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Managing your PhD

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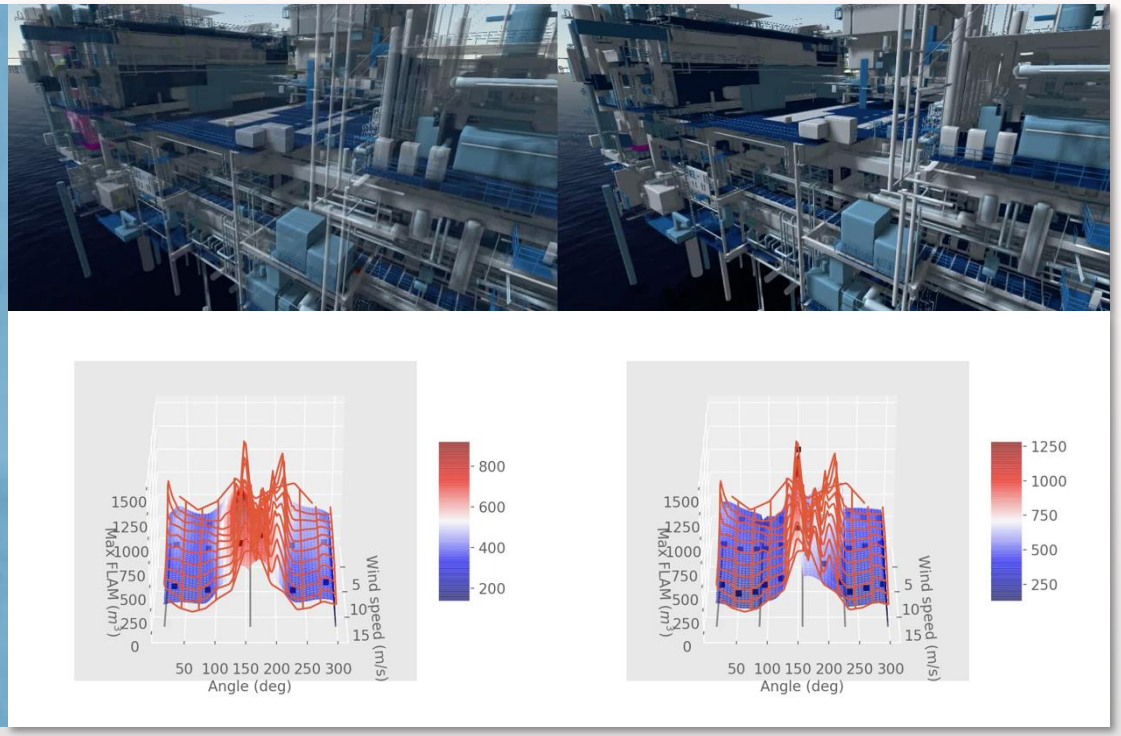
The EAGLE simulations
EVOLUTION AND ASSEMBLY OF GALAXIES AND THEIR ENVIRONMENTS
A project of the Virgo consortium
z = 19.9
L = 25.0 cMpc
Visible components:
CDM


Max FLAM (m^3)
Wind speed (m/s)
Angle (deg)
50 100 150 200 250 300
0 250 500 750 1000 1250 1500
5 10 15
200 400 600 800
Max FLAM (m^3)
Wind speed (m/s)
Angle (deg)
50 100 150 200 250 300
0 250 500 750 1000 1250 1500
5 10 15
250 500 750 1000 1250

IBM

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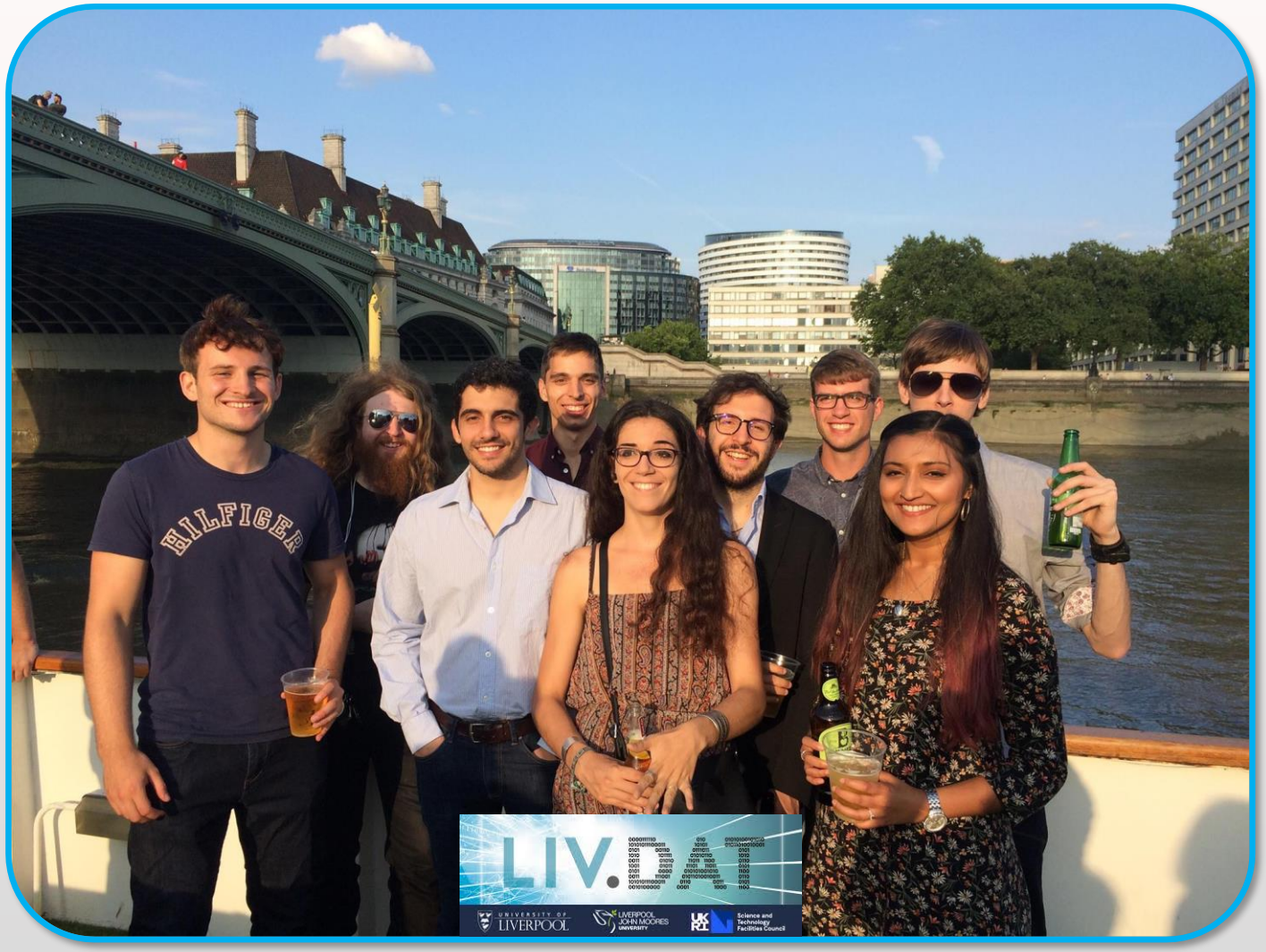
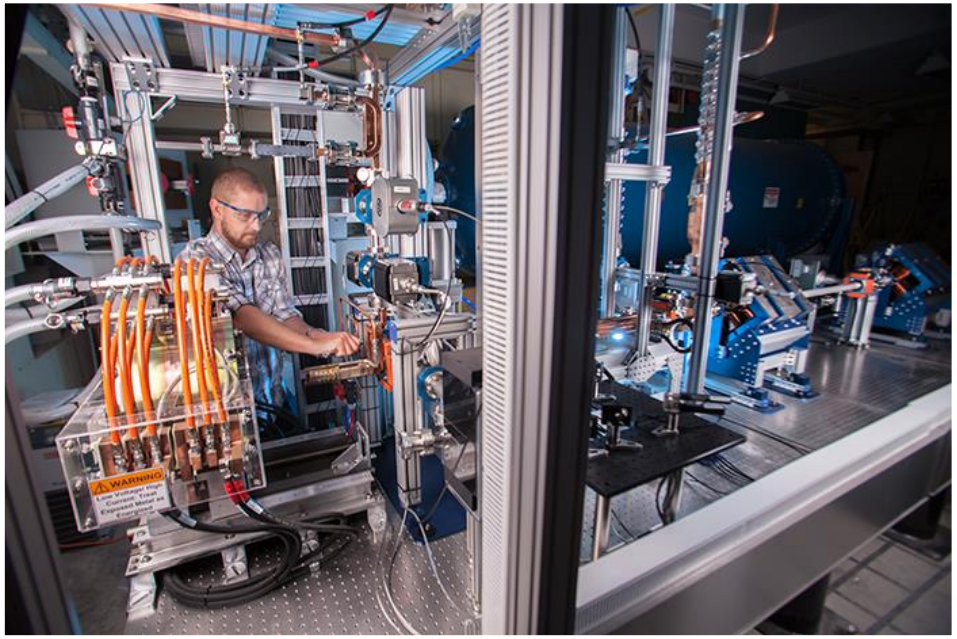


- My PhD experience will (hopefully!) not be reflective of yours over the four years
- The advice here is based on what worked for me, and I didn't do this all the time
- There may be different expectations in your field

What is different about a PhD?



Short timescales: Doing the work

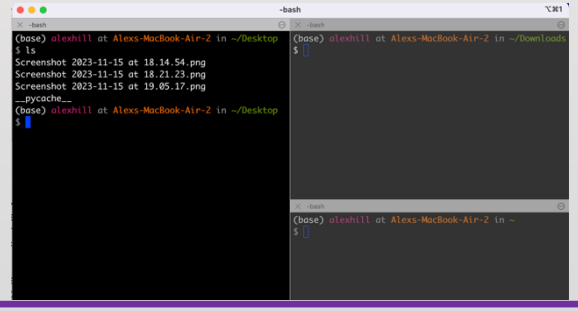
Coding environment

Ask peers and postdocs in your group if they have any recommendations

Check out iTerm2

Use a nice IDE

Learn and use keyboard shortcuts



Package manager

Keep track of your various projects and workplaces using package managers

Consider learning and using conda and docker early

```
(adaptix_env) alexhill at Alexs-MacBook-Air-2 in ~
$ conda activate py35
(py35) alexhill at Alexs-MacBook-Air-2 in ~
$
```

Version control

GitHub is a must for independent and group projects (evidences and backs up work)

GitHub Desktop makes the learning curve much shallower

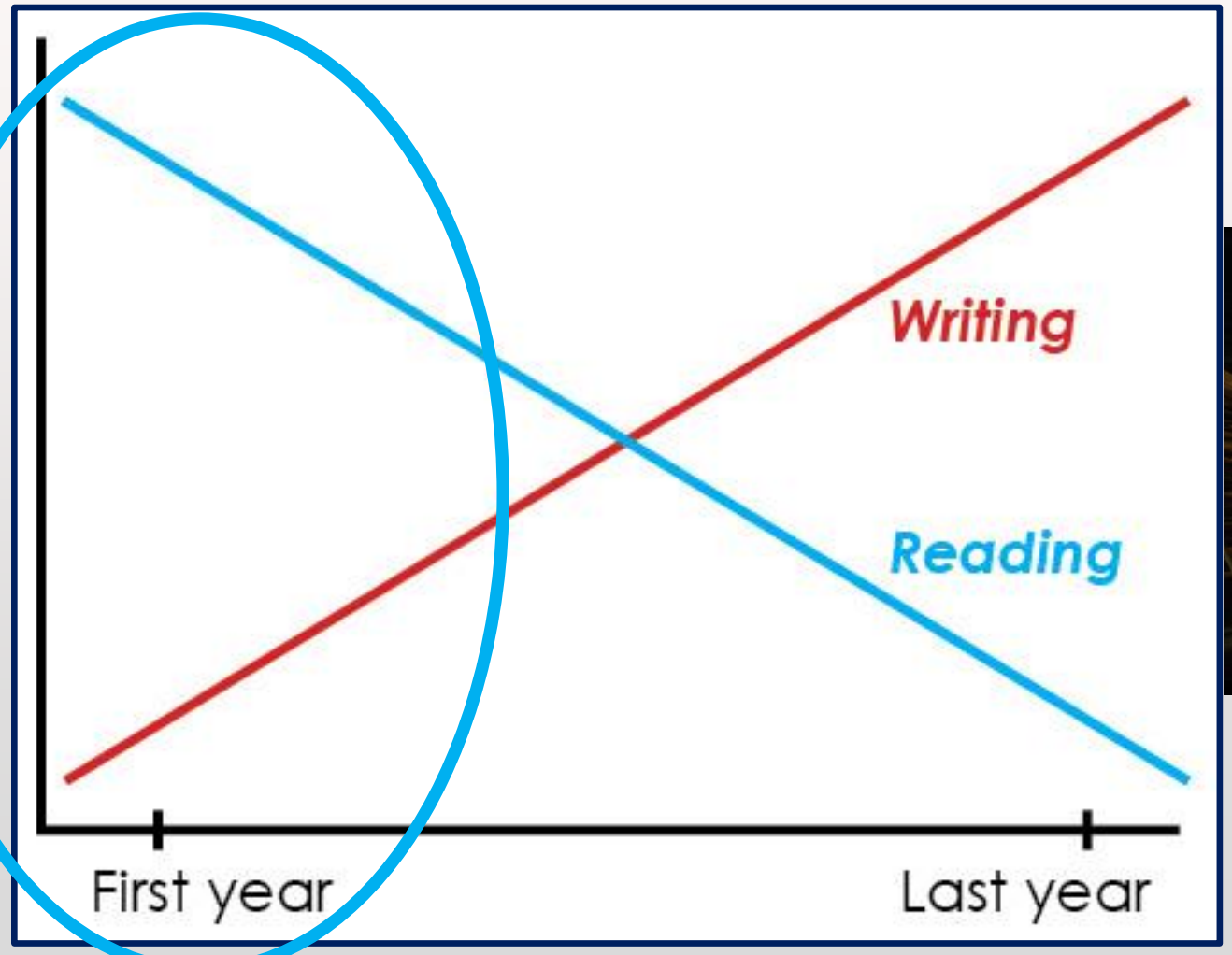
Buy an external hard drive as well and back up your work locally


Clean energy pioneer's lab destroyed in suspected arson attack in Liverpool

Luke Evans, whose work has been called 'breathtakingly new', says he has lost experimental data and all equipment

Luke Evans stands among the remains of his research facility in Wavertree, Liverpool. Photograph: Iain Watts/Liverpool Echo

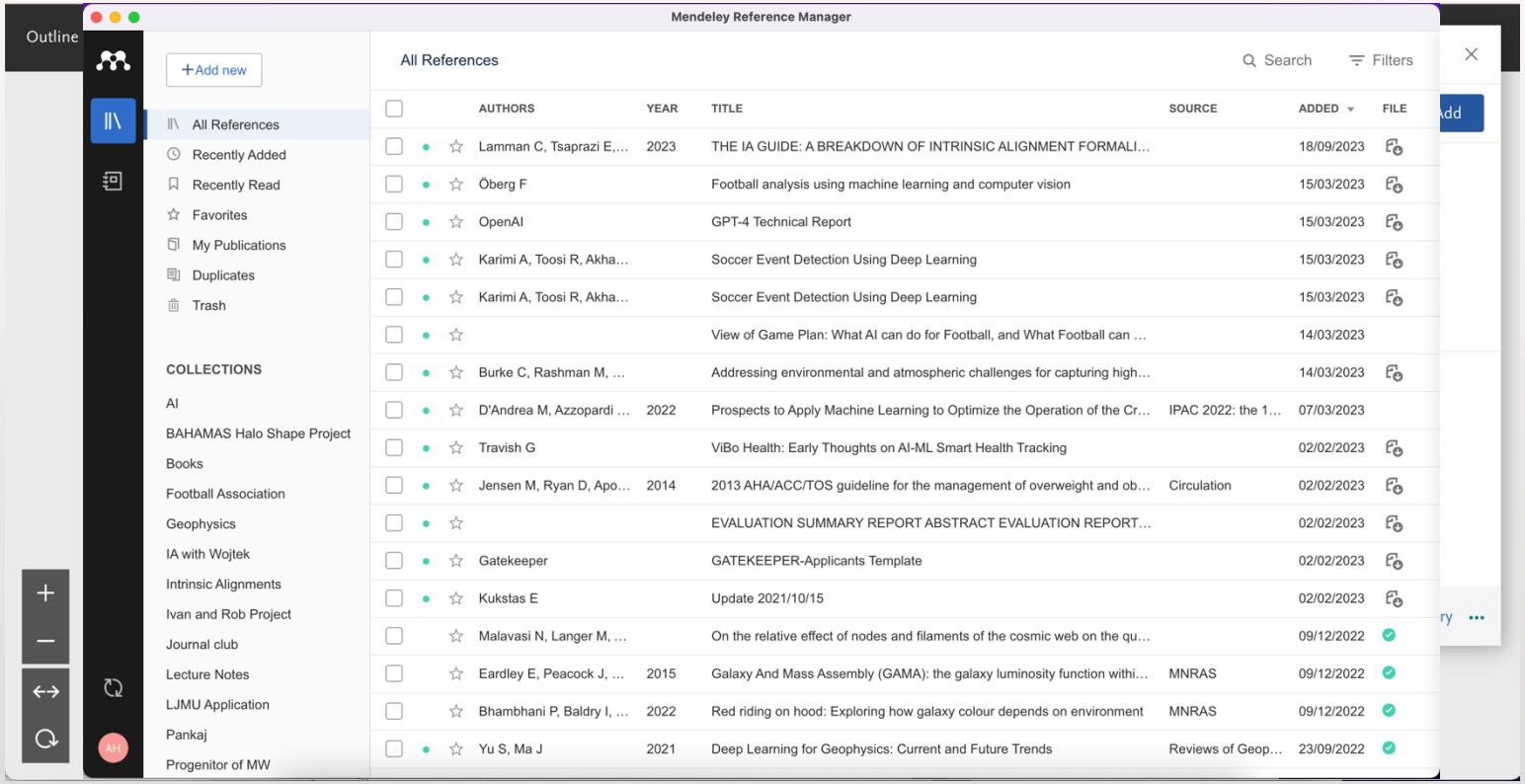
PhD timeline



Paper Management Tools

Mendeley

Zotero



Tracking papers

Literature Reviews

RECONSTRUCTION OF TRANSVERSE BEAM DISTRIBUTION USING MACHINE LEARNING

ANDREW XU

Table of Contents

Credit: Qiyuan (Andrew) Xu

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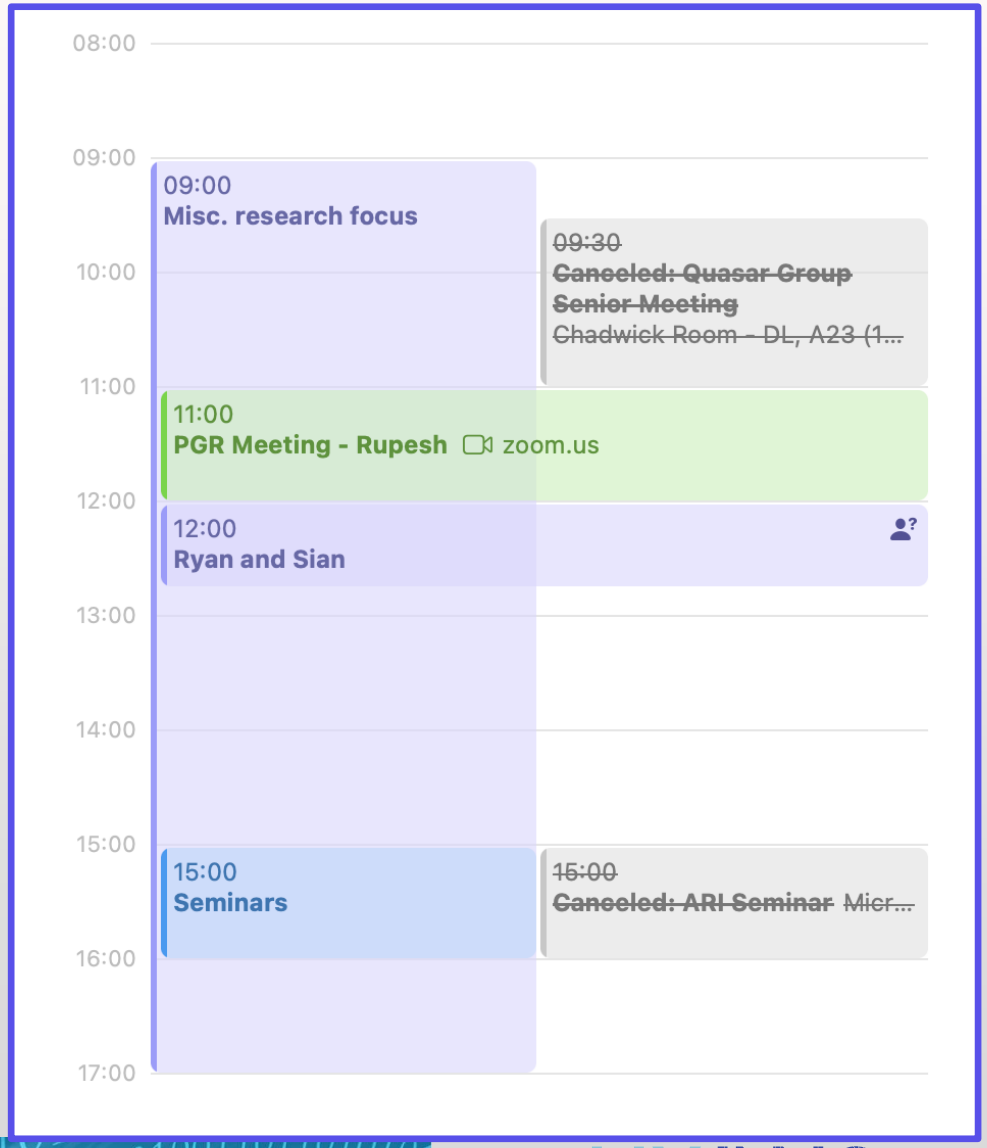
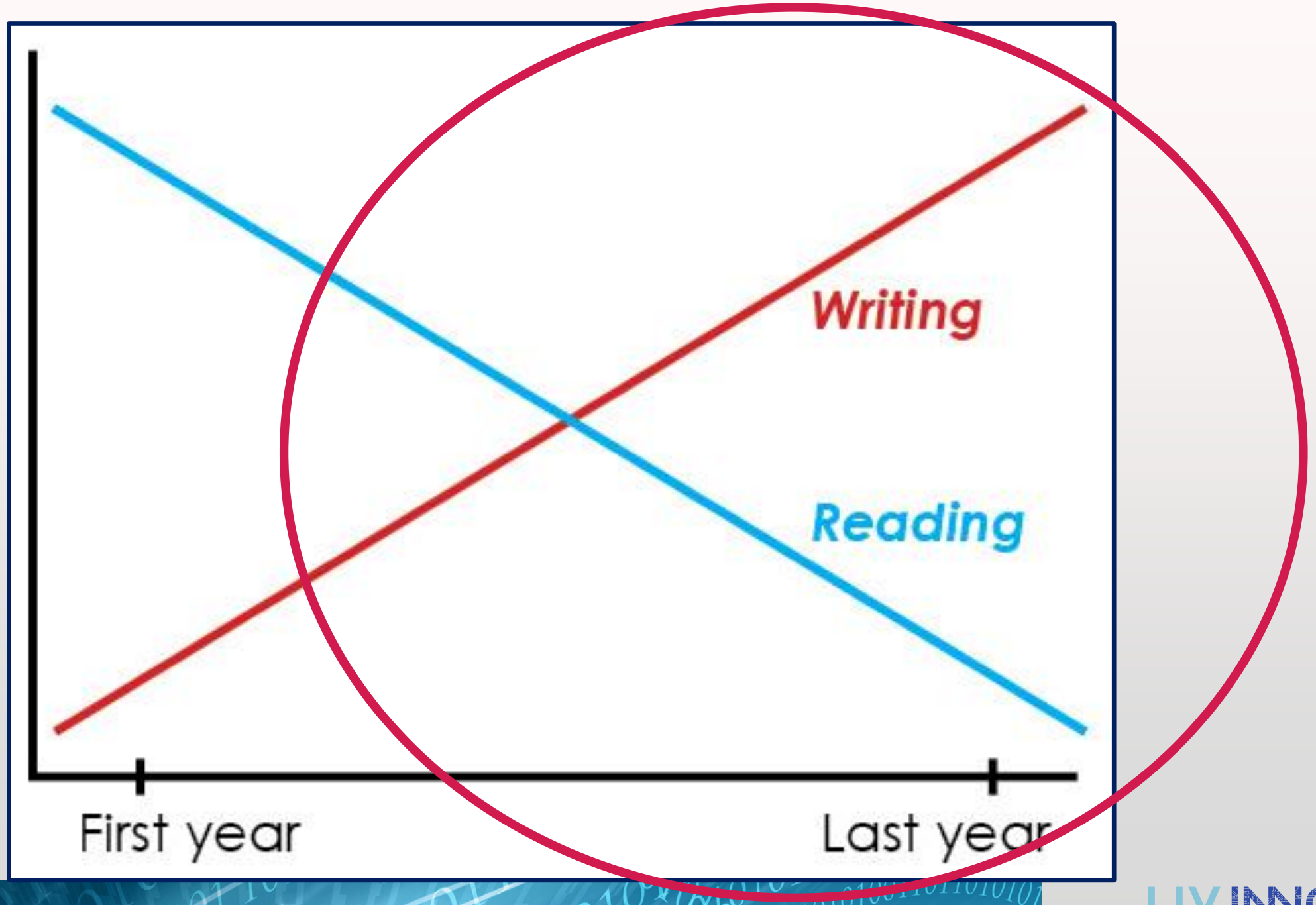
Time management

- In a PhD you will likely have a lot of commitments
- Make use of a calendar (e.g. Google, Apple)
- Set time aside for working on certain projects



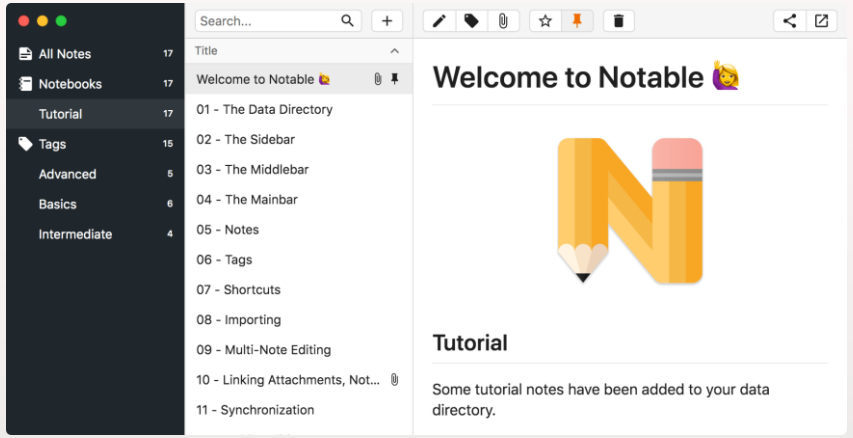
Avoiding Multitasking

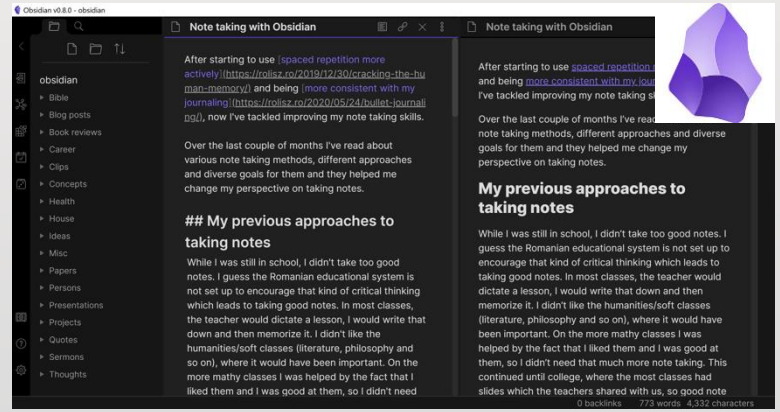
- Set timers for working on certain tasks
- Don’t be afraid to mute your notifications for a short time
- Consider what’s urgent and important
  - Caveat: don’t leave things for too long
- Set a checklist at the start of the day and update it when new tasks come in


Writing
Reading
First year
Last year

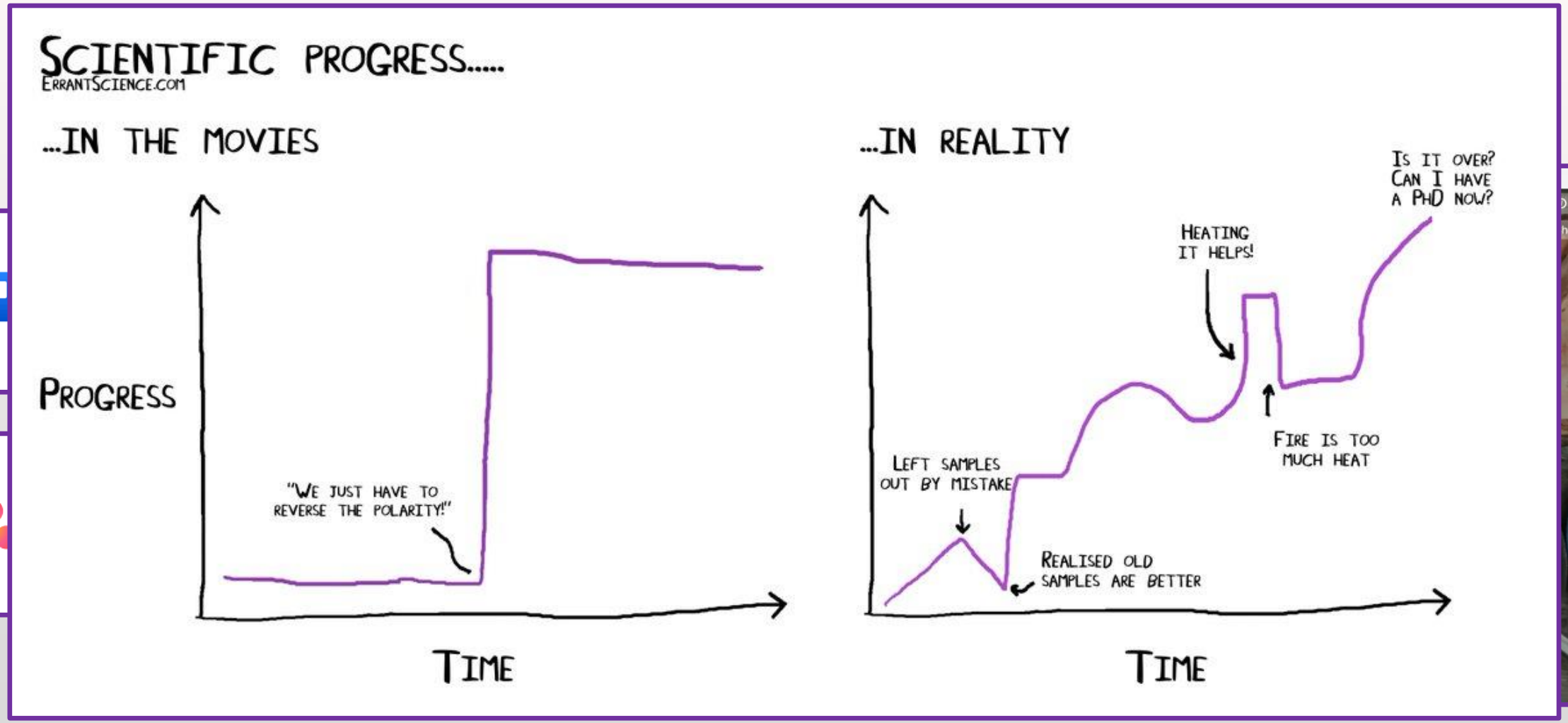
Keeping track of work

- It’s easy to get lost in daily tasks, keep track of your progress with something as simple as an online google sheet
- This helps your work focused, and makes project updates easier
- When it feels like you aren’t making progress, you can see all the work you have actually done
- You can also use apps like Obsidian and Notable





Project Management



Artificial Intelligence

- AI is and will be a huge part of your PhD and future careers. Become an expert in using it well
- It can be an excellent tool, but risky and a hinderance to your personal growth
- If it's free, you're the product
- Speak with your supervisors/research leads to determine if there are any policies in place limiting its use
- Consider the carbon cost of using AI
  - Estimates vary, but a ChatGPT search could use 50-100x more energy than a Google search
- Be wary of hype

Artificial Intelligence Tools

- Literature review (see Ioana Ciucă LIV.INNO Seminar)
- Paper summarising
- Idea generation (see Simone Scardapane LIV.INNO Seminar)
- Writing assistant, coding
- Data analysis
- Research assistant – multi-agent systems to analyse vast datasets (look up Boris Bolliet's work @ University of Cambridge)

Elicit

www.researchrabbit.ai

scikit learn

TensorFlow

PyTorch

Activity: what's worked for you?

- Discuss in groups what challenges you have found in the day-to-day routine of working as a PhD student, and what have you done to address this?

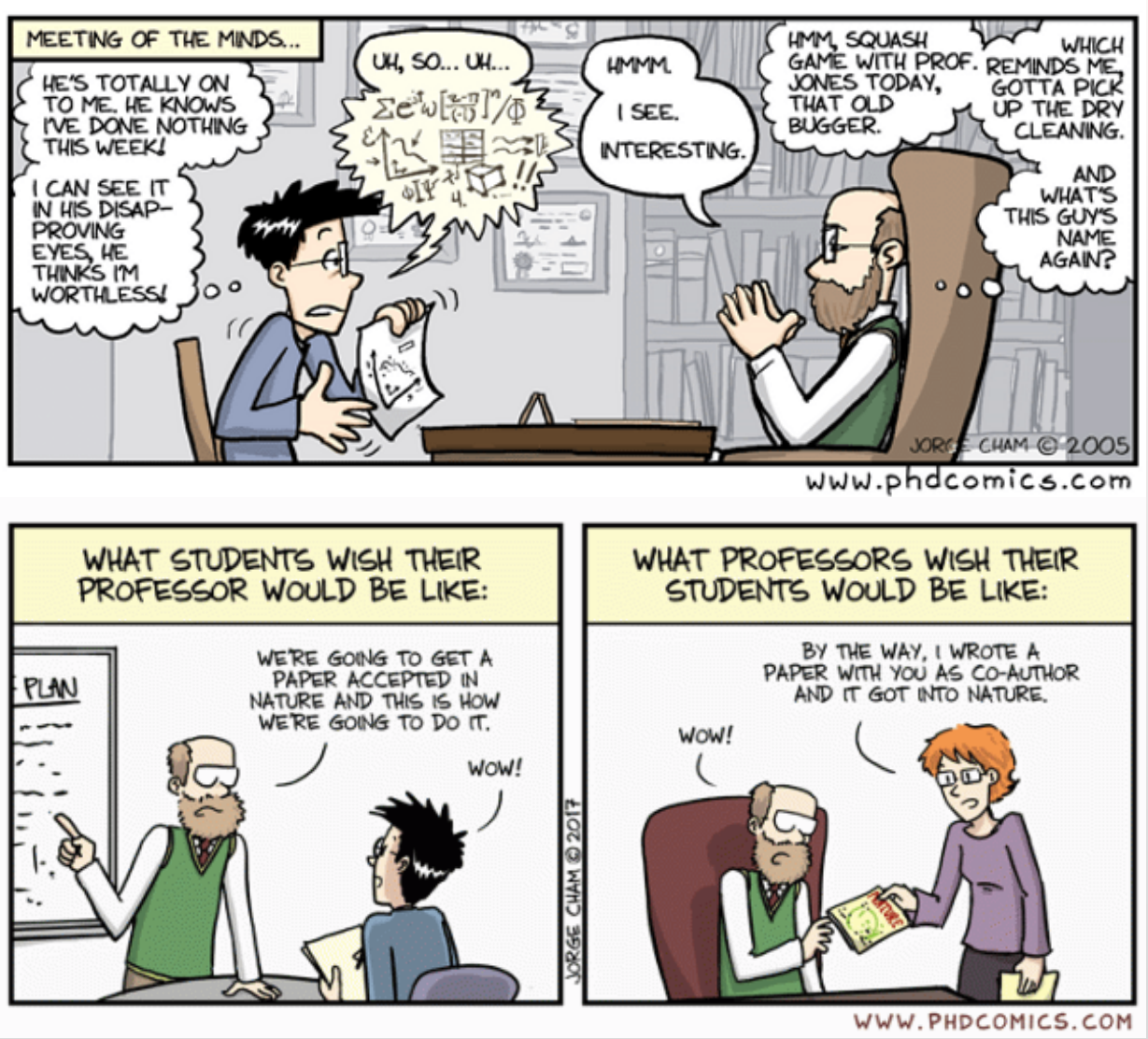
- What other tips can you share?

Positive work environment

- Seek or create positive communities
- Attend departmental activities
- Take part in social events
- Welcome opportunities to give and receive peer feedback
- Find networks and activities of people with your background or research interests

Supervisor Relationship

- Each relationship is unique and depends on the personalities and the project
- Supervisors are there to support you
- Supervisors will guide you, but don't expect direct instruction
- Supervisors aren't thinking about your project as much as you are



Supervisor relationship

What do supervisors expect from their students?

- Independence
- High standard of writing
- ‘Regular’ meetings
- Honest reporting
- Advice will be followed
- Positive scientific discussions

What do students expect from their supervisors?

- To be supervised
- Be available
- Read work in a timely manner
- Be engaged in their research
- Help get them a job at the end!

Supervisor meetings

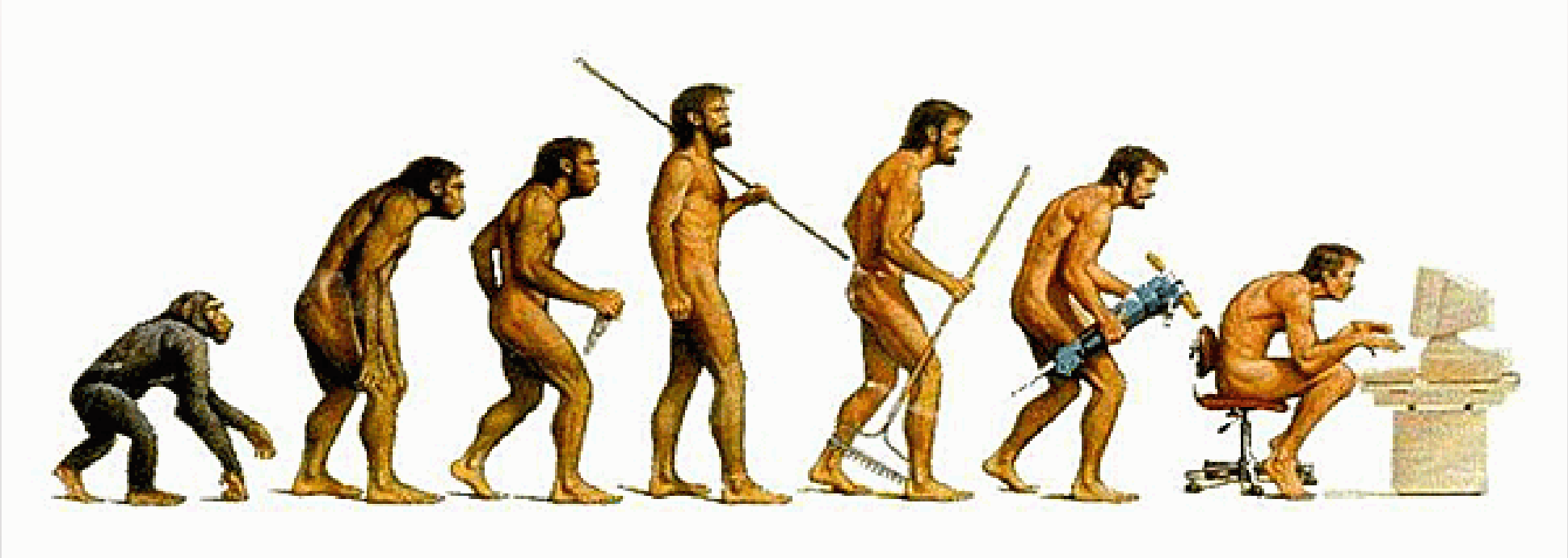
- Use these conversations to:
  - Outline progress
  - Highlight any issues
  - Set/revise expectations
- Be proactive! Especially if you have large supervisory teams. Decide who you would like to see and send an invite
- Ahead of meetings, consider providing a brief summary of your work
- Provide context for your update at the start of the meetings
- Write up a quick summary after the meeting
- Communicate your needs – is the level of contact working for you?

Supervisory teams

- Second supervisors and postdocs in your group are really important

- If you feel like something isn't right in your relationship with your supervisor, communicate it early with them first, then with the wider team to get their perspective

Staying healthy



Staying healthy

- Stay still
- Mess around with your sleep
- Maximise your screen time

Staying healthy

- Develop hobbies and friendships outside of academia

- Leave work at work
- Eat (mostly) healthily
- Take breaks (during the day and holidays)

Celebrate accomplishments

Long term: what are your expectations from your PhD?

- Job in academia? Job in industry? Follow your passion? Get the Dr title?
- Discuss your long term goals with your supervisor every few months
- Take stock of where you are right now, and adapt your medium term plans to help you achieve your goals (Career Development Plan)

Be your own advocate

- People will help you, but you are responsible for your own development
- Put yourself out there, seek mentors, build your network, promote your work
- Become a member of your community
- Hear about opportunities first, be in the room where it happens

Training opportunities

- A PhD is a great time to be developing transferable skills
- In data science there is a LOT of free online material
- Try not to overload yourself, start training schemes you know you'll have time to finish
- Pick a placement to fill a gap in your CV

edX

coursera

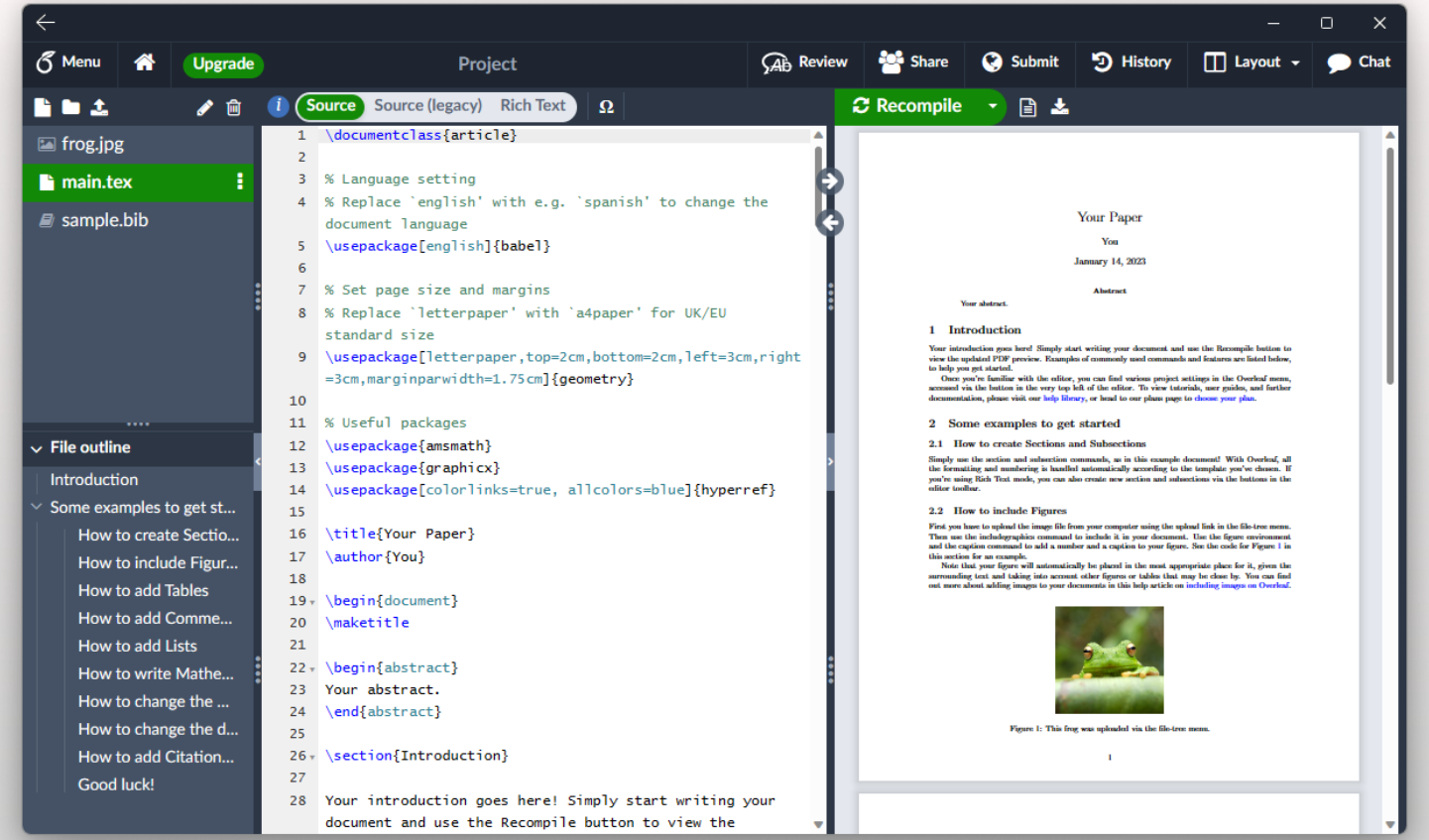
YouTube

The Alan Turing Institute

Hartree Centre
Science & Technology Facilities Council

Paper planning

- In your ~2nd year, start thinking about what your paper title would be
- Draw up a rough wishlist of results in overleaf
- Work towards filling out this paper
- Revise aims as needed
- Set time aside for writing
- Seek out or create writing groups



Science communication

Hsiang-Chih Hwang
@hc_hwang

Paper day: the dynamical masses across the Hertzsprung-Russell Diagram! This is my favorite plot I have ever made 😍😍 In one sentence, we measure the mass of stars using @ESAGaia wide binaries + Newtonian dynamics + stats + a bit neural network 🥰(1/13) arxiv.org/abs/2308.08584

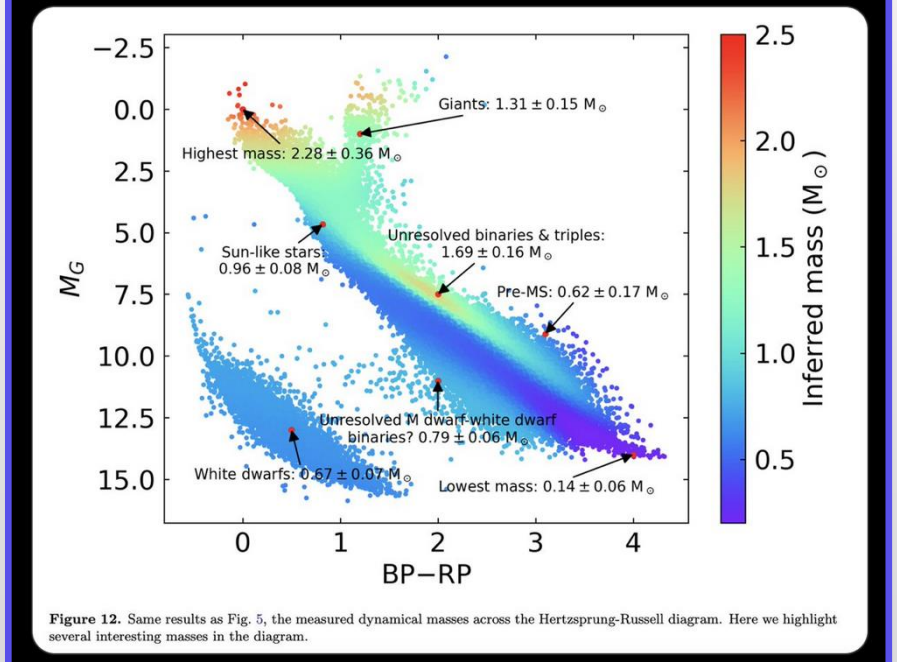


Figure 12. Same results as Fig. 5, the measured dynamical masses across the Hertzsprung-Russell diagram. Here we highlight several interesting masses in the diagram.

Alexander Hill · You
Data Science Fellow
5mo ·

Last week we launched WATMO, an STFC-funded collab between 4wardFutures and the University of Liverpool!

...see more

34 2 comments · 6 reposts

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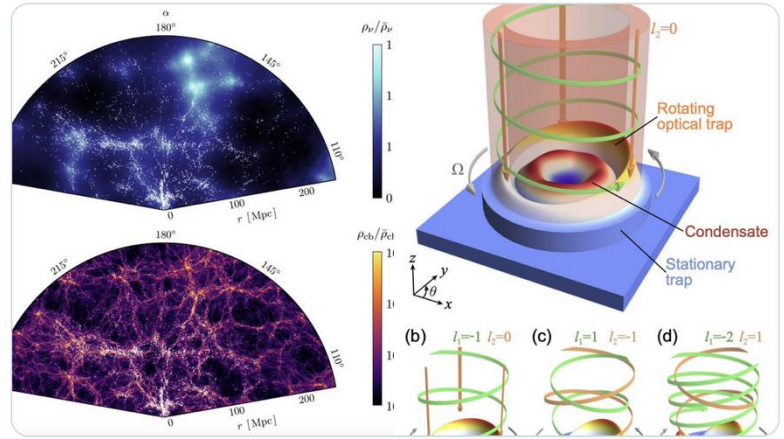
Physics Plot of the Week
@PlotPhysics · **Follow**

Vote for the new "physics plot of the week"

-- Plot from Elbers et al.

-- Plot from Yulin et al.



4:45 PM · Jul 8, 2023

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Read 1 reply

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Outreach

- Great for tailoring science communication
- See your work through fresh eyes
- Share your journey and advice with young people

Final thoughts

Final thoughts

- A PhD is what you make of it
- You deserve to be here
- Ask for help and give it to others
- Focus on your health, keep things in perspective and you'll be ok

Additional Resources

- https://the-turing-way.netlify.app/index.html
- https://blogs.lse.ac.uk/studentsatlse/2023/05/21/managing-your-phd-without-burning-out/
- https://scribblygumblog.wordpress.com/2017/05/23/managing-expectations-the-arranged-marriage-between-supervisor-and-student/