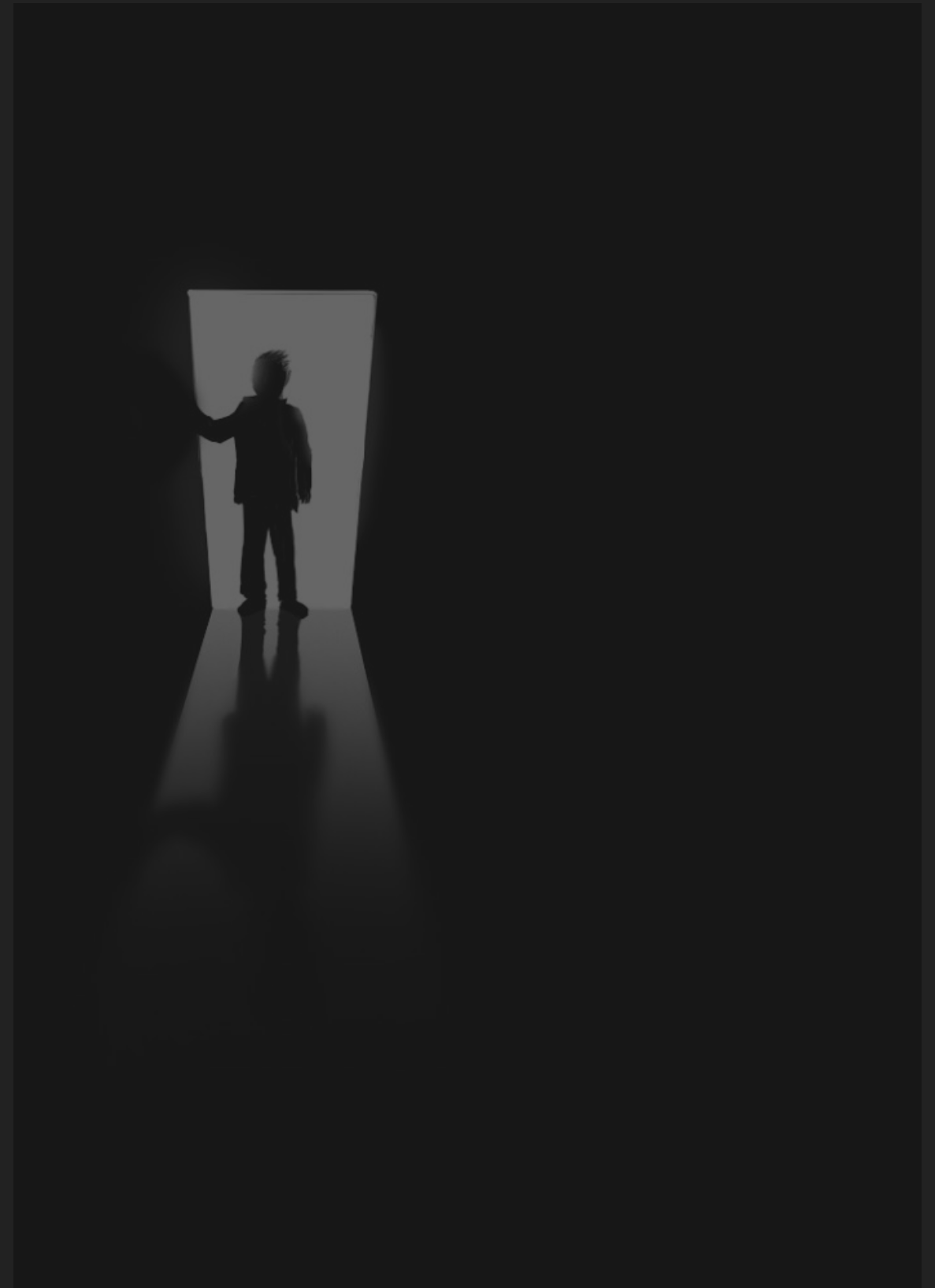
JORGE CHAM © 2010

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WHAT YOU  
CAN (NOT)  
CONTROL

### ARE YOU AFRAID OF THE DARK?

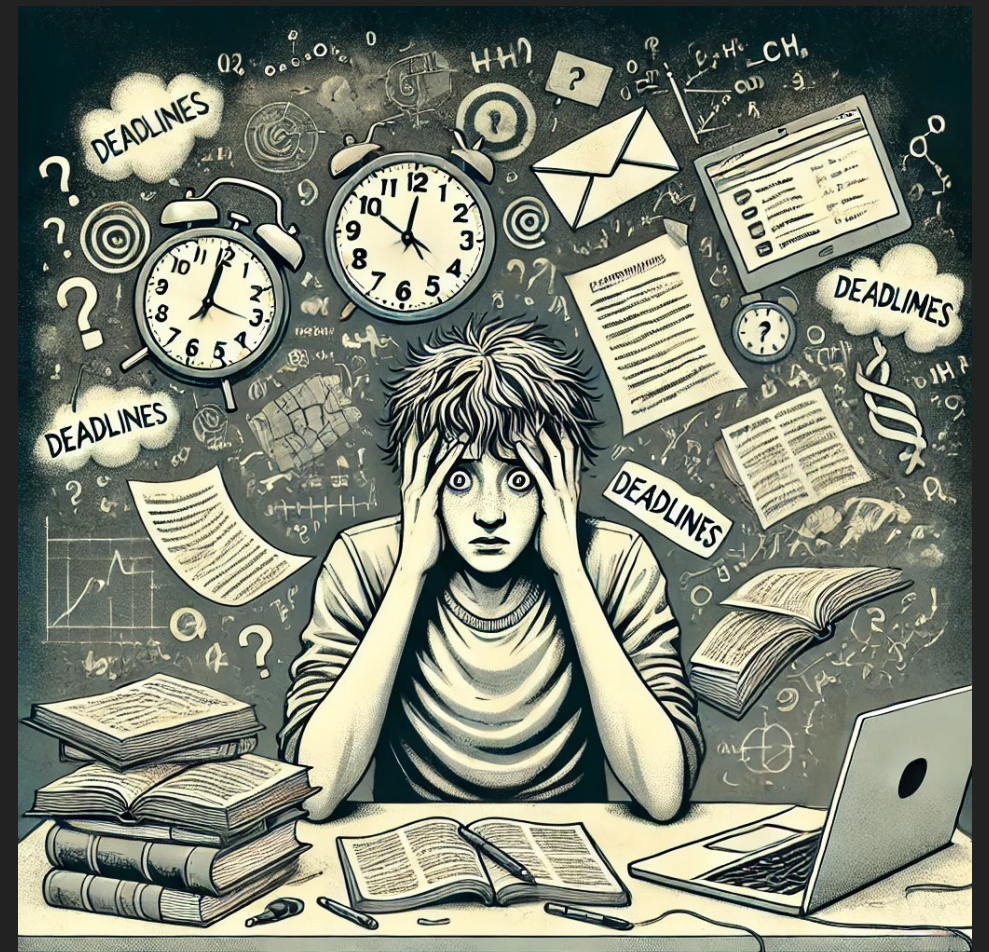
- ▶ To do science is to be in the dark
  - ▶ We may strike gold
  - ▶ Or we find dirt, dirt, and more dirt
- ▶ We don't know the answers we're looking for
  - ▶ We don't know if the answers even exist
  - ▶ Heck, we don't even know the correct questions





# 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



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WHO KNOWS WHAT  
YOU SHOULD DO?



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# 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  $\varepsilon$  progress  $\implies$   $200\varepsilon$  progress after 1 year!
    - ▶ In the real world, constants matter!
  - ▶ Forces you to be honest with yourself

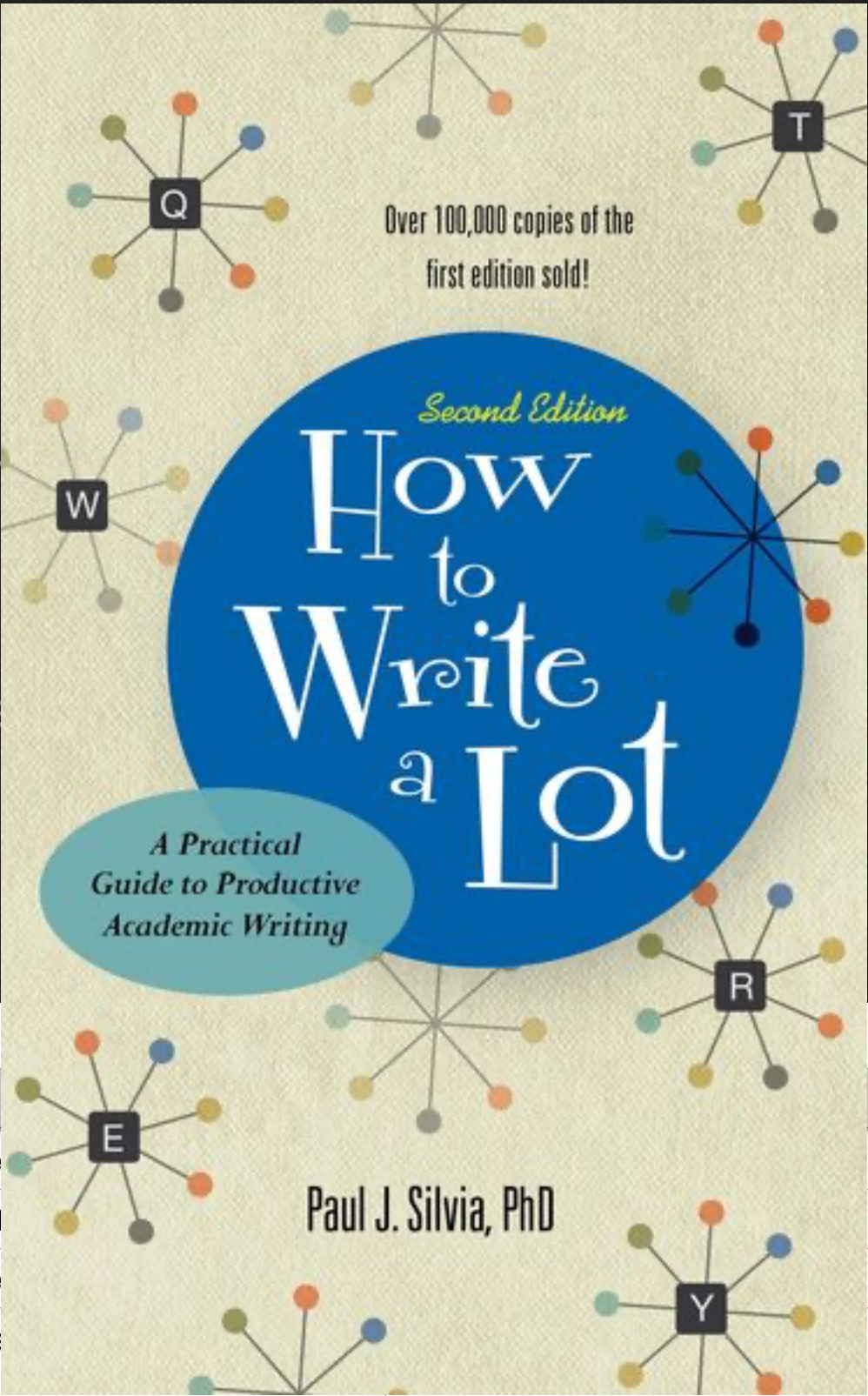
Writing Schedule

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.



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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?

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## YOU'RE STUCK – WHAT TO DO

- ▶ Ask your advisor

WHO YOU'RE GONNA CALL WHEN THE PROBLEMS COME?

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## YOU'RE STUCK – WHAT TO DO

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

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- ▶ 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
  - ▶ 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.



## YOU'RE STUCK – WHAT TO DO

▶ Ask your advisor

▶ Ask your friend

▶ Keep banging

▶ Sometime i

▶ Sometimes  
your chair v  
knows, you



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t a day. Who  
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



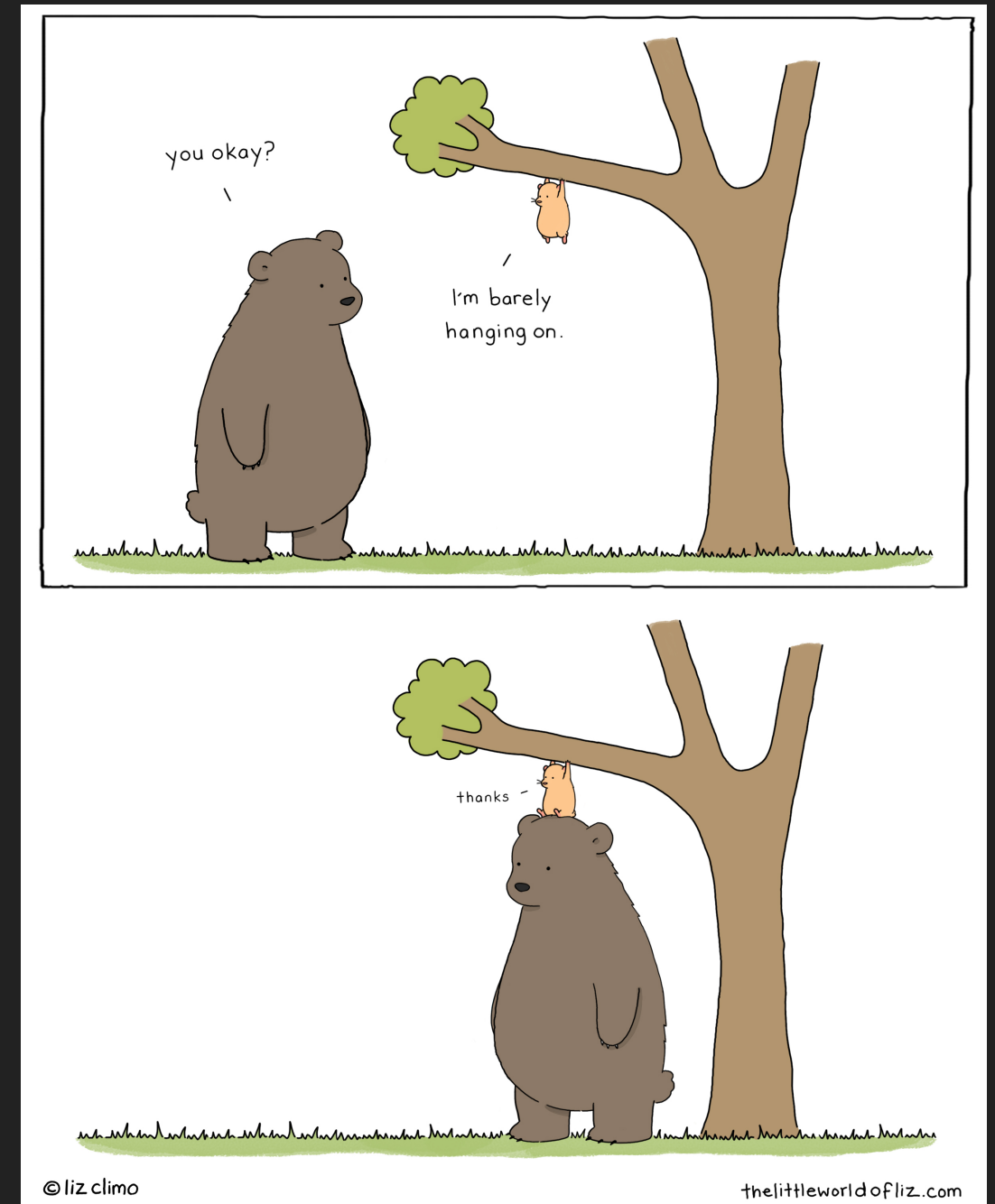
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  - ▶ Competitive people put themselves under a lot of pressure
  - ▶ Many of you even live in a new country
- ▶ Find some friends inside and outside of academia
- ▶ Meditate if that's your thing



# 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](http://thelittleworldofliz.com))
- ▶ Piled Higher & Deeper ([phdcomics.com](http://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](http://neumannstefan.com/files/survival.pdf)

