

How to Be a Good AI Researcher

Tao LIN

October 13, 2023



1 Recitation

2 How to Do Research

- More on How to Read Papers
- 12 Resolutions for Grad Students
- How to Manage Your Time?
- How to Be Productive?
- Tips for Work-Life Balance (WLB)
- Others Career Tips

Course schedule

| Week | Date | Topics |
|---------------|---|---|
| 1 | 2023. Sep. 01 | Introduction to CS & AI |
| 2 | 2023. Sep. 08 | How to communicate |
| 3 | 2023. Sep. 15 | How to present |
| 4 | 2023. Sep. 22 | How to be a good AI researcher (I): doing research |
| 5 (this week) | 2023. Oct. 13 | How to be a good AI researcher (II): productivity and career |
| 6 | 2023. Oct. 20 ← proposal submission | How to be a good AI researcher (III): academic paper writing and peer reviews |
| 7 | 2023. Nov. 03 | Sharing the experience of writing excellent academic papers and rebuttal |
| 8 | 2023. Nov. 10 | Practice course |

Acknowledgement

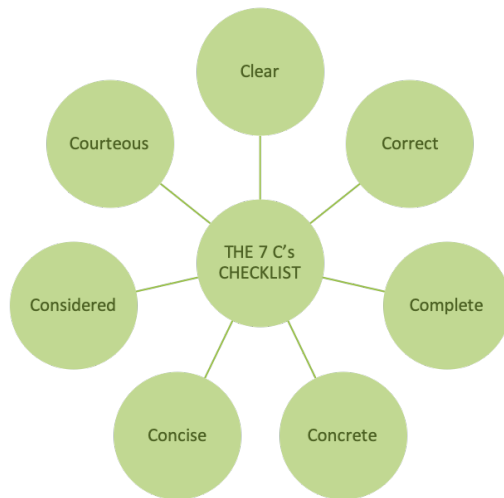
- The 7 Cs of Communication, World of Work Project
- Awesome Tips, JiaBin Huang
- 12 resolutions for grad students, Matt Might
- Tips for work-life balance, Matt Might
- Productivity tips for academics, Matt Might
- [https://www.stat.cmu.edu/ aramdas/checklists/reading-tips.pdf](https://www.stat.cmu.edu/aramdas/checklists/reading-tips.pdf), Aaditya Ramdas

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- 1 Recitation
- 2 How to Do Research

In the previous three lectures...

We learn how to communicate: the 7 **C**'s of communication



Please revisit our previous lecture when necessary.

We learn the principles of presentation

Great talks require effort & time!

We learn the first course on “how to do research”

- The Illustrated Guide to a Ph.D.
- 10 Easy Ways to Fail a Ph.D.
- How to Make Steady Progress?
- How to Keep Track With the Literature?
- How to Come up With Research Ideas?
- How to Do Experiments?
- How to Create More Impact

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But why do we need to answer these questions?

Know why you are reading a research paper

- Good reasons:

- Bad reasons:

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 - “I am citing this paper, so I should read it fully.”

How reading papers evolved for me (and might evolve for you)

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- Start of PhD

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Looks like an important paper. Let me read it from start to end

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I never read a paper from start to end on my first opening (or ever)

Common (wrong) belief: papers should be read linearly

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No! How exactly I read a paper depends on

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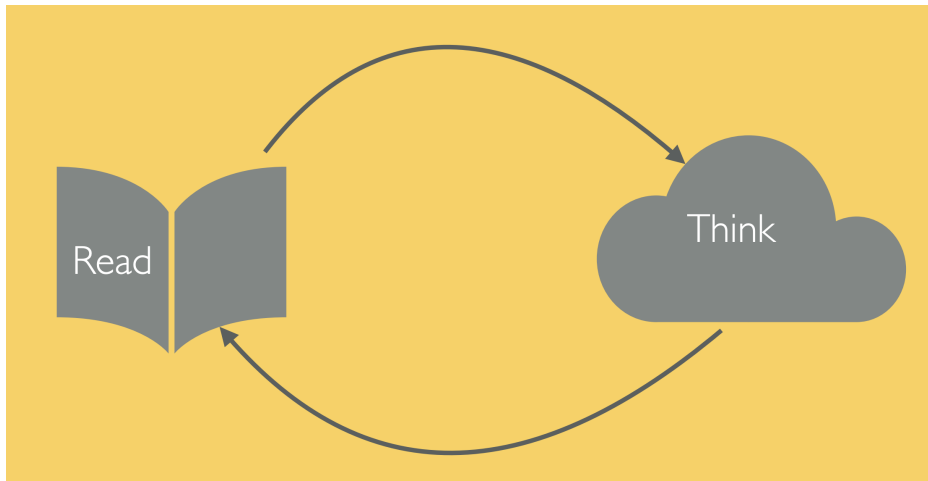
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- Can often skip entire sections
- May need to read other paragraphs or subsections multiple times
- Sometimes the reading needs to split across days

The principle of iterative refinement



First pass: jigsaw puzzle theme (5-30mins)

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[problem context]

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Sources: abstract/intro, problem definition, main theorem, discussion.

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Sources: examples, special cases, key lemmas/propositions, proof outlines

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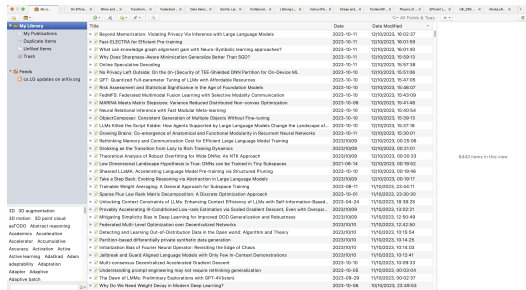
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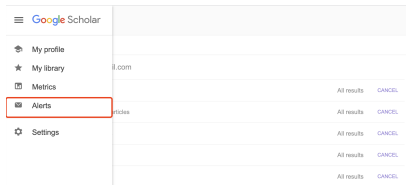
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Sources: appendices, proof details, corollaries, remarks, related work

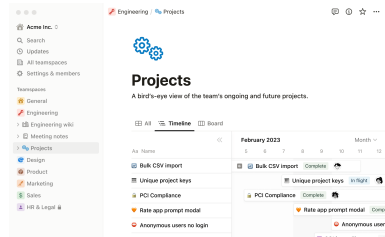
How I organize my reading



Zotero



Google Scholar Alerts



Notion

This week we will talk more on ***productivity and career.***

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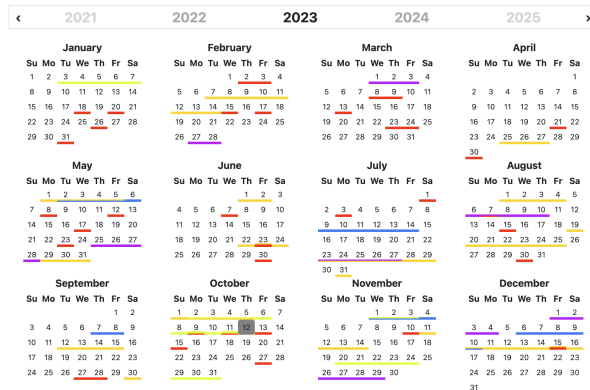
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Map out the year

Map out what the next twelve months will look like.

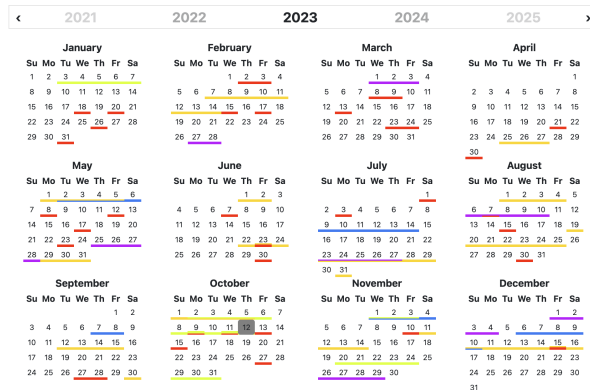
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Map out the year

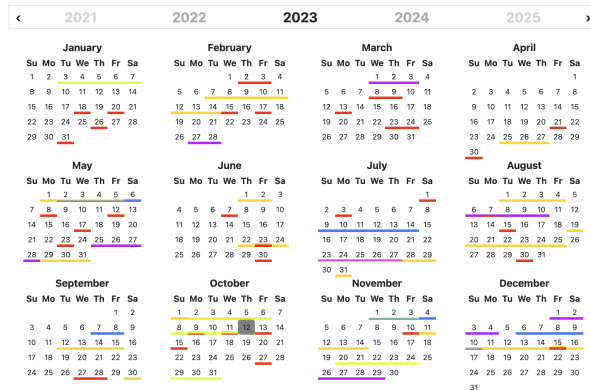
Map out what the next twelve months will look like.



- Put major deadlines on your calendar.

Map out the year

Map out what the next twelve months will look like.



- Put major deadlines on your calendar.
- Decide program milestones

Improve productivity

We will discuss it later!

Embrace the uncomfortable

What topics in your field are outside your comfort zone?

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Try those!

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Tips:

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Tips:

- The “rule of 3”:

When a third person recommends you try something, you must try it.

- The “15 minute rule”:

Give something the benefit of the doubt for 15 minutes.

If you don't want to continue after 15 minutes, drop it.

Upgrade your tools

Make sure you have the right tools.

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For example,

- Do you have an automatic research workflow?

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Upgrade your tools

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For example,

- Do you have an automatic research workflow?
- Is there software or hardware that could accelerate your workflow?
- Have you optimized your configuration files?
- Is it time to set up your LaTeX macros?

Stay healthy

Mind and body are connected: a healthy body supports a creative mind.

¹ It's OK to get depressed. It's not OK to do nothing about it.

Stay healthy

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- Evaluate your diet and exercise habits.

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- Evaluate your diet and exercise habits.
- Learn to do something with your body.

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Stay healthy

Mind and body are connected: a healthy body supports a creative mind.

- Evaluate your diet and exercise habits.
- Learn to do something with your body.
- Watch out for mental health¹.

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Update your CV and web site

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- For a CSer, if you can't be googled, you don't exist.

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Doing a Ph.D. \approx building your life product.

- For a CSer, if you can't be googled, you don't exist.
- Maintain a well-designed, professional-looking academic web site.
- Try your best to improve your profile / product.

Keep your eye on the job market

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- Look at the hiring areas and check whether your work fits.
- If your school is interviewing, attend hiring talks.

Network

Your future success will depend in part on networking.

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For example,

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For example,

- You will need letter-writers.

Network

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For example,

- You will need letter-writers.
- You will need them to pull you from the crowd when applying for jobs/interns.

Say thanks

Thank the giants upon whose shoulders you stand.

Volunteer for a talk

Effective public communication is critical to success.

Practice writing

Effective writing is equally critical to success.

Check with your committee

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→ check in with your committee at least once a year to update them on your plan.
- Check with your committee is also a way for networking
→ you may even uncover opportunities for collaboration.
- Keeping your committee informed eliminates surprises at your defense.

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Be on top of things. Avoid drama and stress.

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Make EVERYTHING you plan to do as a calendar entry (including planning the calendar) and do it at that time.

Calendar, not to-do lists: viewing time as space².

- Principle 1: Everything takes time. So everything needs to be on your calendar.
- Principle 2: It is easier to *measure how wrong your time estimates are* than *it is to fix them*.
- Principle 3: More generally, incorporate your patterns.
- Principle 4: Re-plan.
- Principle 5: Break it down.
- Principle 6: Backtrack. Foresee.
- Principle 7: Visualize your time.

²See details in <https://deviparikh.medium.com/calendar-instead-of-to-do-lists-9ada86a512dd>

Principle 1: Everything takes time → everything on your calendar.

Time is always ticking and there is finite time in the day.

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Everything takes time
(something, anything, and nothing)

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Everything needs to be an entry on your calendar.

Principle 2 & 3: Wrong time estimation → incorporate your patterns.

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- If you are not a morning person
 - mark your mornings as “not a morning person” and don’t put tasks there.

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 - no tasks there.
- If you are not a morning person
 - mark your mornings as “not a morning person” and don’t put tasks there.
- If you see repeatedly that you are too tired on Saturdays to do anything
 - Mark your entire Saturdays as “goof off”

Principle 4: Re-plan.

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- The plan is feasible. But it is not guaranteed to work.
- Move things you could not get done to other open slots.
- The future you will appreciate the extra buffer!

Principle 5: Break it down.

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Principle 5: Break it down.

Tasks don't always present themselves in calendar-sized chunks.

- 1 A 300-hour project due in 3 months cannot be a calendar entry.
- 2 Break it down.
- 3 Mark them on your calendar in available slots

Principle 6: Backtrack and Foresee.

Backtrack on the timeline.

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Backtrack on the timeline. For example: What if a conference deadline is in 3 months?

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Backtrack on the timeline. For example: What if a conference deadline is in 3 months?

- It means that *you need to start writing the paper at least a month before the deadline.*

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✗ Don't mistake it to be the time when you should do something.

- Re-planning needs empty slots, needs buffer.

Principle 7: Visualize your time.

| Wed | Thu | Fri | Sat | Sun |
|--|---|---|------------------------------------|--|
| 7:30 AM Get ready and go to work | 7:30 AM Get ready and go to work | 7:30 AM Get ready and go to work | 7:30 AM Sleep in | |
| Add LaidSiv paper to CV | PerceptiveConv meeting | | | Call Mom |
| SFA replied? Plan expenses | LaidSiv Pytorch meeting | AI Guest interview | | 9:30 AM Look into Atlanta apartments |
| Prepare for hiring meeting | Hold because talks often... | 10 AM Alex Parrish's talk | 10 AM Get ready, brunch, loiter | Call Shankar and Gulpreet |
| Write YFA grant report | Ramesh's meeting DAI biweekly | Meet RE candidate | | 12 PM Write time management blog post |
| Lunch | Lunch | Lunch | | |
| Plan PRCV18 practice ses... | 1 PM Plan for planning class in Fall | 1 PM Group meeting or reading group | | |
| David going to IACL? | | | | |
| Look into Kelly's gifts data... | | | | |
| 2:30 PM Think about service role for next year -- let Brian know | 3 PM Algorithmic art coding | Manager 1:1 When is Angela starting? | 3 PM Meeting Julie and Andy | |
| 4 PM Figure out concrete intern projects. Otherwise hard to make good progress! Set up meetings with Boris to brainstorm. | | 5 PM Calvin, Sam transferring courses? Dawn, Mohit taking quals next semester? | | |
| Dinner | Dinner | Dinner | | Dinner |
| Leave \$120 for Lydia | Read article Dori sent | | | 8 PM Black Mirror |
| Swati's job search status? | | | | |
| Order fans | | | | |
| | | | | |
| answer question in journal | answer question in journal | answer question in journal | answer question in journal | answer question in journal |
| Sleep | Sleep | Sleep | | Sleep |

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When transiting from *structured learning environments* (e.g. courses) to *unstructured ones* (e.g. research)

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We need • a productive routine and • a good time management.

Exercise, exercise, exercise

Doing regular exercise (e.g., in the early morning) gives you the

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- physical energy

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Doing regular exercise (e.g., in the early morning) gives you the

- mental acuity
- physical energy
- emotional stability

Exercise, exercise, exercise

Doing regular exercise (e.g., in the early morning) gives you the

- mental acuity
- physical energy
- emotional stability
- social health

Eat that frog

Start your day by working on the most important task of the day (aka the frog)

Stick to your plan and do what you are doing

Stick to your plan and do what you are doing

Multitasking /,mʌl.ti'tæs.kɪŋ/

(v.) Screwing up multiple things
at the same time.

Multi-tasking gives you the illusion of productivity.

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Multitasking /,mʌl.ti'tæs.kɪŋ/

(v.) Screwing up multiple things
at the same time.

Multi-tasking gives you the illusion of productivity.

Follow your calendar and focus on one thing at a time instead.

Practice self-care

Take care of yourself!

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Take care of yourself!

- Get enough sleep,

Practice self-care

Take care of yourself!

- Get enough sleep,
- Eat well,

Practice self-care

Take care of yourself!

- Get enough sleep,
- Eat well,
- Do exercise.

Use interrupt coalescing

Group and defer interruptions

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Group and defer interruptions
(e.g., emails, slack messages, twitter feeds)
according to their urgency.

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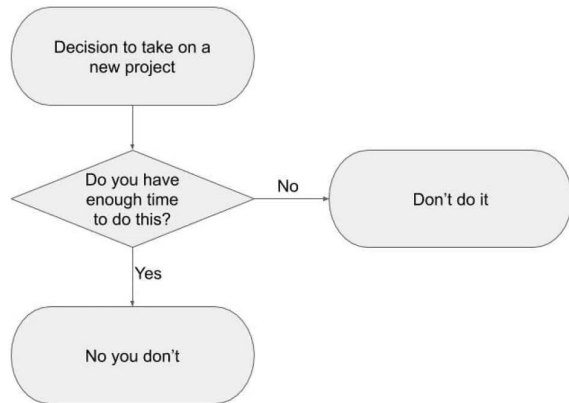
Allocate a specific time slot in a day to address these interruptions.

Learn to say no

Before accepting any new tasks, ask yourself

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Give up precise task prioritization

Sometimes you may be *spending more time ranking the tasks than actually doing it.*

Touch each email/message exactly once

Open an email, skim through it, and make a quick decision
(reply/archive/allocate a time slot).

Don't work from home (?)

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Home is full of distractions

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Academics have flexible schedules

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Invest in making your work-space a comfortable, productive, enjoyable place to be, e.g.,

- Move your books into your work-space.

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- Move your books into your work-space.
- Get an ergonomic office chair.

Don't work from home (?)

Home is full of distractions \longleftrightarrow Academics have flexible schedules

Invest in making your work-space a comfortable, productive, enjoyable place to be, e.g.,

- Move your books into your work-space.
- Get an ergonomic office chair.
- Get a high-quality ergonomic keyboard.

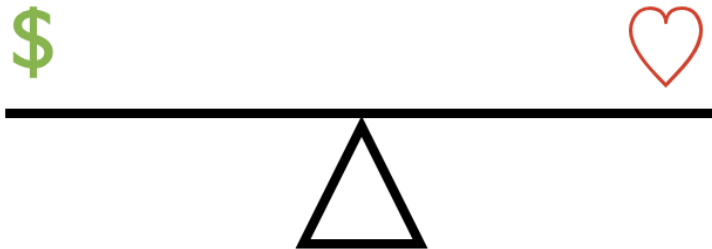
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Tips for work-life balance



Some high-level tips³:

- Explicitly acknowledge priorities
- Avoid workaholism
- Avoid perfectionism
- Set and enforce boundaries
- Avoid over-commitment
- Use a work-flow system
- Communicate
- Keep hobbies
- Exploit opportunity cost
- Continuously adapt

³See details in <https://matt.might.net/articles/work-life-balance/>

Explicitly acknowledge priorities

Start by listing your priorities in life.

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Start by listing your priorities in life.

- ✗ If factors like “health”, “happiness”, or “family” rank below professional goals
⇒ your long-term priorities are not stable.
- ✗ If those inverted priorities persist
⇒ a crisis—injury/sickness, depression or divorce—is inevitable.

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✗ The “work more; sleep less” mentality is misguided.

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- ✓ Efficiency.

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- ✓ Efficiency.

The equation for work:

$$\text{output} = \underset{:=\text{productivity}}{\text{unit of work / hour}} \times \text{hours worked} \quad (1)$$

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It is good to use perfection as a guide, but recognize that it is unattainable.

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Iterate toward perfection!

Set and enforce boundaries

Maintaining work-life balance require setting boundaries.

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For example,

- I always schedule recurring “life” time into my calendar

Avoid over-commitment

Learn when and how to say “no.”

Keep hobbies

Even the best jobs create stress.

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Hobbies are a way of letting stress go before it explodes.

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Check out links below:

- [How to Get a Great Letter of Recommendation](#)
- [Academic job search advice](#)
- [Fantastic Faculty Jobs and How to Get Them?](#)
- See more at <https://github.com/jbhuang0604/awesome-tips#career>

Course schedule

| Week | Date | Topics |
|---------------|---|---|
| 1 | 2023. Sep. 01 | Introduction to CS & AI |
| 2 | 2023. Sep. 08 | How to communicate |
| 3 | 2023. Sep. 15 | How to present |
| 4 | 2023. Sep. 22 | How to be a good AI researcher (I): doing research |
| 5 | 2023. Oct. 13 | How to be a good AI researcher (II): productivity and career |
| 6 (next week) | 2023. Oct. 20 ← proposal submission | How to be a good AI researcher (III): academic paper writing and peer reviews |
| 7 | 2023. Nov. 03 | Sharing the experience of writing excellent academic papers and rebuttal |
| 8 | 2023. Nov. 10 | Practice course |