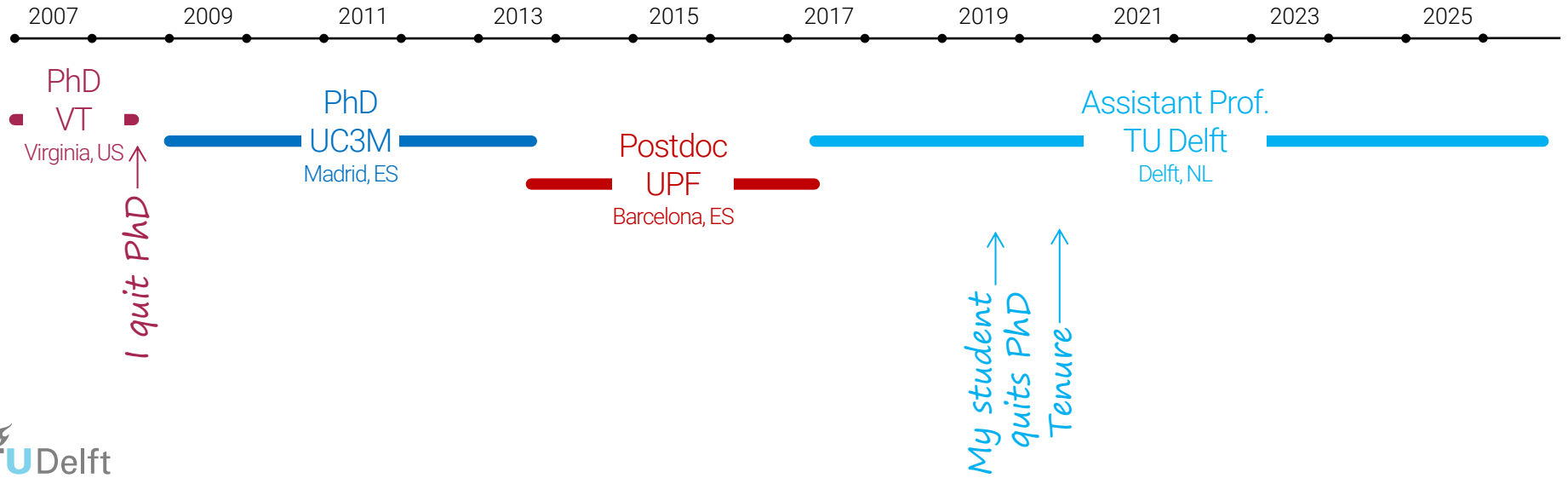
Your PhD & You

Picture by RobinHiggins

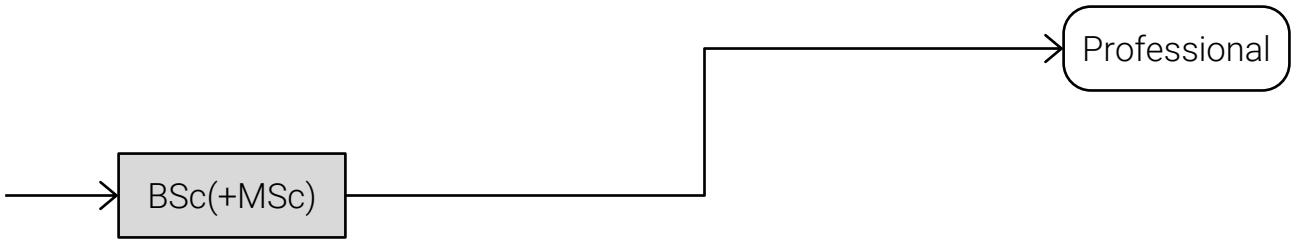
Me

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



Education

- At University we acquire the knowledge to perform as professionals

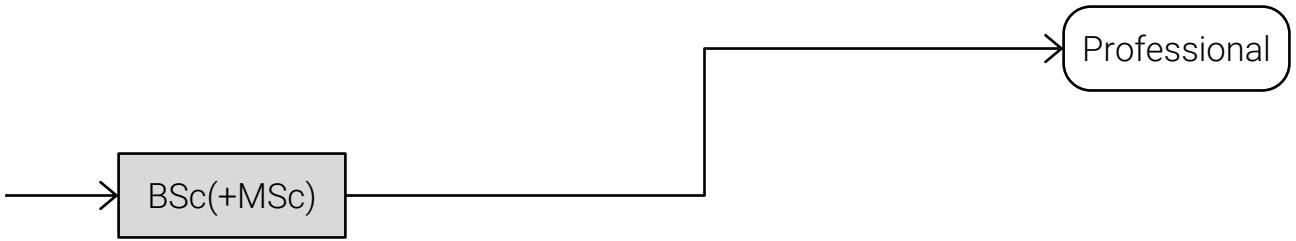


“You will not be an engineer when you graduate.

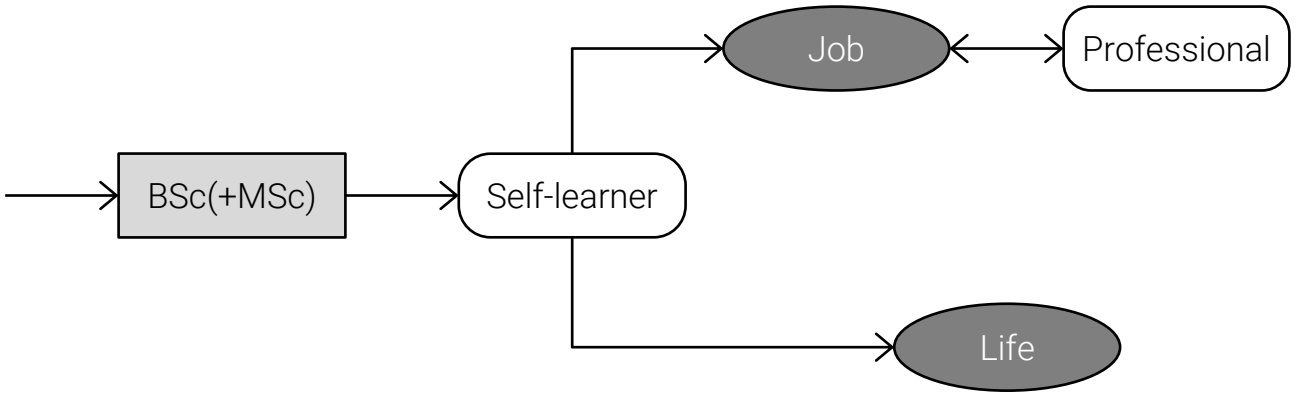
You will just have the necessary vocabulary

to know what the real engineers talk about”

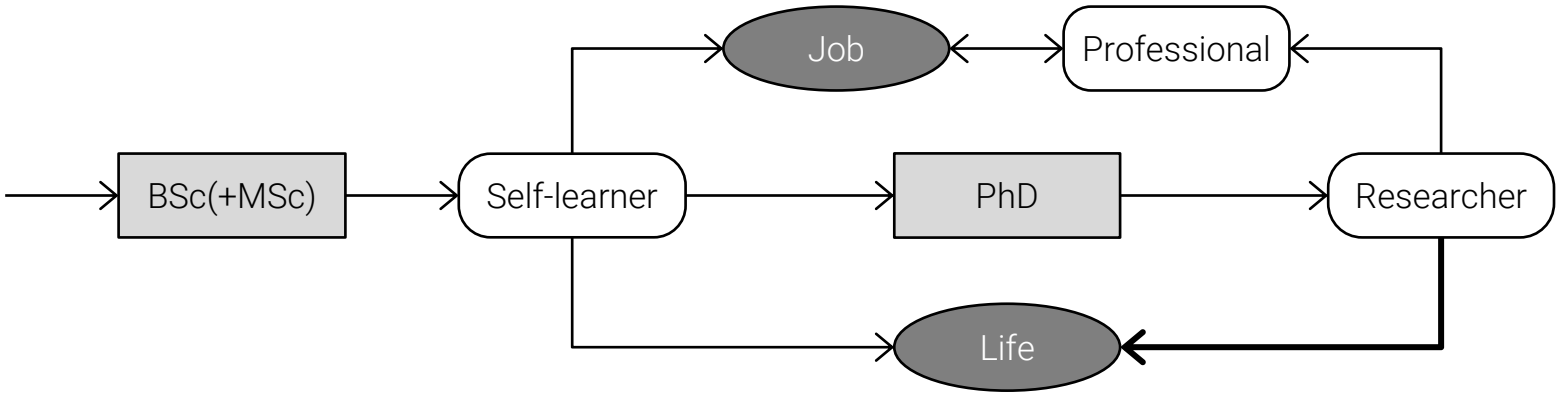
—Some Professor from Córdoba



- But then I went to University…
  - The world is much bigger, more complex, and yet more beautiful than I thought
  - University gives us the fundamentals and the tools to be self-sufficient



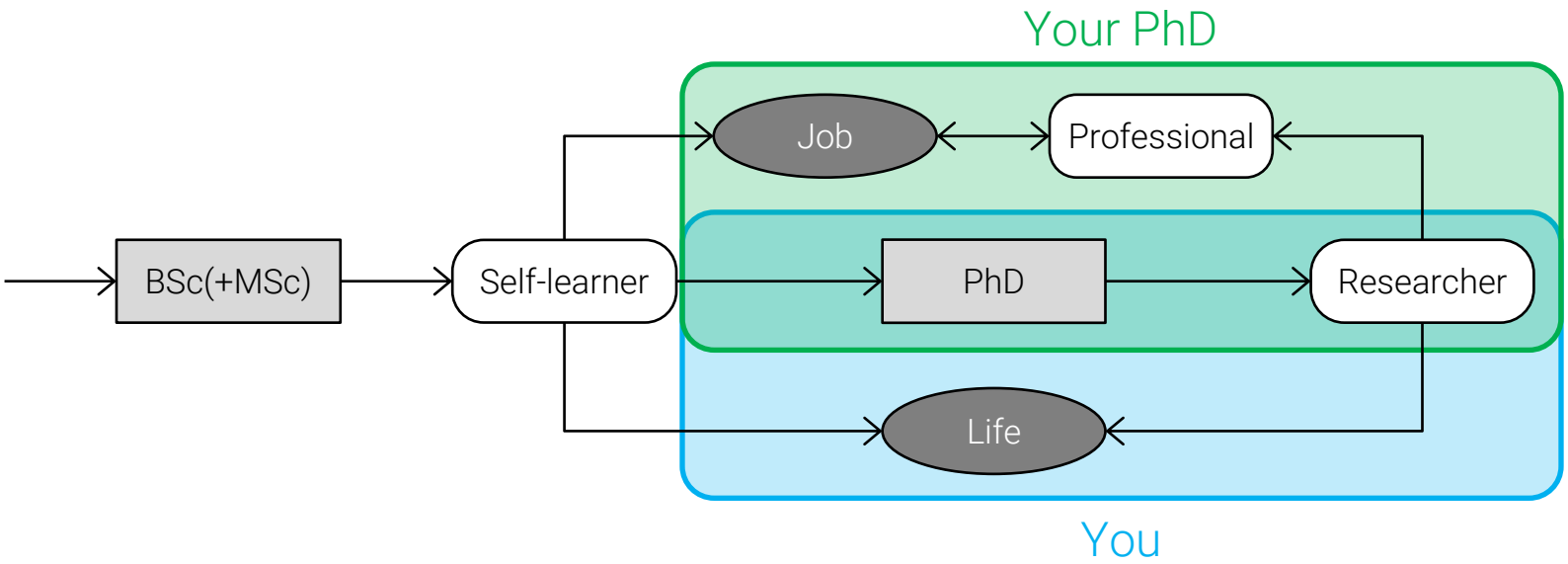
- …and then I got into a PhD program (twice)
  - Produce new knowledge, what will eventually be taught at BSc/MSc programs



Sad Times

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

This Talk


Your PhD
Job
Professional
BSc(+MSc)
Self-learner
PhD
Researcher
Life
You

Trust Me

- It’s not about the 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 being called “Dr.”
- 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.

[…]”

TU Delft

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 management

- Not about how many tools you know, but about how well you know them

4. Don’t Just Do

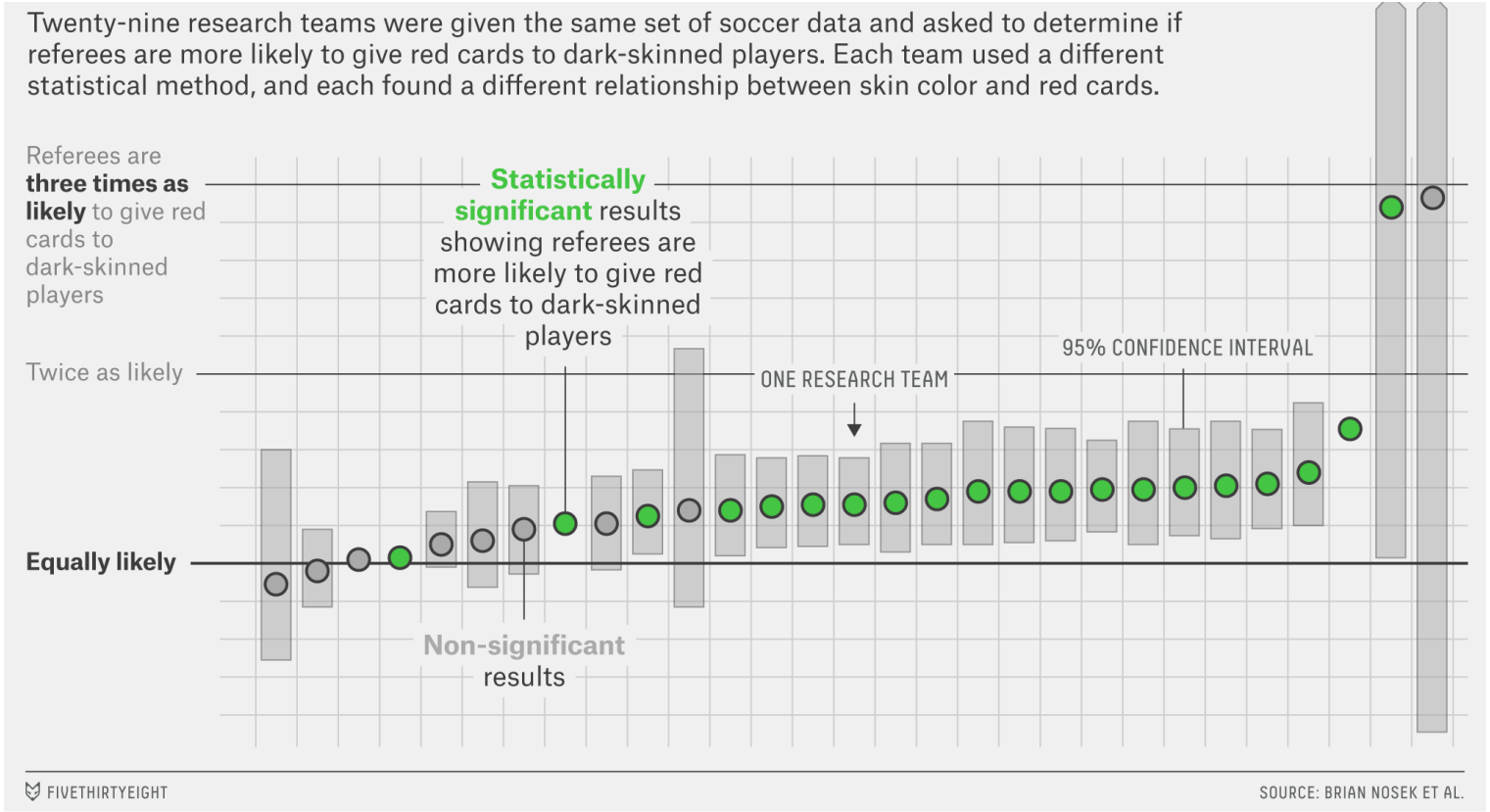
“Everyone is entitled to their own opinions, but not their own facts”

—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, and constantly Evolving



https://fivethirtyeight.com/features/science-isnt-broken/

Remember

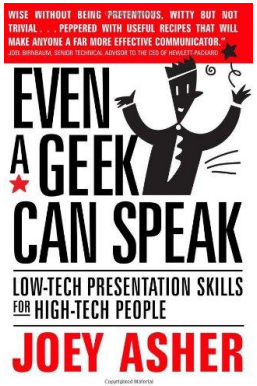
- Realize that **if something is published, it doesn't mean it's correct**
- The issue is often how much is claimed from what is done

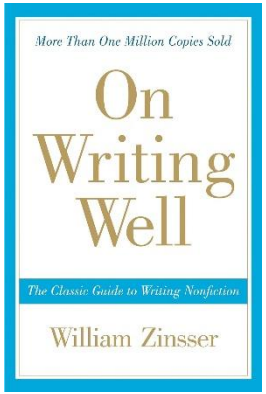
- It's not about pointing people to the flaws in their work
- It's about detecting and preventing them, mainly in your own work

- 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

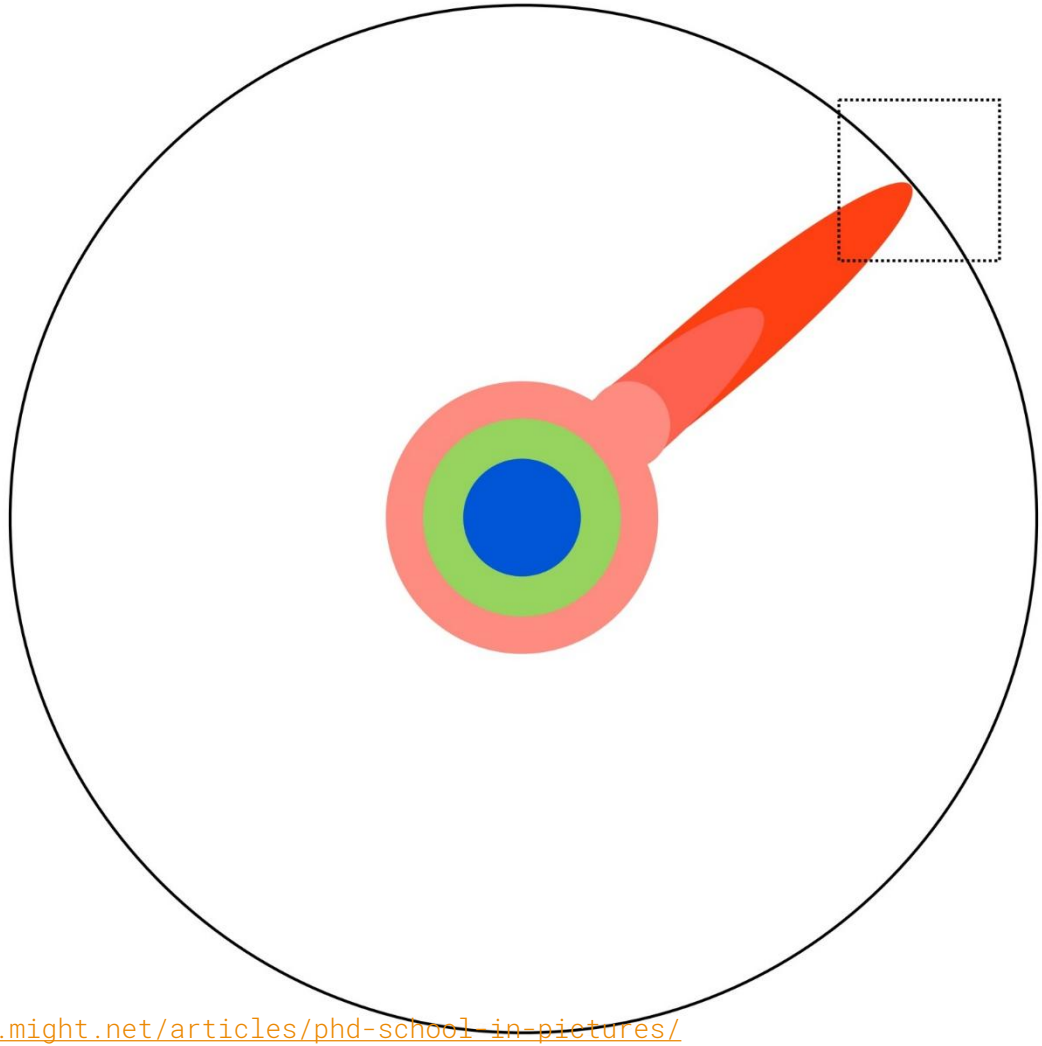
3. Overcomplicating everything to show that our work is of high quality

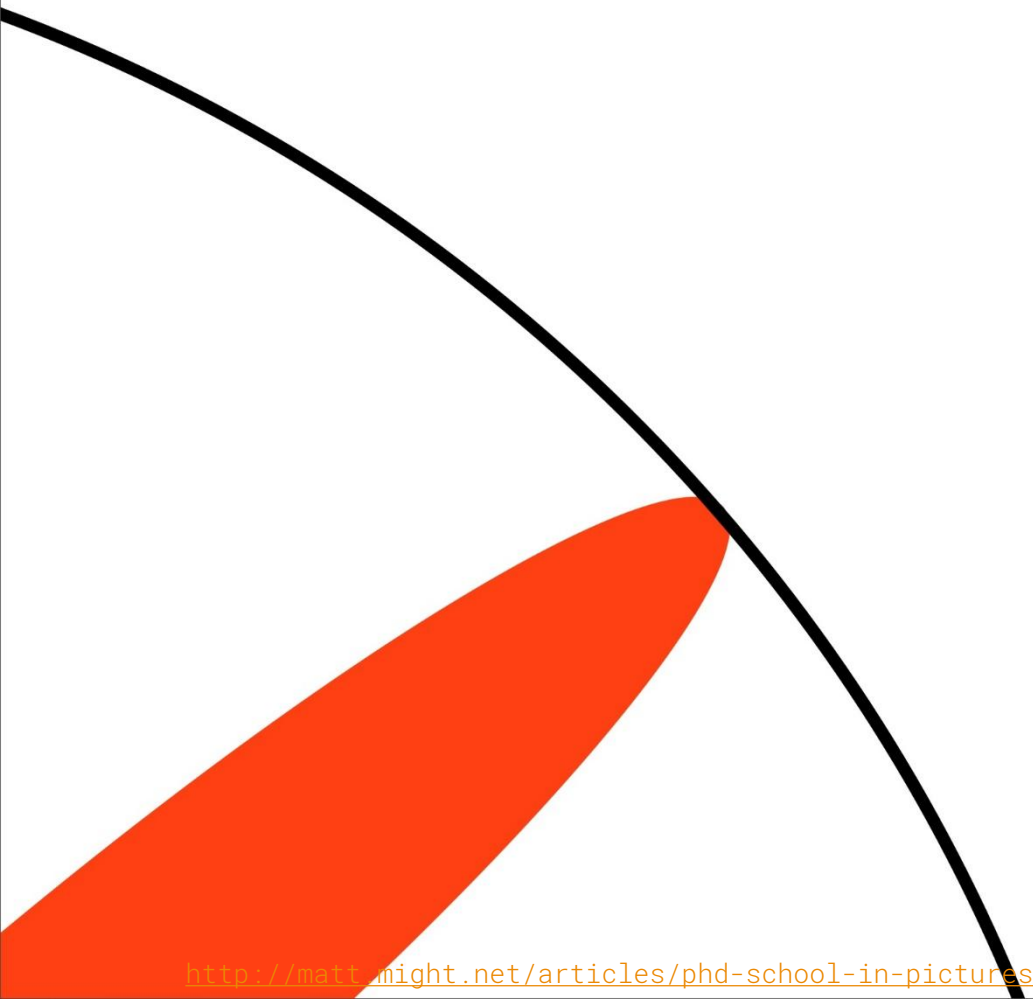
6. Keep Track

- Don’t rely on your brain to remember stuff

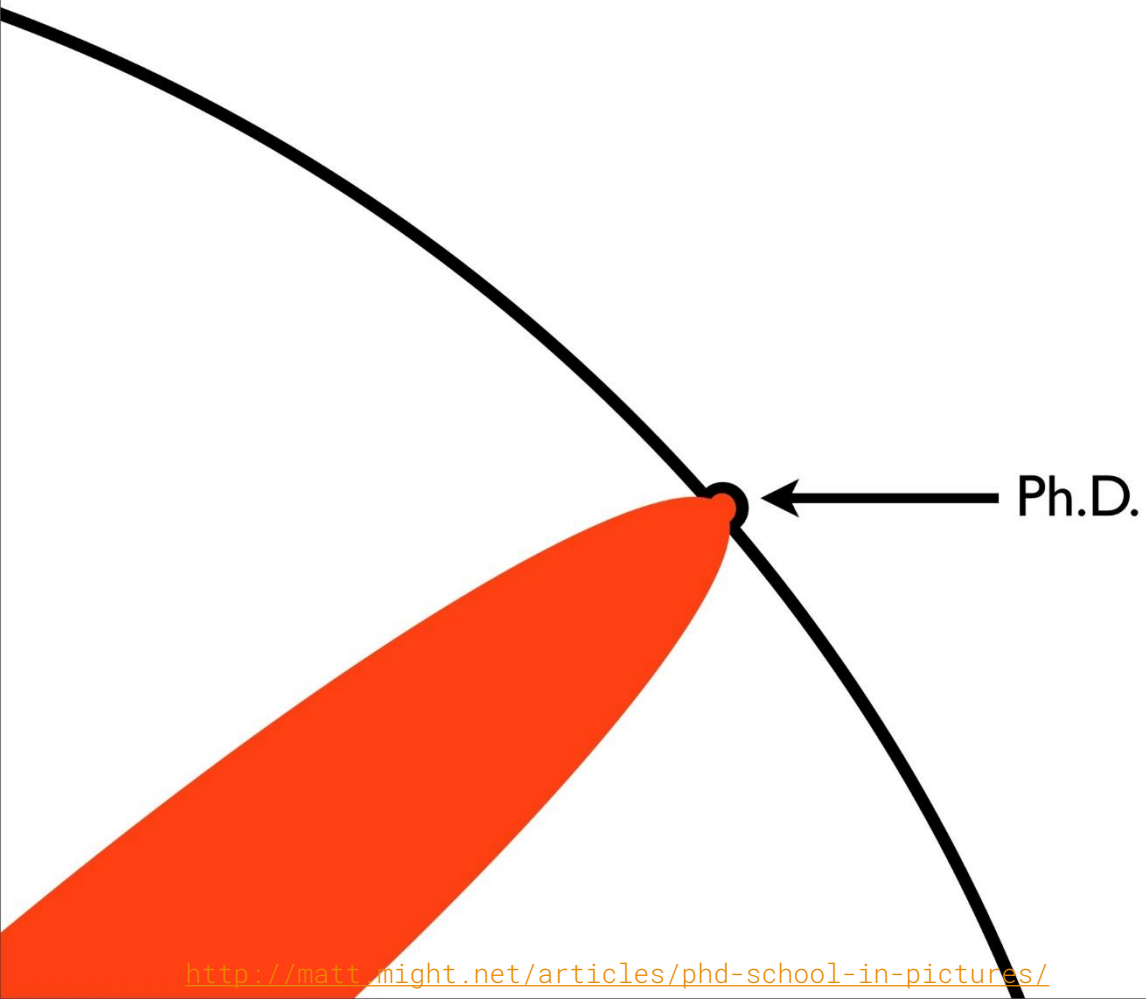
- For the low level, always have a **notebook** around
  - Log everything you do: you’ll need to know
  - Don’t write anywhere else
  - Archive *all* your notebooks
- For the high level, keep a **diary**
  - Take time to reflect: think about where you’ve been to know where you’re going
  - Summarize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

The Others





http://matt.might.net/articles/phd-school-in-pictures/



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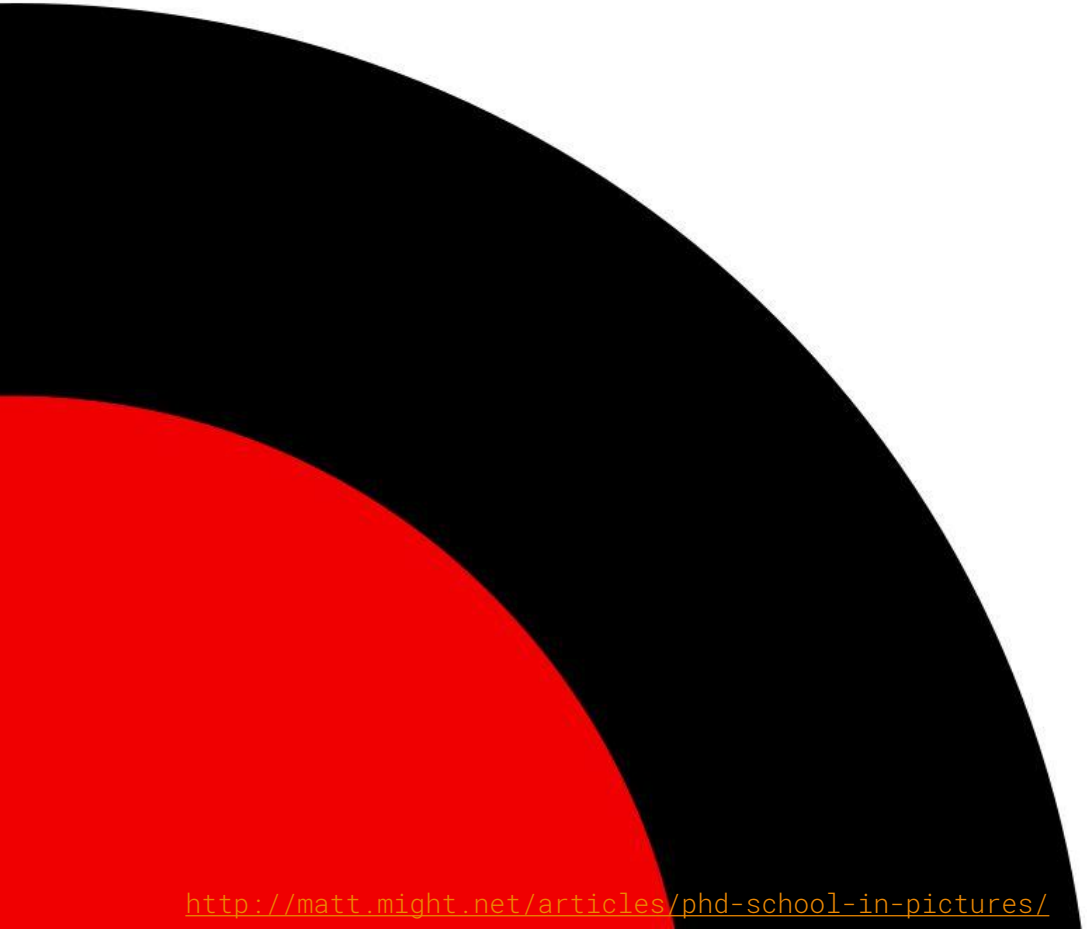

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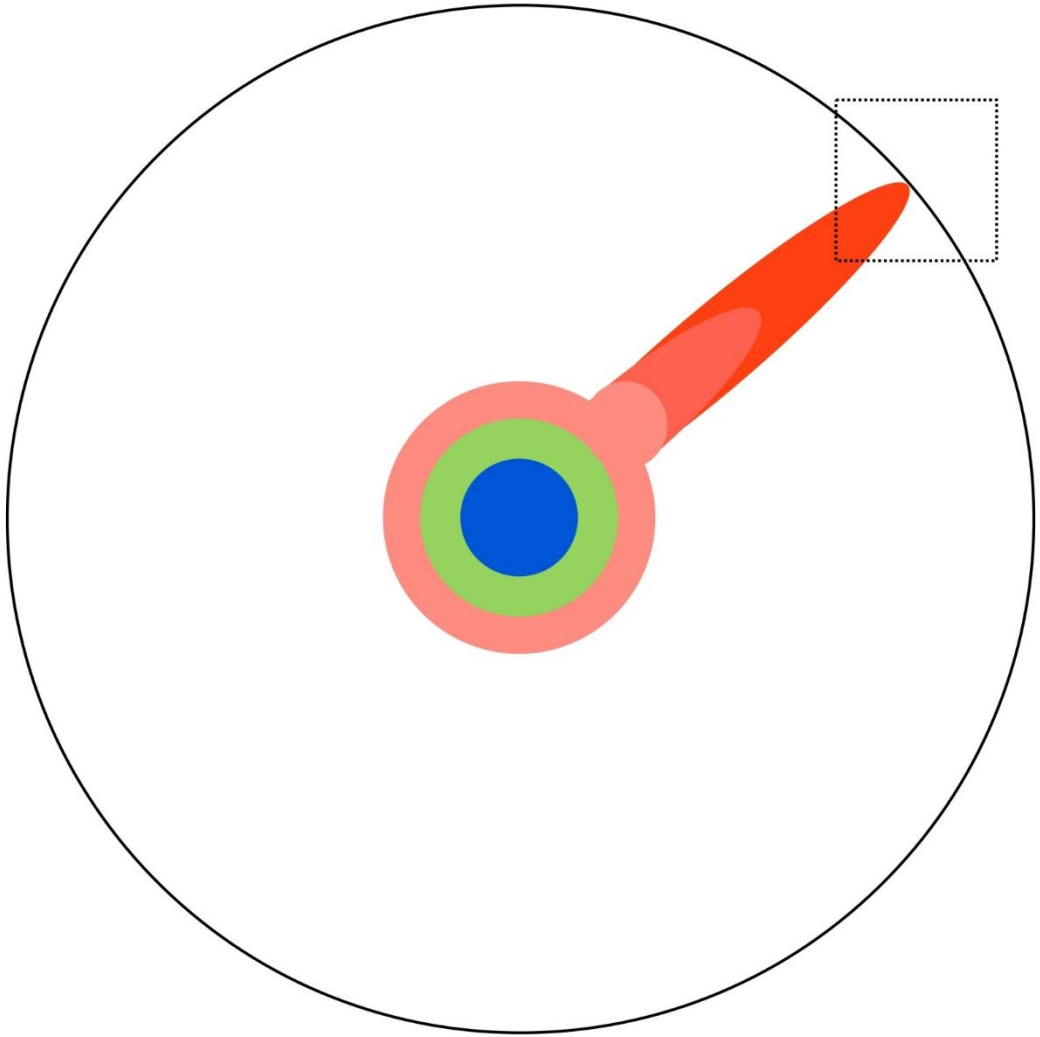


The Community

- The research outcome may be rational, but the process is not…it's about people

- 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** 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
- 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
- Is probably not trained to be a psychologist or coach
- Is probably not trained to be a manager
- Is probably not the best person mentor you

- Every student is different. Supervisors are also learning throughout
  - Don't blame yourself. Don't blame them. **Work it out together**
  - Often we just advice what worked for us in the past

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

- Family and friends will probably not even understand them; your lab mates will
- Saying *"it's understandable"* and *"I can help you"* can be very powerful

- 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
  - had positive attitude
  - enjoyed what you did

- But suddenly…
  - think you're not good enough
  - become negative
  - work makes you suffer

you're not qualified

to judge the value

of your own work

Stupidity

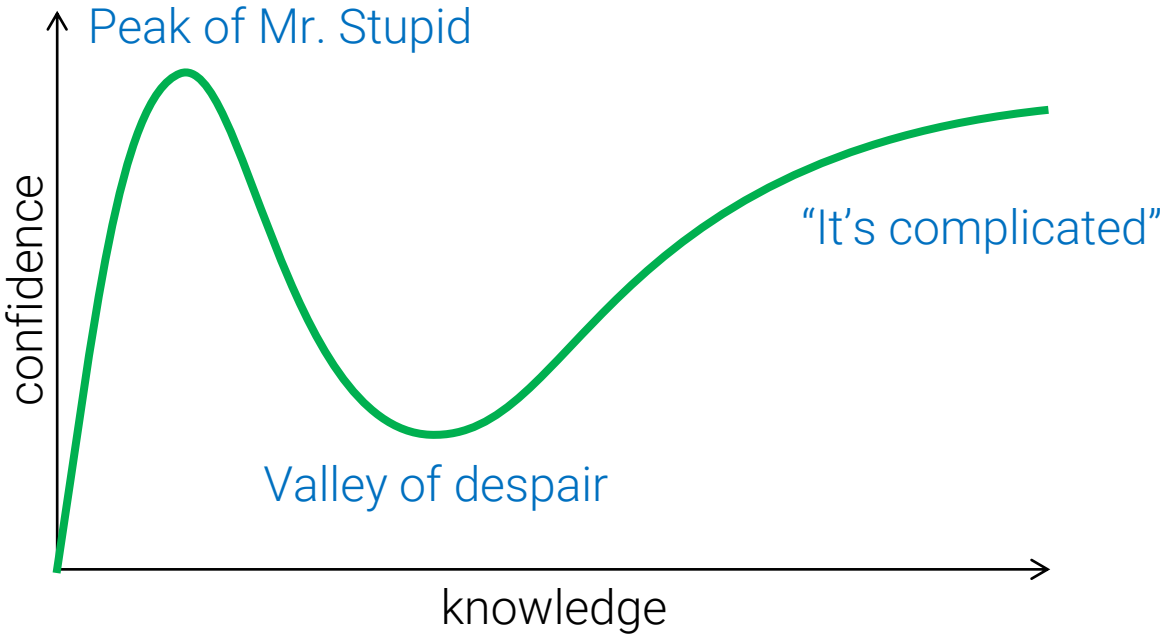
- So far you've been evaluated based on your answers to questions, but in research nobody knows the answers. **So why should you?**
  - If you don't feel stupid, you're doing it wrong

- The amount of things you don't know is, for all purposes, infinite
- **This shouldn't discourage you. It's liberating!**

- The biggest hurdle is not being wrong. It is being wrong in public
- Learn to tolerate it, then help others tolerate it too

Dunning-Kruger Effect

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



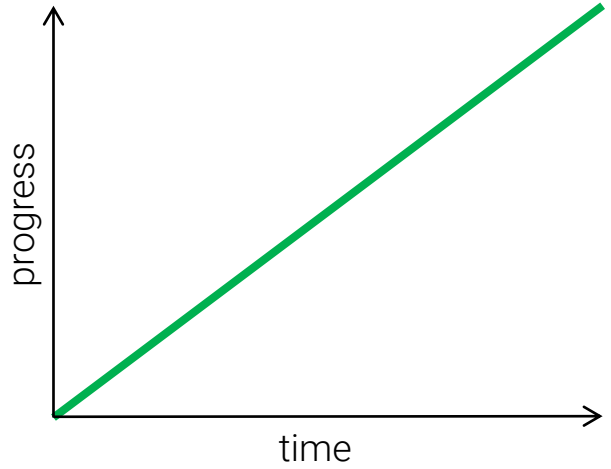
Dunning-Kruger Effect

- 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

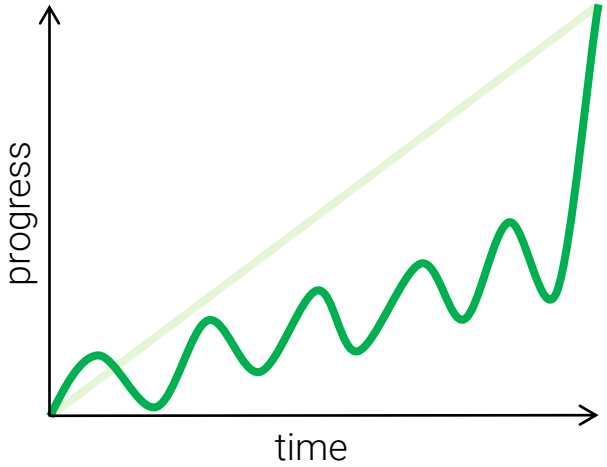
About Progress

- Progress is continuous and monotonically increasing



About Progress

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



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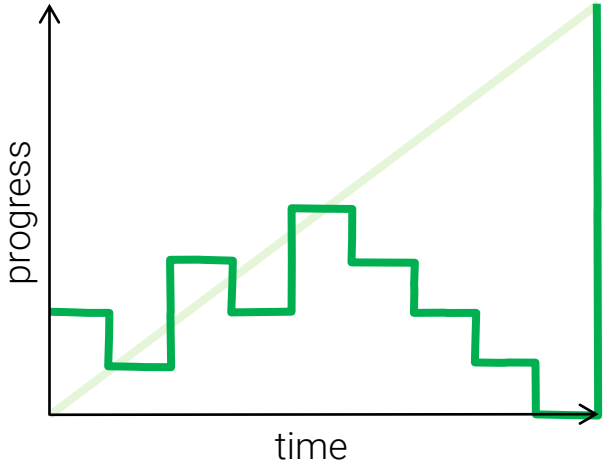

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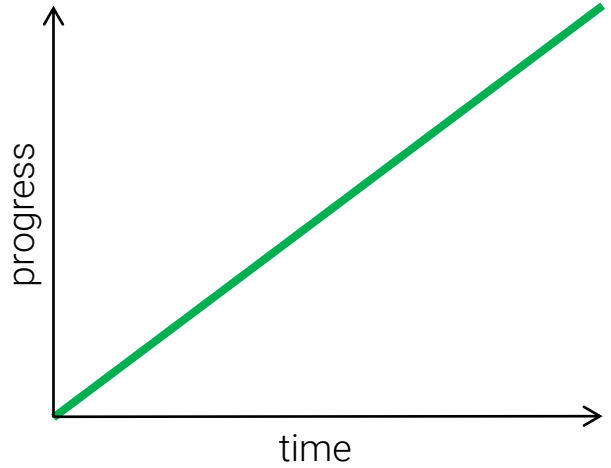


- Measure progress in units of learning, not units of solving
  - Force yourself into writing in your diary 3 achievements of the week
- A PhD is not a sprint, but a marathon
- You're not expected to solve the uber-problem, but to show that you can

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

- After a success, don't just move on to the next thing; celebrate

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 and 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

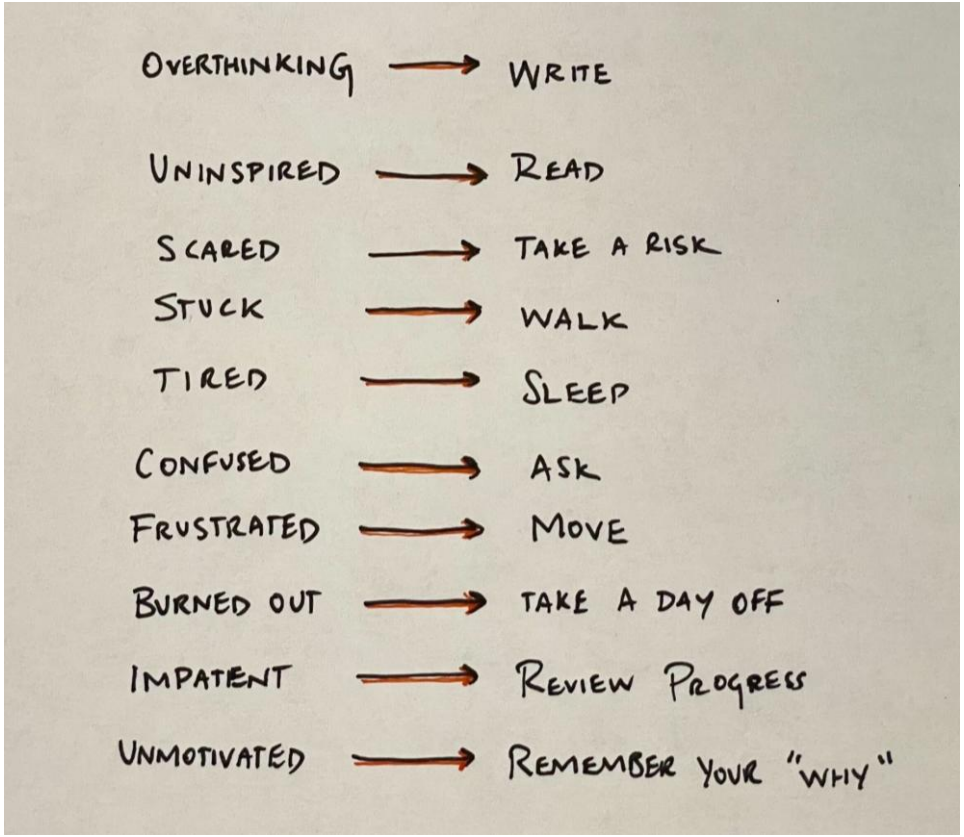
Procrastination

- Try to learn why you do it and fix that if possible
  - Fear of failure, success, attachment, separation, etc.
- 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**

https://www.youtube.com/watch?v=arj7oStGLkU

Where to Start

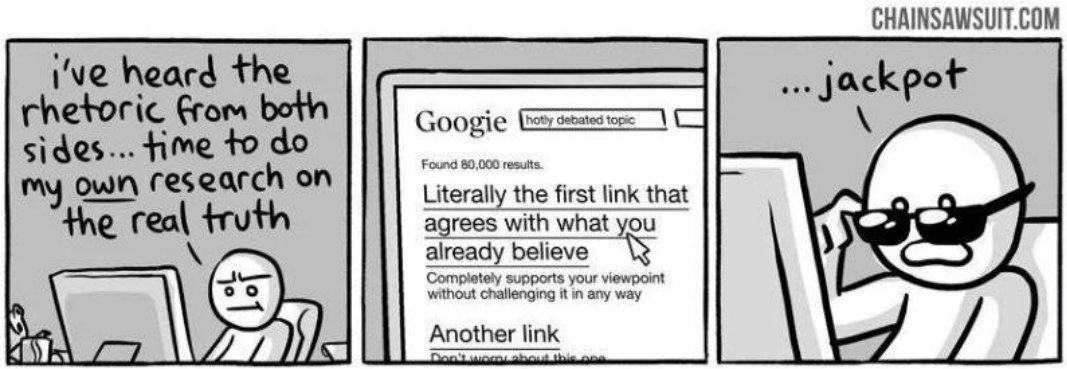


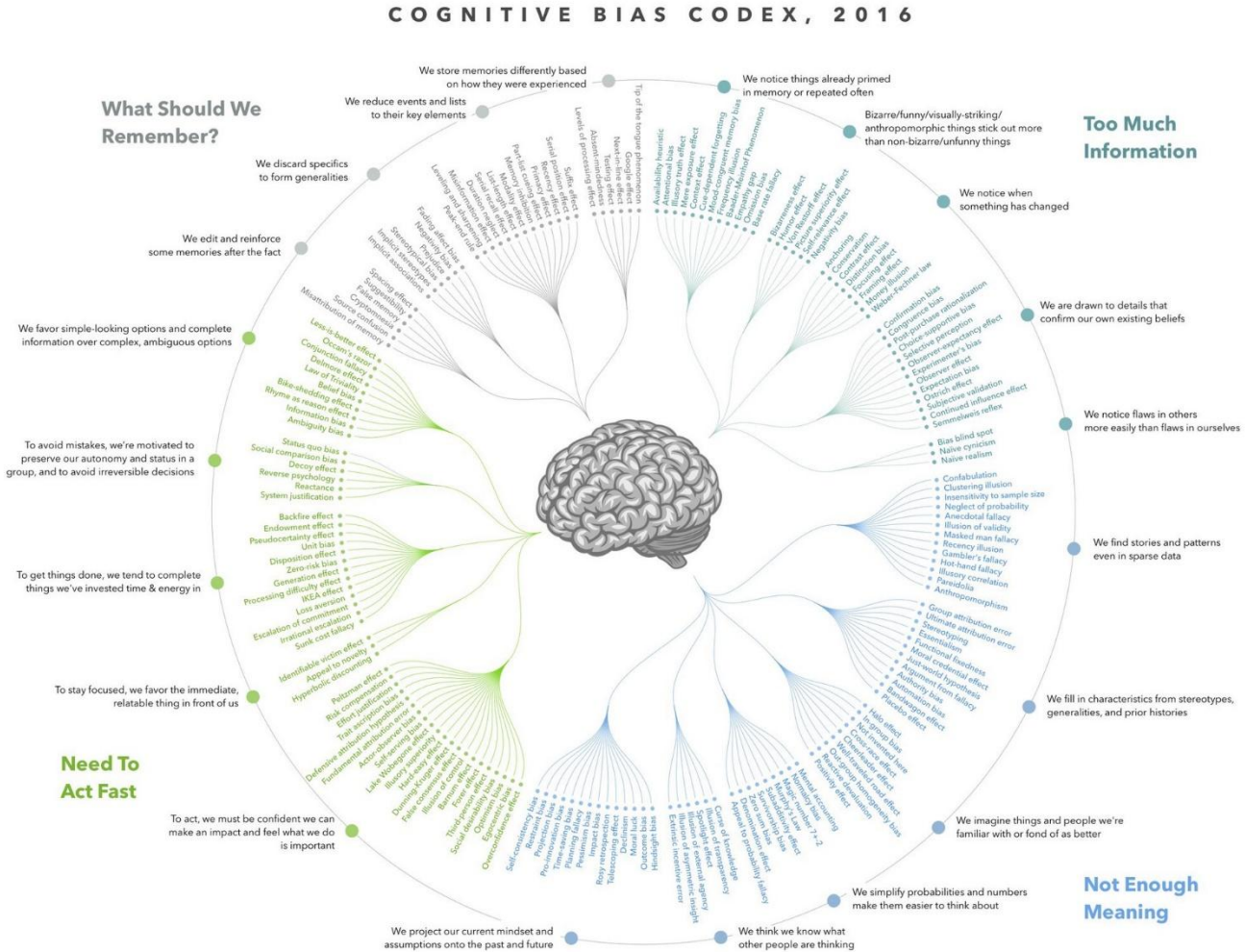
https://x.com/gregisenberg/status/1799120392998584655

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





https://cs.brown.edu/people/jsavage/sources/2016_01_06_Medium_CognitiveBiasCheatSheet_BetterHumans.pdf

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

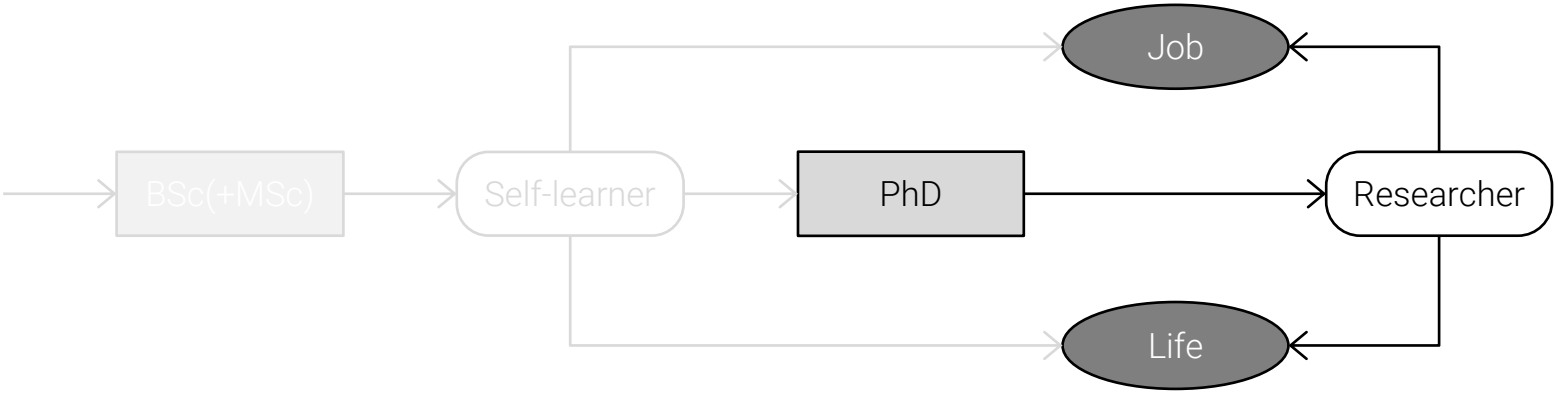
You're Biased too, and that's Great

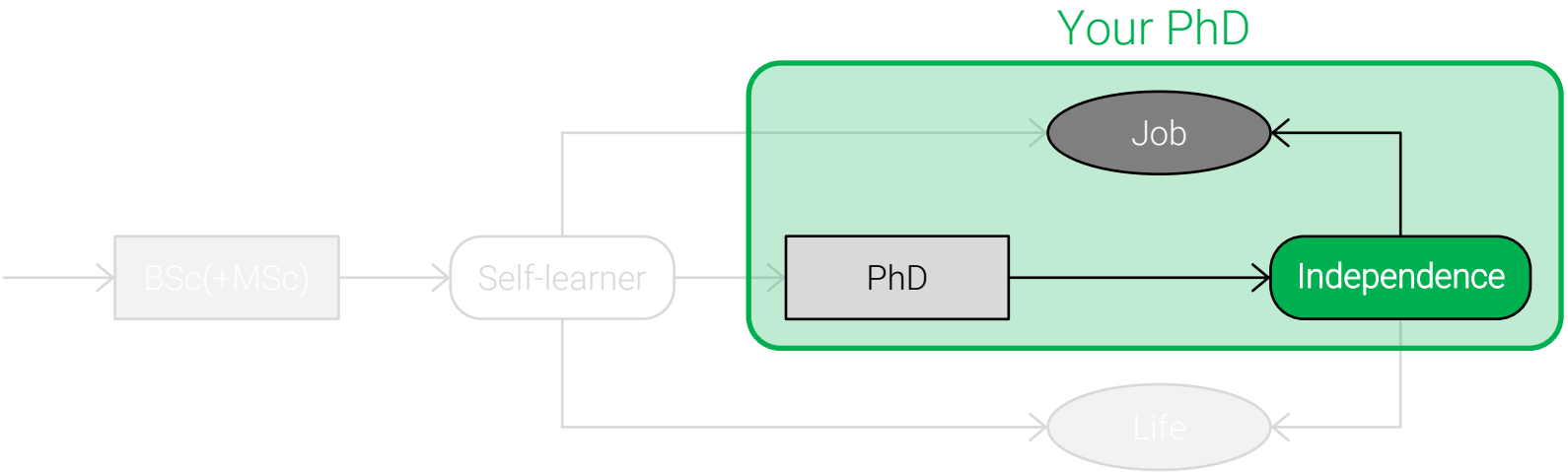
- We may easily fall for the blind spot bias and miss our own biases
- Don't kid yourself. We are all biased

- Be humble, and 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 Messages

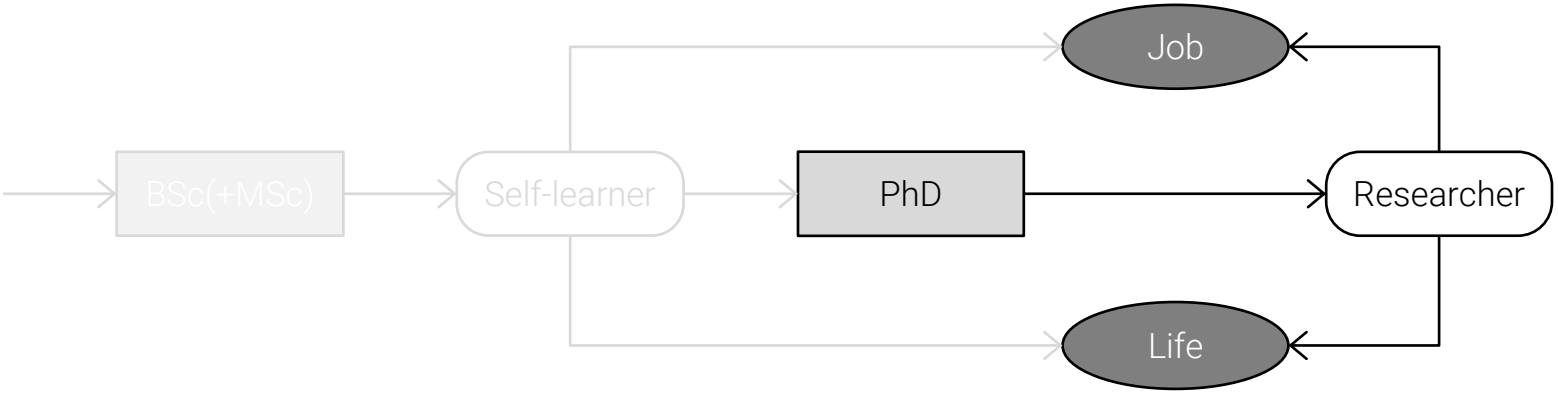

BSc(+MSc)
Self-learner
Job
PhD
Researcher
Life


Your PhD
Job
BSc(+MSc)
Self-learner
PhD
Independence
Life

What Really Matters – Your PhD

- The research and the papers are secondary
- Your CV makes only a tiny contribution to being hired

- Quality over quantity
- Design and analysis of experiments
- Project and team management
- Communication, especially to non-technical audiences
- Vision and leadership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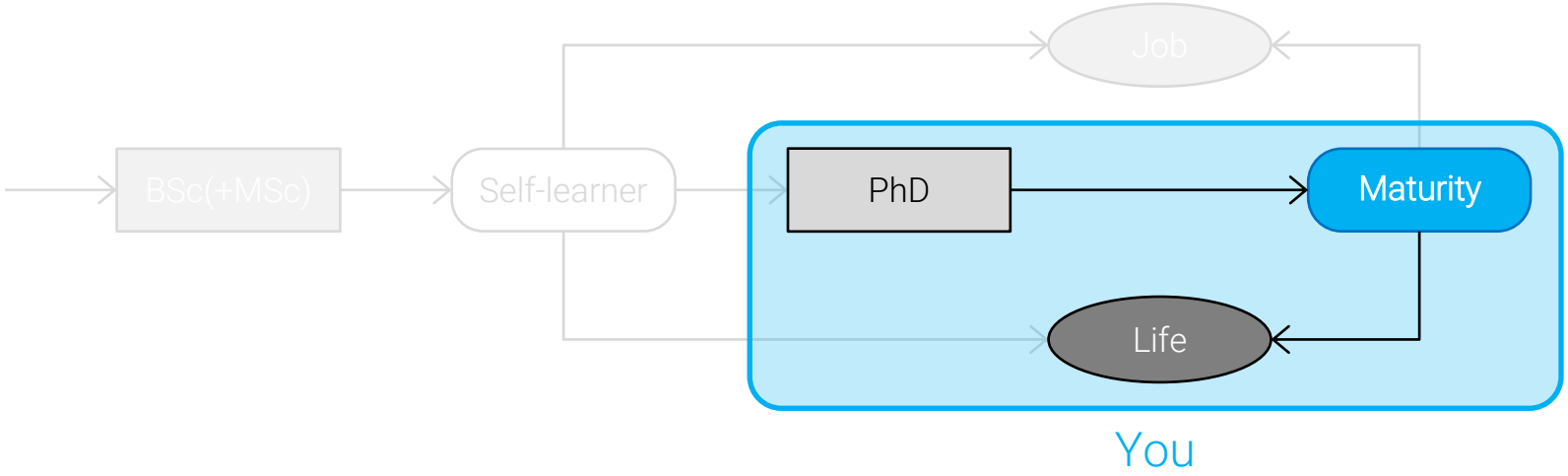
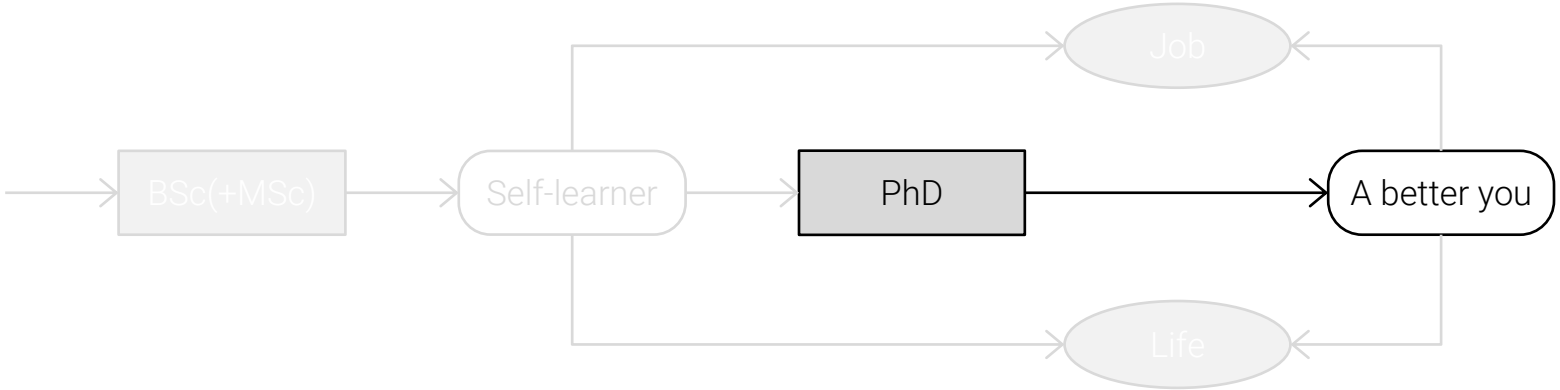

Job
BSc(+MSc)
Self-learner
PhD
Maturity
Life
You

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


Job
BSc(+MSc)
Self-learner
PhD
A better you
Life

- A PhD is a wonderful, life-transforming experience
- There will be ups and downs. It happens to everyone. Talk about it
- Don’t expect goals to make you healthy and happy. It’s the other way around
- Remember why you’re doing it. Enjoy it, and grow as a human being

it’s all about

You