

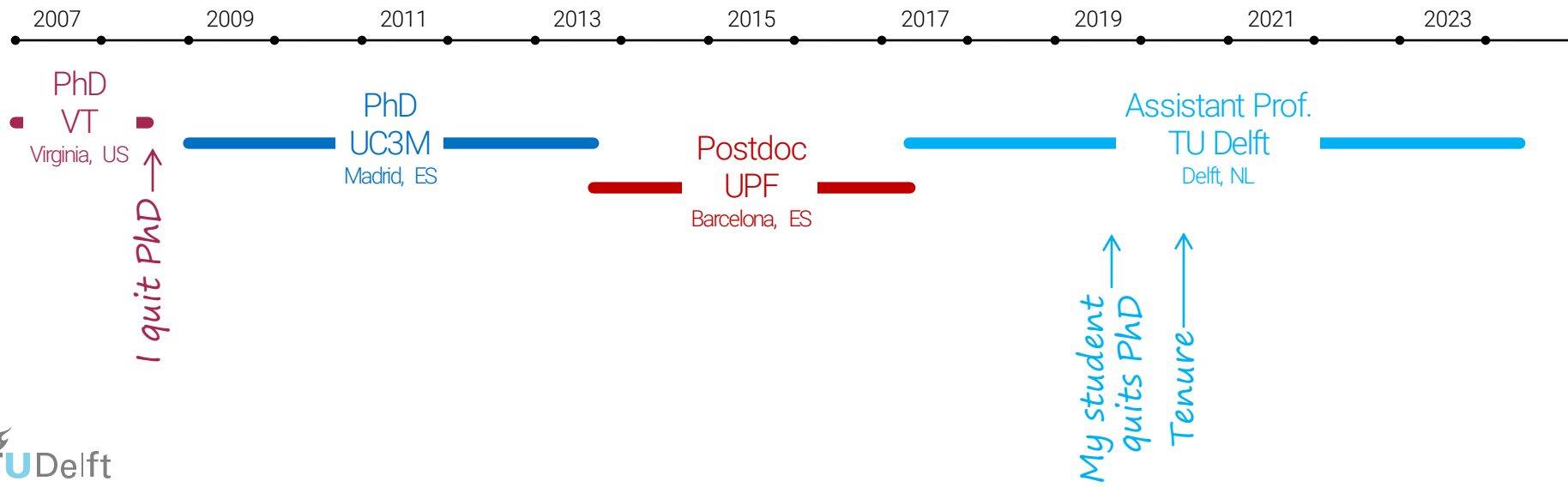
# Your PhD & You



Picture by RobinHiggins

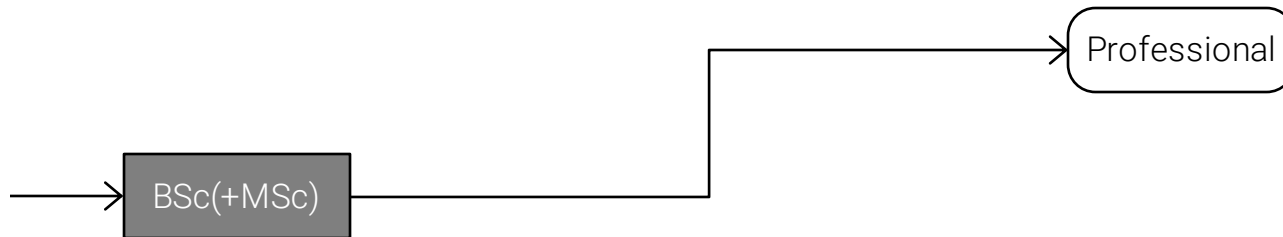
# Me

- Julián Urbano
- Assistant Professor @ TU Delft, Netherlands
- Information Retrieval (Evaluation)



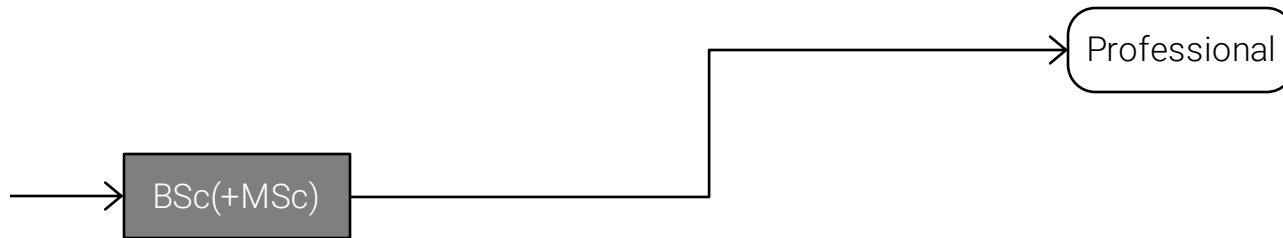
EDUCATION

- University is where we go to become professionals
- We acquire the necessary knowledge to perform as such



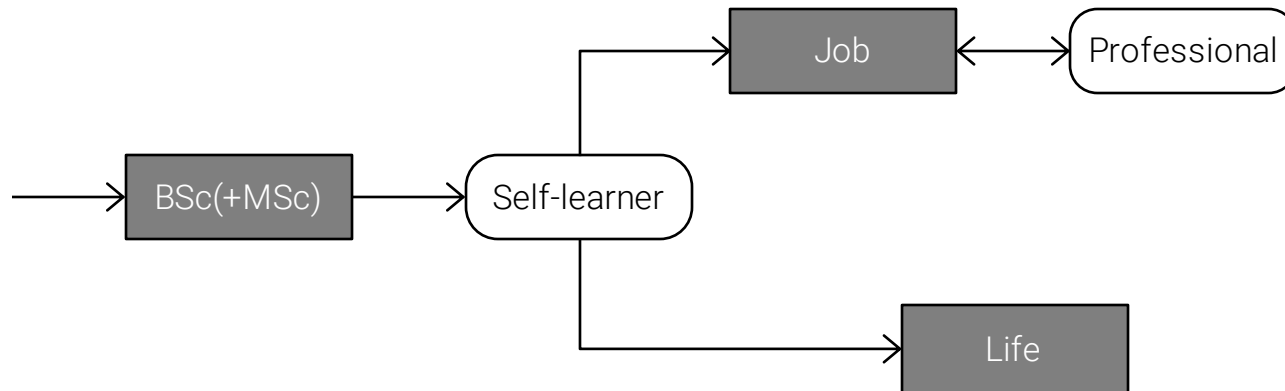
*“You will not be an engineer when you graduate.  
You will just have the necessary vocabulary  
to know what the real engineers talk about”*

—Some Professor from Córdoba

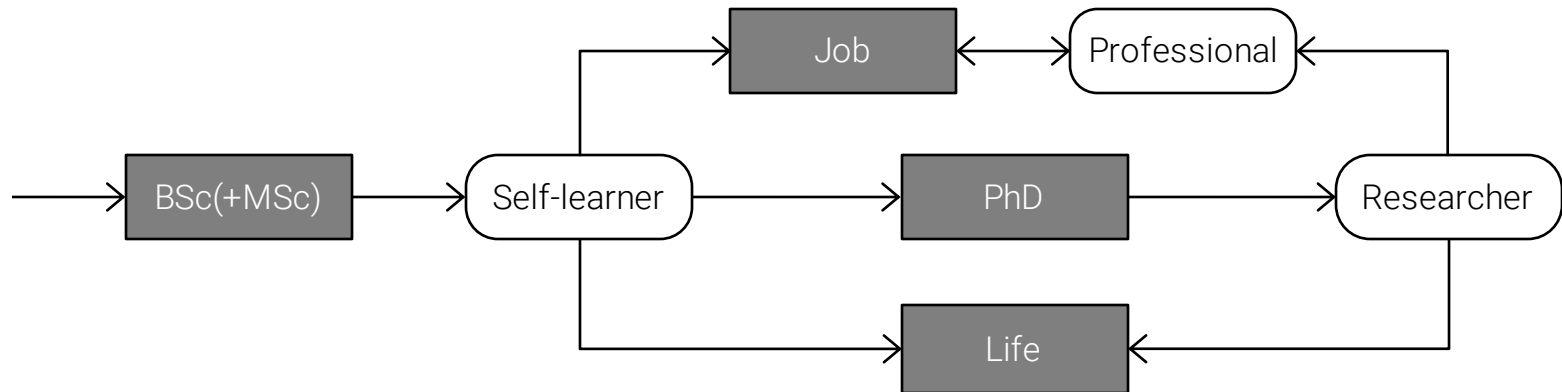


- But then I went to University...

- The world is much bigger, more complex, and yet more beautiful than I thought
- Becoming a professional is a life-long process
- University gives us the fundamentals and the tools to be self-sufficient



- ...and then I got into a PhD program (twice)
  - Produce new knowledge, what will eventually be taught at BSc/MSc programs
  - Learn how to do research
  - Learn how terrible we humans are at reasoning

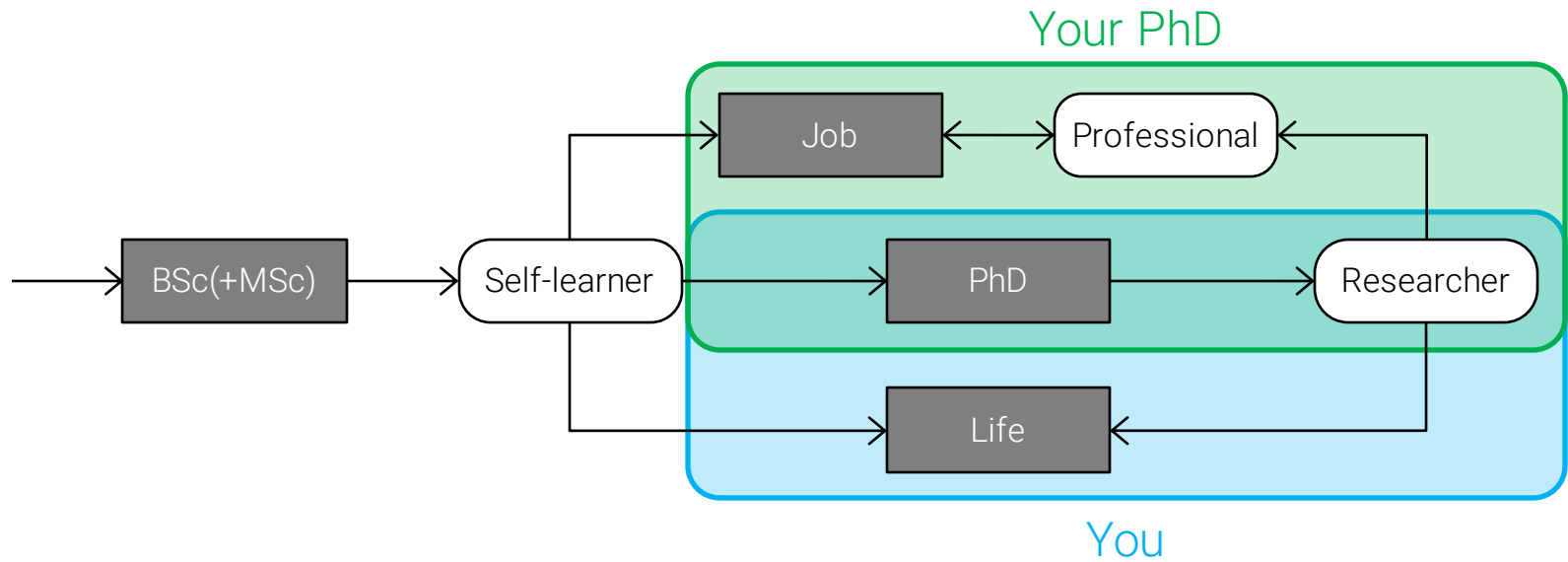


# Sad Times

- We live in the times of the alternative truths, where
  - we have loads of information around us
  - people don't care about the truth, only about what support their beliefs
  - the media doesn't give information but opinions
  - everyone knows about everything
  - clicking the ads is more important than the truth
  - people don't want to learn, but to be entertained
  - we're not allowed to disagree on certain topics
  - scientific facts can be disputed with mere opinions
  - politicians are unconstrained by the facts



# This Talk



# Trust Me

- It's not about your research
- It's not about the papers
- It's not about the citations
- It's not about the awards
- It's not about the thesis
- It's not about the title
- It's not about choosing "Dr." when you book an airplane ticket
- It's not about making your family proud

it's about you

# You

*“Learned Doctor,*

*You now have the right to use the title of doctor.*

*Your doctorate means that society can rely on your judgment, that you will act transparently and communicate independently about your results and the societal relevance of your work. In other words, your doctorate implies that you will uphold scientific integrity.*

*[...]”*



# SIX TIPS

# 1. Be Tidy

- Develop the habit of organizing and structuring everything
- Standardize all you do:
  - How you read and annotate papers
  - How you organize *all* your files
  - How you process data
  - How you run in the cluster
- You need to be efficient

# 2. Backup

- E.v.e.r.y.t.h.i.n.g.
- E.v.e.r.y.d.a.y.
- To paranoid levels
  
- Use synchronization tools
- Use online services, but don't rely only on them
  
- Your need to be fail-proof

# 3. Master your Toolbox

- Use version control (e.g. Github) for everything
  - Code, data, papers, notes, reviews, paperwork, etc.
- Automate whenever you can
- Learn LaTeX
- Never ever use Excel for research; only for administration
  
- Not about how many tools you know, but about how well you know them



# 4. Don't Just Do

*“Everyone is entitled to their own opinions, but not their own facts”*

—Daniel Patrick Moynihan

- Learn the process to reach to the facts; at least get familiar with terminology
  1. Research Methods
  2. Statistical analysis
- **Always ask why we do things the way we do, and get a rough idea why**
- You'll never be completely sure that you're doing things the right way, but you'll avoid the other million ways of doing it wrong

# It's Hard

Twenty-nine research teams were given the same set of soccer data and asked to determine if referees are more likely to give red cards to dark-skinned players. Each team used a different statistical method, and each found a different relationship between skin color and red cards.

Referees are **three times as likely** to give red cards to dark-skinned players

Twice as likely

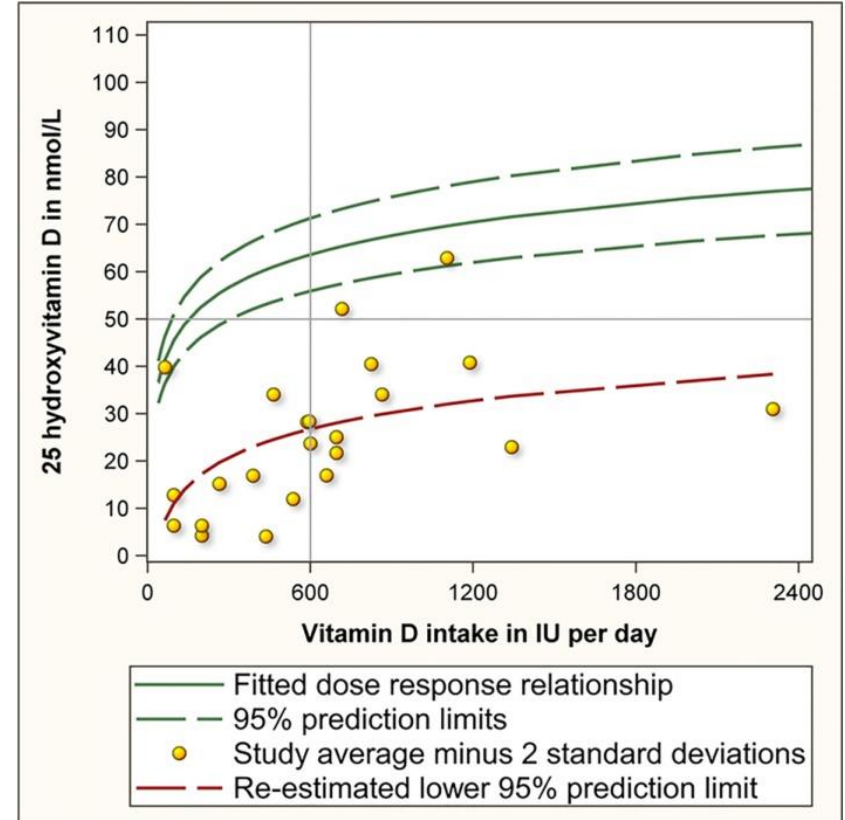
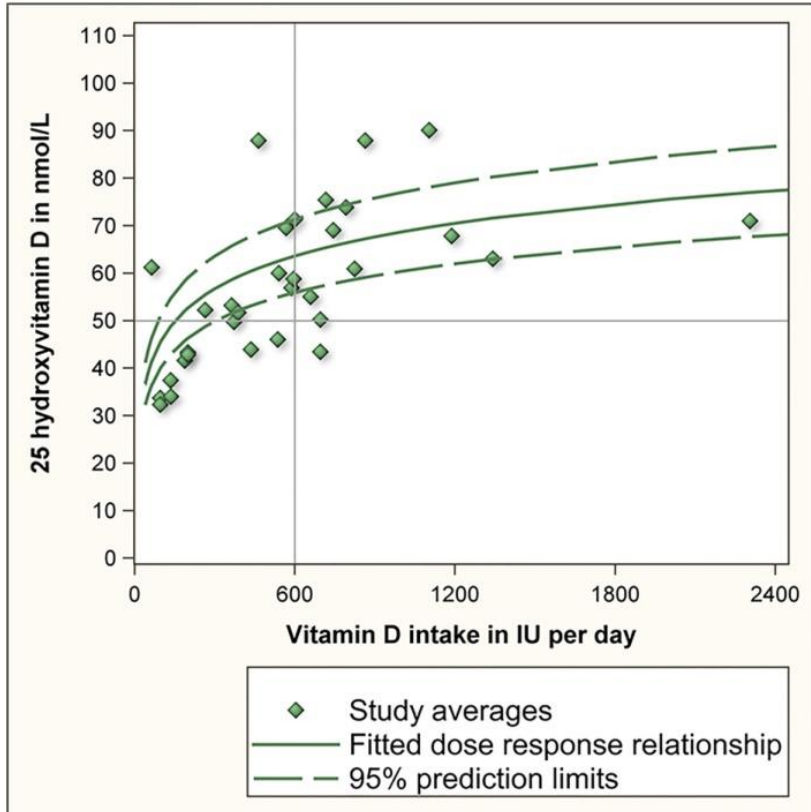
Equally likely

**Statistically significant** results showing referees are more likely to give red cards to dark-skinned players

Non-significant results

ONE RESEARCH TEAM

95% CONFIDENCE INTERVAL



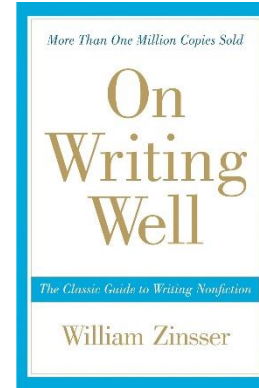
# Remember

- Realize that if something is published, it doesn't mean it's correct
- It's not about pointing people to the flaws in their work
- It's about detecting and preventing them, mainly in your own work
- It's the kind of knowledge that others will look you up for

# 5. Learn to Communicate

- Your ideas are not as important as how well you tell the world about them
- It's rarely about telling results, but often about telling stories

- Learn the do's and don'ts



- Give talks whenever you can; volunteer
- Practice. Practice. Practice. Practice. Practice. Practice. Practice. Practice.

# 3 Capital Sins of the Research Talk

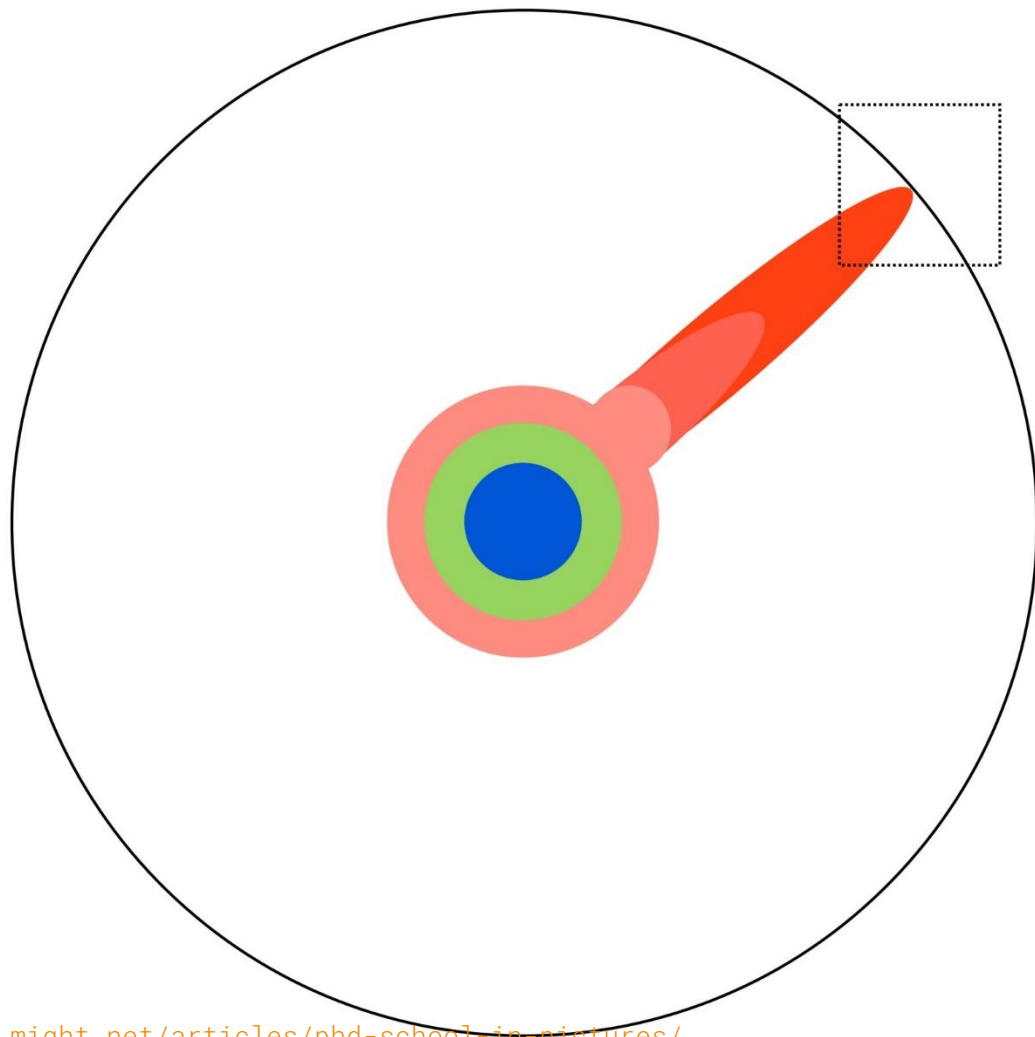
1. Assuming that everyone is familiar with the topic and they know the context
2. Including every single detail to show how much effort we put in our work
3. Overcomplicating everything to show that our work is of high quality

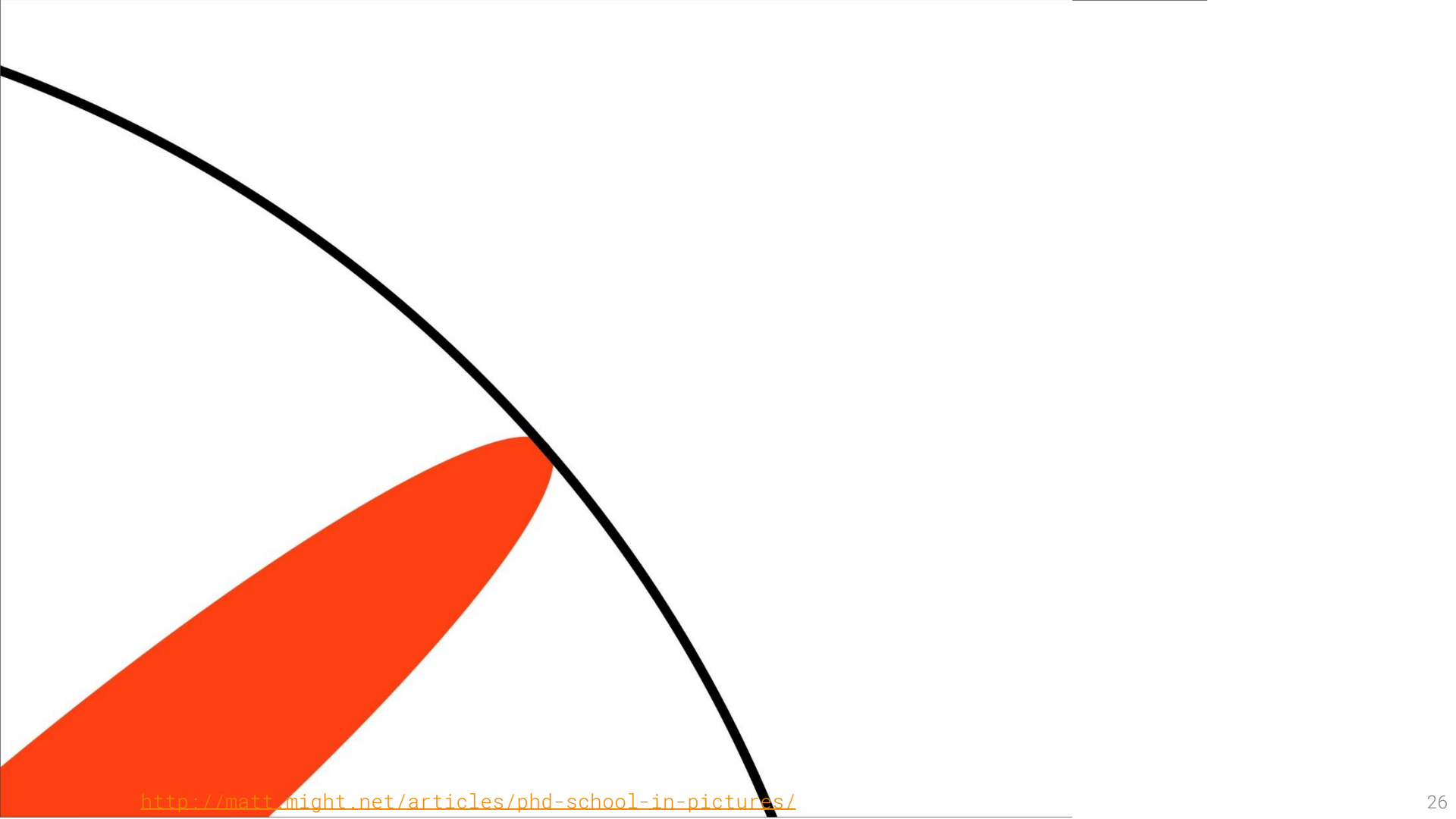
# 6. Keep Track

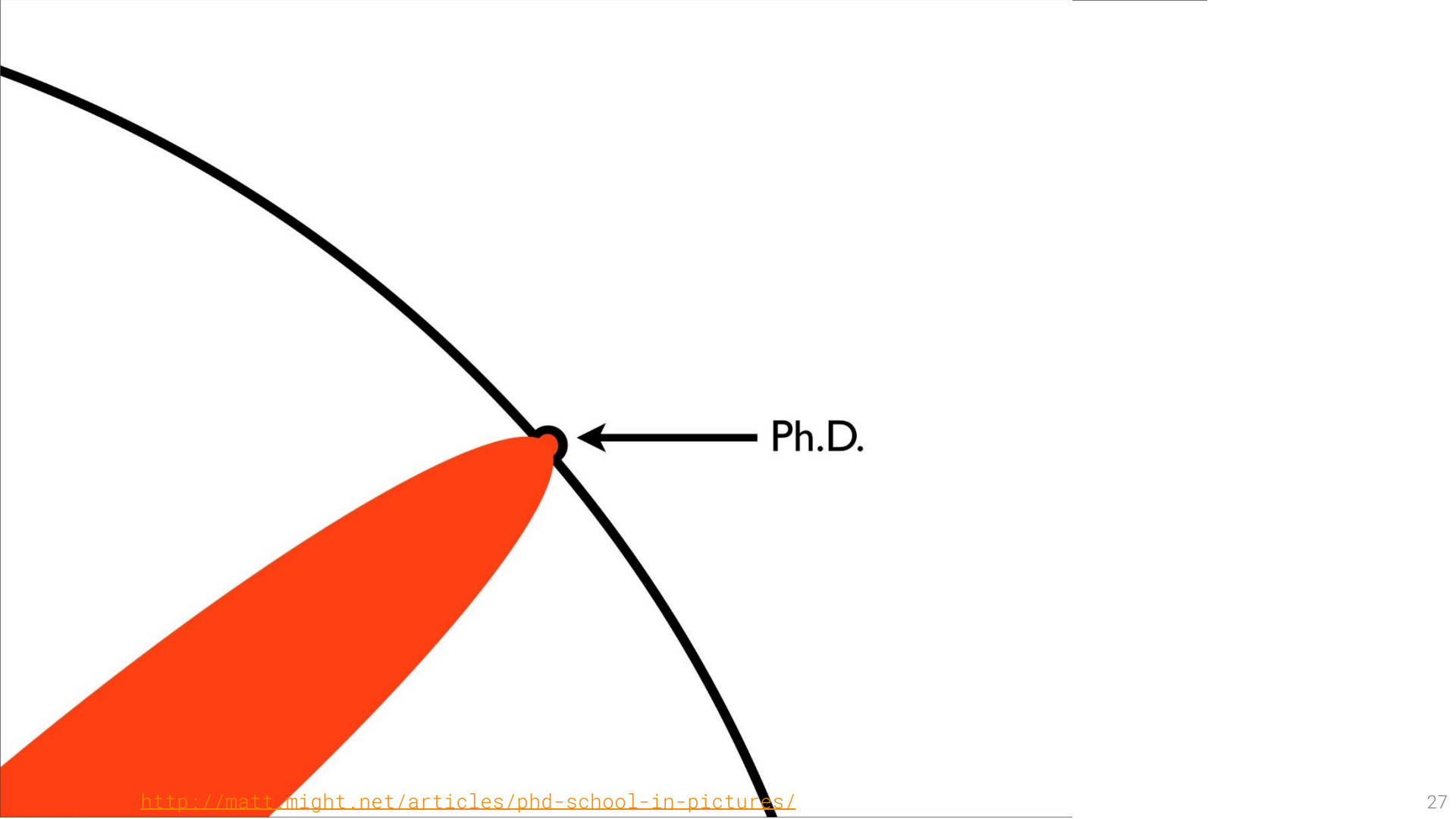
- Don't rely on your brain to remember stuff
- For the low level, always have a notebook around
  - Log everything you do: you'll need to know
  - Don't write anywhere else
  - Archive *all* your notebooks
- For the high level, keep a diary
  - Take time to reflect: think about where you've been to know where you're going
  - Summarize your week: what you've done and *why*
  - Organize and shape your ideas

# THE OTHERS

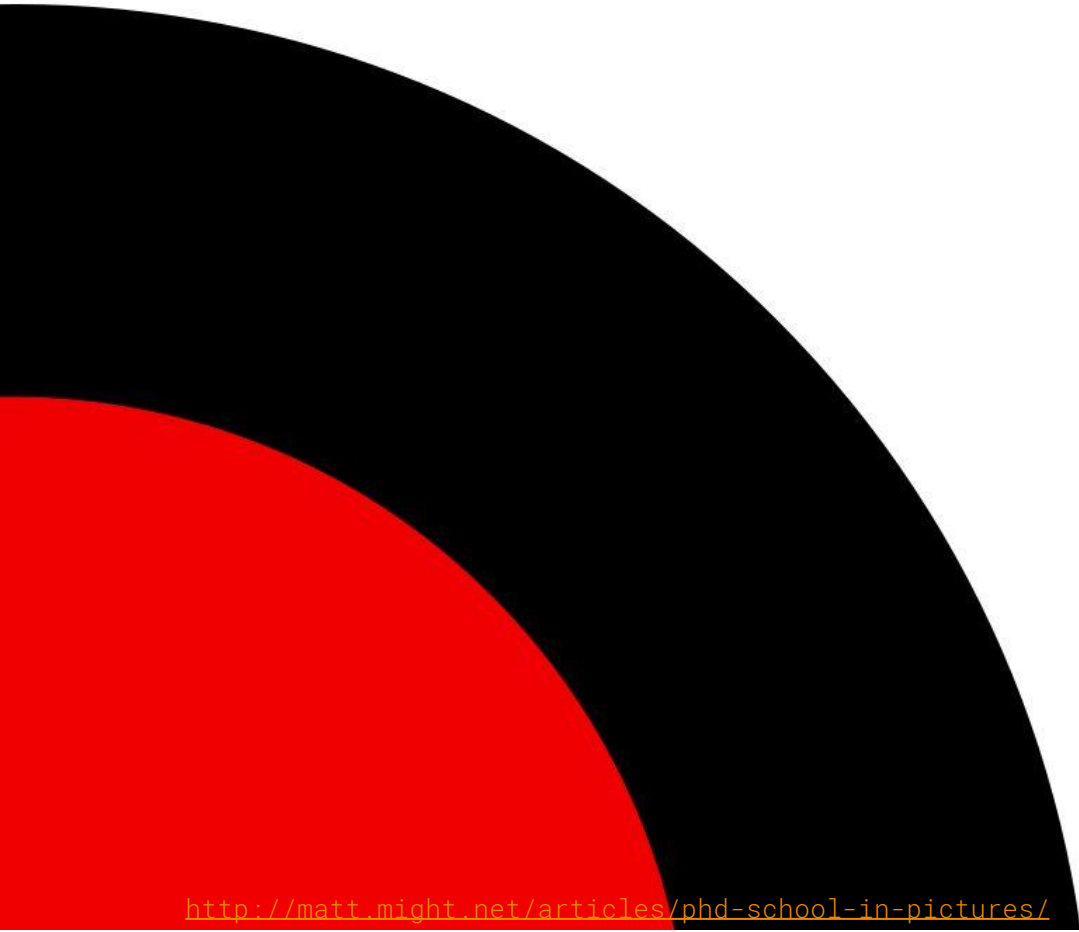


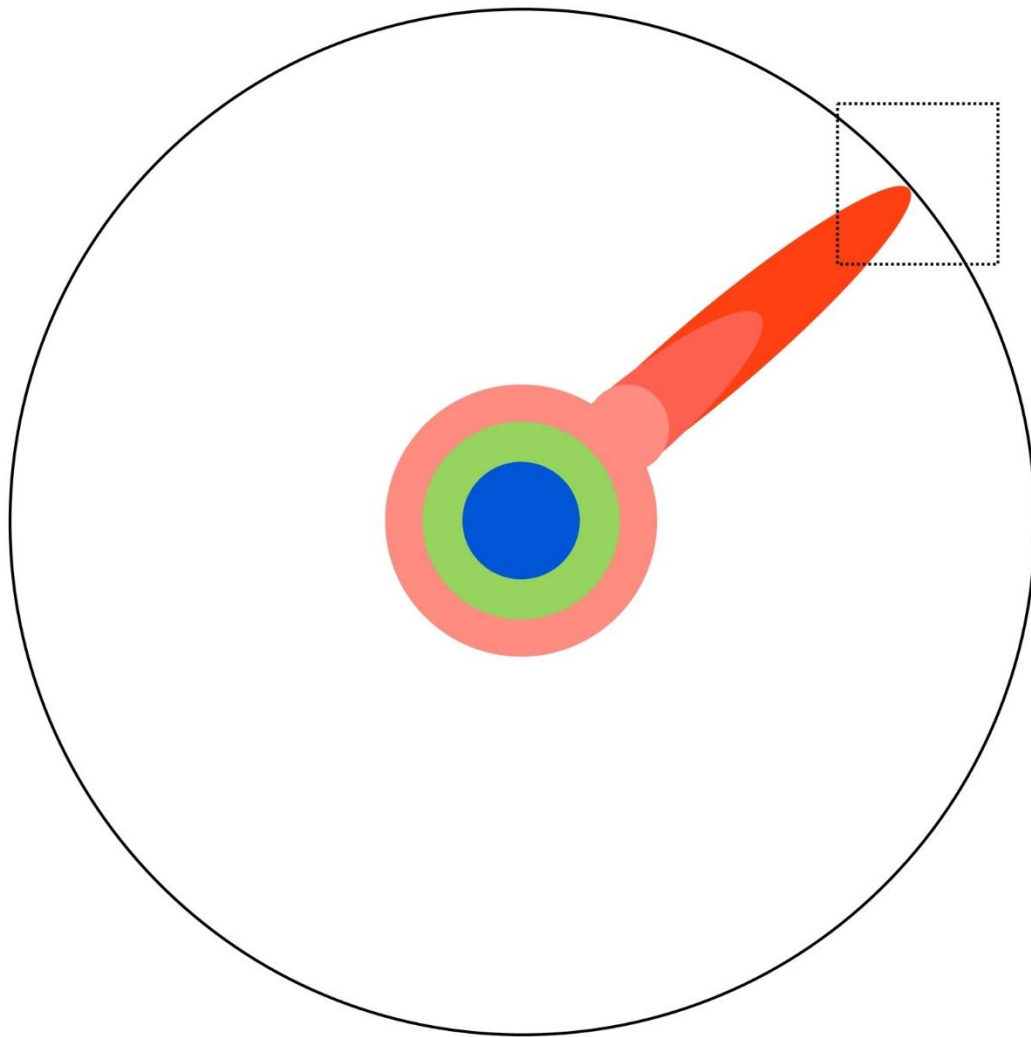






Ph.D.





# The Community

- Research doesn't happen in a vacuum
- Know the community, the people
  - Especially those in power: you want them to remember you when the time comes
  - **Make friends**, even before you meet them (e.g. social media)
  - Show interest in the work of others. Acknowledge them
  - **Surround yourself by people who complement you**
  - Work with others and learn from them
- Explore other communities and other fields
  - Realize that STEM > nothing

# Your Supervisor

- It's **your PhD**. You're on the driver's seat. You're on your own
- Supervisors are feedback machines: the more you put in, the more you get out
  - What matters is what kind of questions you ask, and what you do with the feedback
- **Be proactive, always ask for feedback**
  - Take silence as positive feedback (I know...we're sorry)
  - Ask for hypercritical feedback
- **Careful with never-ending feedback: *"it's never good enough!"***
  - If your work is good enough but you still get feedback, that's normal
  - We're not there to give you a grade, but to help you **move forward**
  - How much farther is something you two need to talk about, so be open about it

# Your Supervisor

- Is not good at everything
  - Find someone who can help you where they can't
- Is not trained to be psychologists or coaches
  - You probably want someone else when in need of help
- Is not trained to be a manager
  - They'll probably just advice whatever worked for them
- Is not there to mentor you
  - You probably want to ask others when looking for guidance
  - Preferably someone not in your field of study
- **Every student is different. Supervisors are also learning throughout**
  - Don't blame yourself. Don't blame them. **Work it out together**



# Family and Friends

- *“Life is that thing that happens while doing your PhD”*
- **Don't take family and friends for granted**
- They'll still be there for you, but it won't be the same
- You'll miss many things, and you'll regret it
- Take your mind off work: yes, you can put the laptop away and have fun
- **Don't be afraid to talk about your work.** Teach whenever you can!
- **Exercise.** You'll feel accomplished regardless of how the day went

# Lab Mates

- You'll go through many troubles during your PhD
  - Mental challenges (e.g. anxiety, depression) are x6 more frequent among academics
- Your family and friends will probably not even understand them
- Your lab mates will, so share and help each other
- The struggles of a PhD will forge very strong bonds with your lab mates

You

# What's Going On?

- You've always been... top of the class, positive attitude, enjoyed what you did
- But suddenly... think you're not good enough, become negative and suffer from what you do?
  
- So let's talk about...
  - Stupidity
  - Dunning-Kruger effect
  - Impostor syndrome
  - The valley of shit
  - The pit of despair

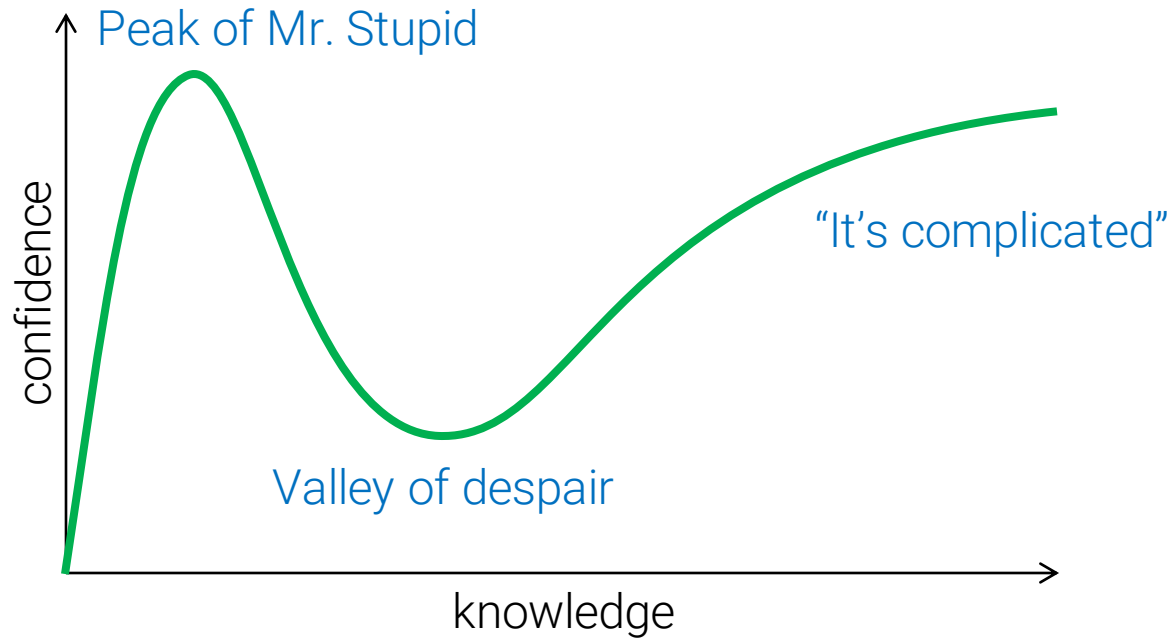
you're **not** qualified  
to judge the value  
of your own work

# Stupidity

- So far you've been evaluated based on your answers to questions, but in research nobody knows the answers
- **So why should you?**
- The amount of things you don't know is, for all purposes, infinite
- **This shouldn't discourage you. It's liberating!**
- If you don't feel stupid, you're doing it wrong
- You won't always succeed, be comfortable with the mistakes and take them as opportunities to learn

# Dunning-Kruger Effect

- The incompetent believe they know it all. The wise doubt they know anything.



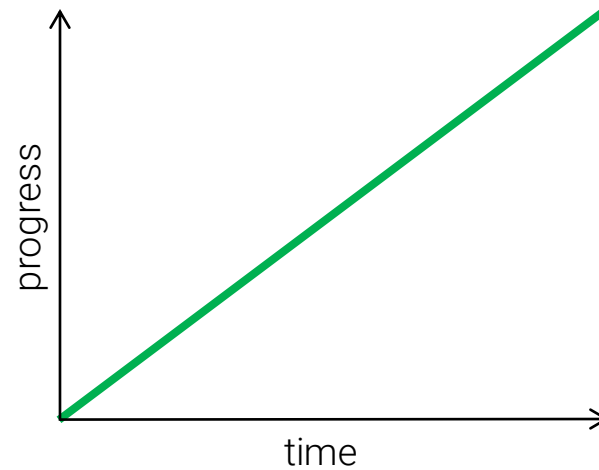
# Dunning-Kruger Effect

- Keep learning and practicing
  - The more you know about something,  
the more you'll recognize how much there is still to learn
- Ask others how you're doing
- Question what you know and what you do



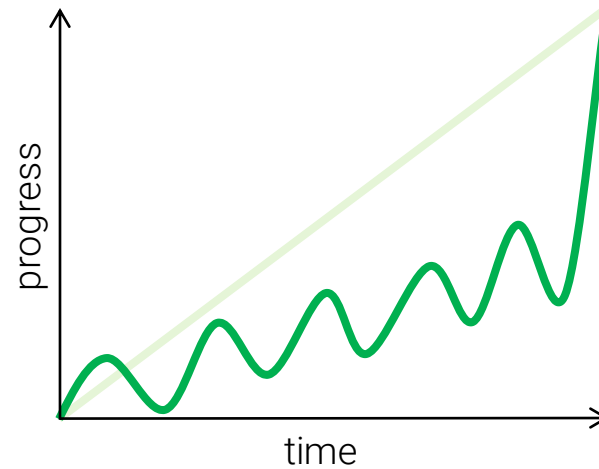
# About Progress

- Progress is continuous and monotonically increasing



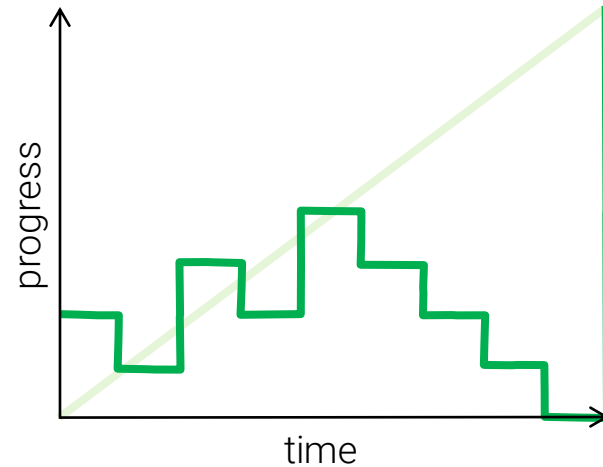
# About Progress

- Progress is continuous and monotonically increasing
- Self-estimation is biased and very noisy

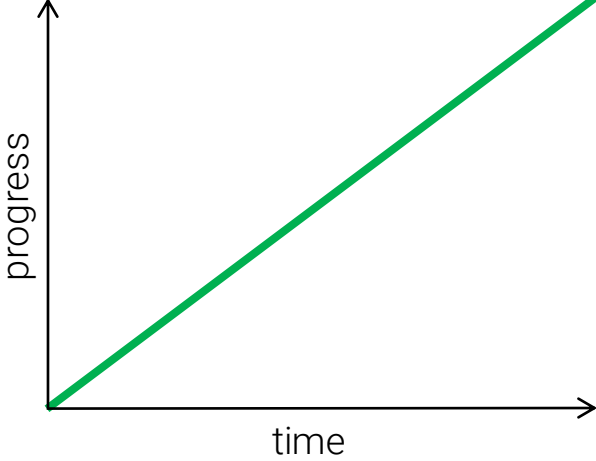


# About Progress

- Progress is continuous and monotonically increasing
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# About Progress

- Progress is continuous and monotonically increasing
  - Self-estimation is biased and very noisy
  - Discretized around outcomes
- 
- **Measure progress in units of learning, not units of solving**
    - Force yourself into writing in your diary 3 achievements of the week
  - A PhD is not a 100m sprint, but a 42km marathon
  - You're not expected to solve the uber-problem, but to show that you can

# Impostor Syndrome

- You doubt of your accomplishments and fear to be exposed as a fraud
- *After an accepted paper: "I was just lucky, I didn't deserve it"*
  - Result: you always put extra effort because otherwise you'll fail
- *After they tell you you're good: "They don't know what they're talking about"*
  - Result: you ignore absolutely all forms of positive feedback
- The value of your work does not define your value as a person

# Impostor Syndrome

- It happens to everyone. **You're just normal**
- Successful people feel like impostors too
  - They don't question themselves, but their ideas and their knowledge
  - They ask for advice, learn, and improve, so they don't freeze when the time comes
  - They eventually regain confidence by realizing they overprepared

# The Valley of Shit

- It suddenly feels like you can't manage
  - You lose perspective, confidence, and start second-guessing: *"will I be able?"*
  - Everyone thinks you're fine and will make it, but how do they really know?
- It can feel endless, but it does have an end: the brown stuff blocks your view
- **You're alone in it, but there's no need to be lonely.** Talk about it
- May happen once or multiple times, for long or short periods, but it'll happen
- **Keep walking. It's just a valley**

# The Pit of Despair

- *Nothing* seems to go right, it's all slow, difficult: “*what am I doing here?*”
- The smell turns into constant depression and anxiety for no reason, don't care about anything and are incapable of enjoying your work
- Then you're not walking the valley anymore. You're digging a pit.
- **Take time off, get help and get well.** Be kind to yourself, allow you to stand up
- You'll start caring again, even if just to hate everything, but that's the first step
- **It's ok to quit, but don't do it because you think you're not capable**
  - Almost every happy person doesn't have a PhD
  - Most people with a PhD would happily do it over again



let's be honest...

it happens to **all of us**

...and well beyond our PhD

# Procrastination

- Try to learn why you do it and fix that if possible
  - Fear of failure, fear of success
  - Fear of attachment, fear of separation
- Make it work for your own advantage
  - Accept that you'll do it last minute anyway, so do those other things in between
- **It's all about *when* you feel the pressure**
  - Work in 45m time slots and get rewards for it
  - Schedule time for yourself
  - Use a time tracker, **the pressure of yourself**
  - Set deadlines with your collaborators; **the pressure of others**

# I Think, therefore I'm Biased

- Cognitive biases are shortcuts that help us overcome certain problems
  - Too much information, not enough meaning, need to act fast, what to remember
- They will mostly fail us and make us wrong
- They are everywhere. Once you know about them, you'll see them all around





# Biases in Academia

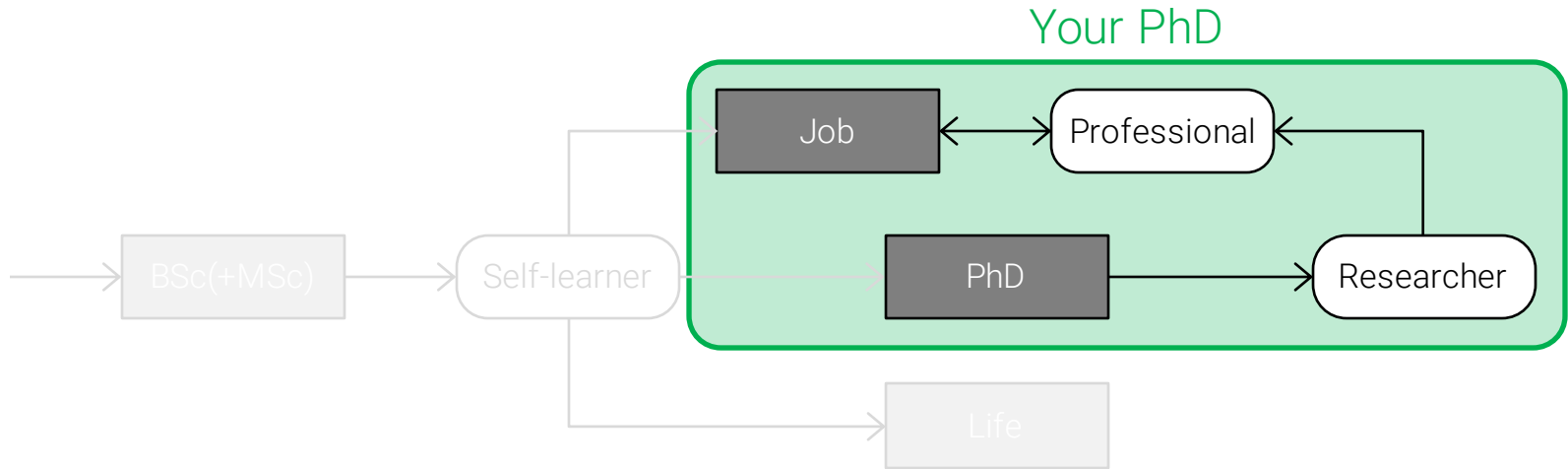
- **Confirmation bias:** only see the 20% of results that agree with our expectations
- **Survivorship bias:** only see other people's successes, not their failures
- **Anchoring bias:** tend to overrate the first papers we read
- **Authority bias:** tend to attribute more value to statements by popular authors
- **Hindsight bias:** everything is obvious once we know the answer
- **Self-service bias:** success is thanks to us, failure is because of others
- **Self-handicapping bias:** not giving ourselves enough time is a win-win situation  
Success: *"and I only spent 1 day!"* Failure: *"well, I only spent 1 day..."*
- **Backfire effect:** all reviewers are wrong, and we hate them

# You're Biased too, and that's Great

- We may easily fall for the blind spot bias
  - Tendency to see ourselves as less biased than others
- Don't kid yourself. We are all biased. Humbly accept it
- Acknowledge that there's room for improvement
- **Confirmation bias will actually help you identify your own biases**
- Will ultimately help you understand yourself better, how you think, and how to become better at it

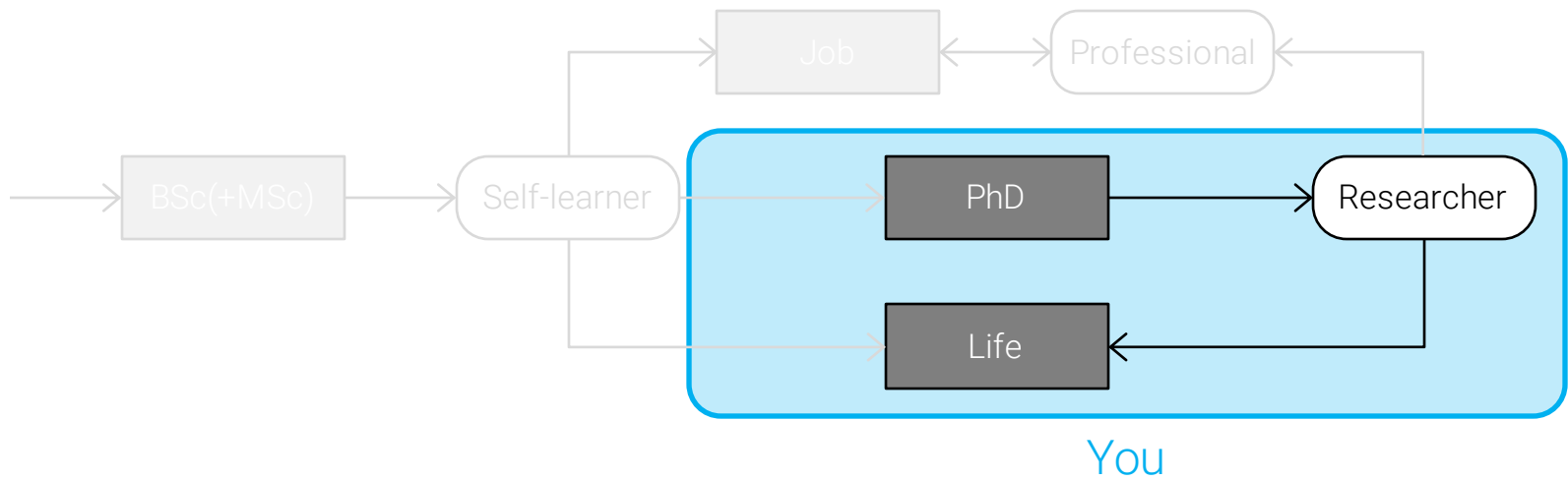
# TAKE-HOME MESSAGE





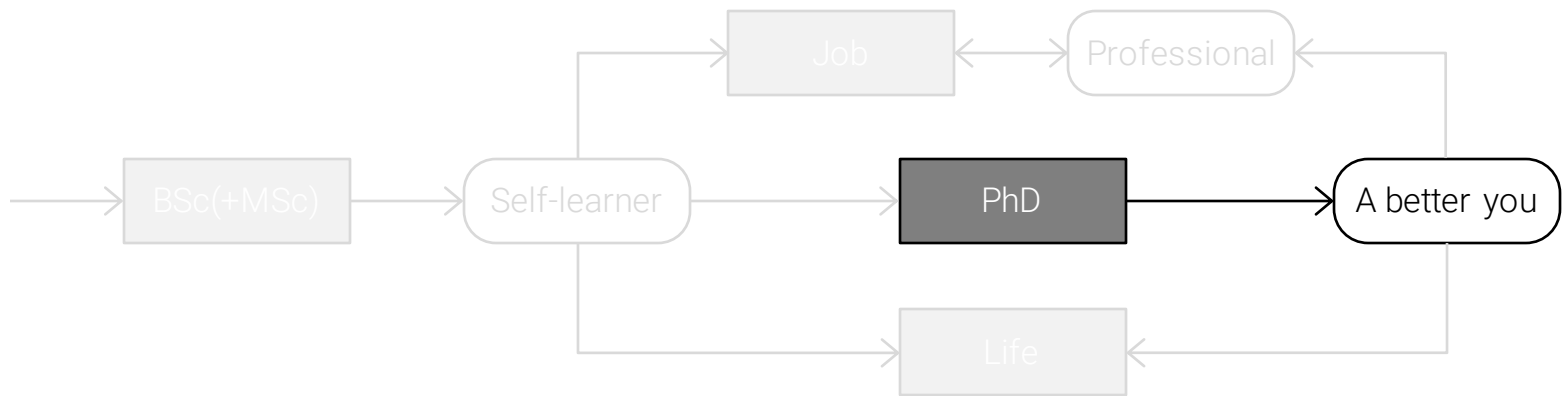
# What Really Matters – Your PhD

- The research and the papers are secondary
- Your CV makes only a tiny contribution to being hired
  
- Design and analysis of experiments
- Project and team management
- Communication, especially to non-technical audiences
- Vision and leadership



# What Really Matters – You

- Dedication
- Emotional intelligence
- Knowing when to shup up
- Listening more than talking
- Saying “no”
- Asking for help
- Staying humble
- Learning about yourself



- A PhD is a wonderful, life-transforming experience
- There will be ups and downs. It happens to everyone. Talk about it
- Remember why you're doing it. Enjoy it, and grow as a human being

it's all about

**You**