



Hints on doing research

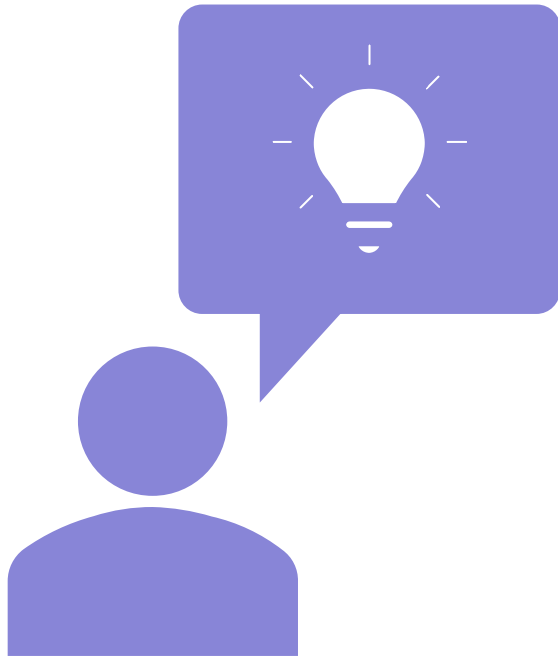
OR: 36 YEARS IN 36 MINUTES

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Planning

Develop a research vision



Ask yourself "If my research succeeds, how will this make the world a better place?"



Research should be 'worth doing, doable, and not done'

Have a good answer for why, if it's doable, it's not done - perhaps it's not worth doing? Don't fill a "much-needed gap."





Strive for impact

More than a million papers are published each year but only a few are read and fewer are cited

Try to write papers that will be cited for decades to come

More impact comes from taking more risk!

Be ethical in
your work



Execution

Always do a literature survey

Before trying to break down a wall to get to the other side, do a literature survey to check if there is a door





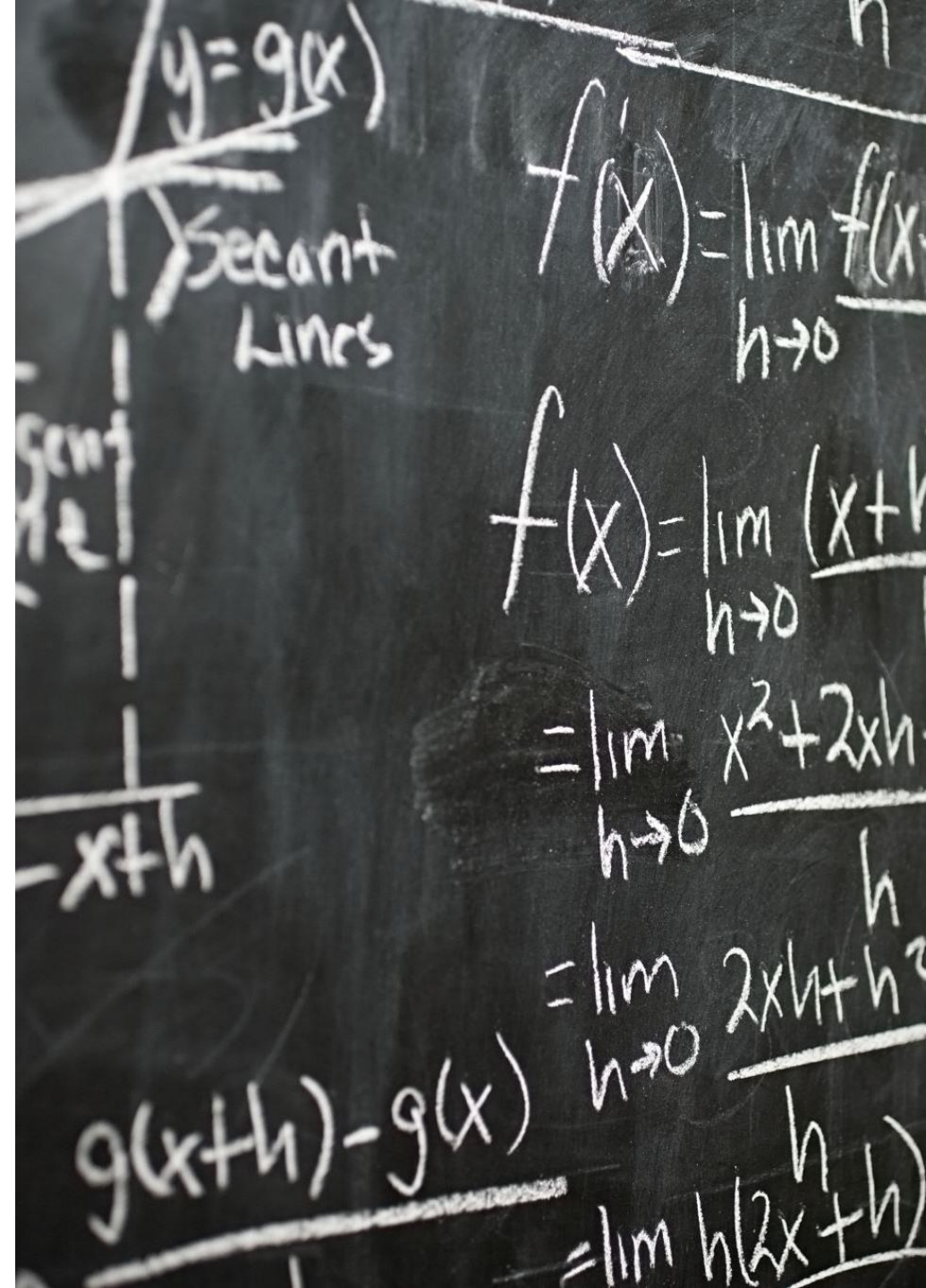
Do not be afraid to challenge conventional wisdom

Look for a mismatch between hype and reality. Good research comes from re-examining conventional assumptions and separating wishful thinking from what's true.

But be certain of your facts.

Seek theoretical bases for your work

A prototype is one-off, but a theory is for ever.

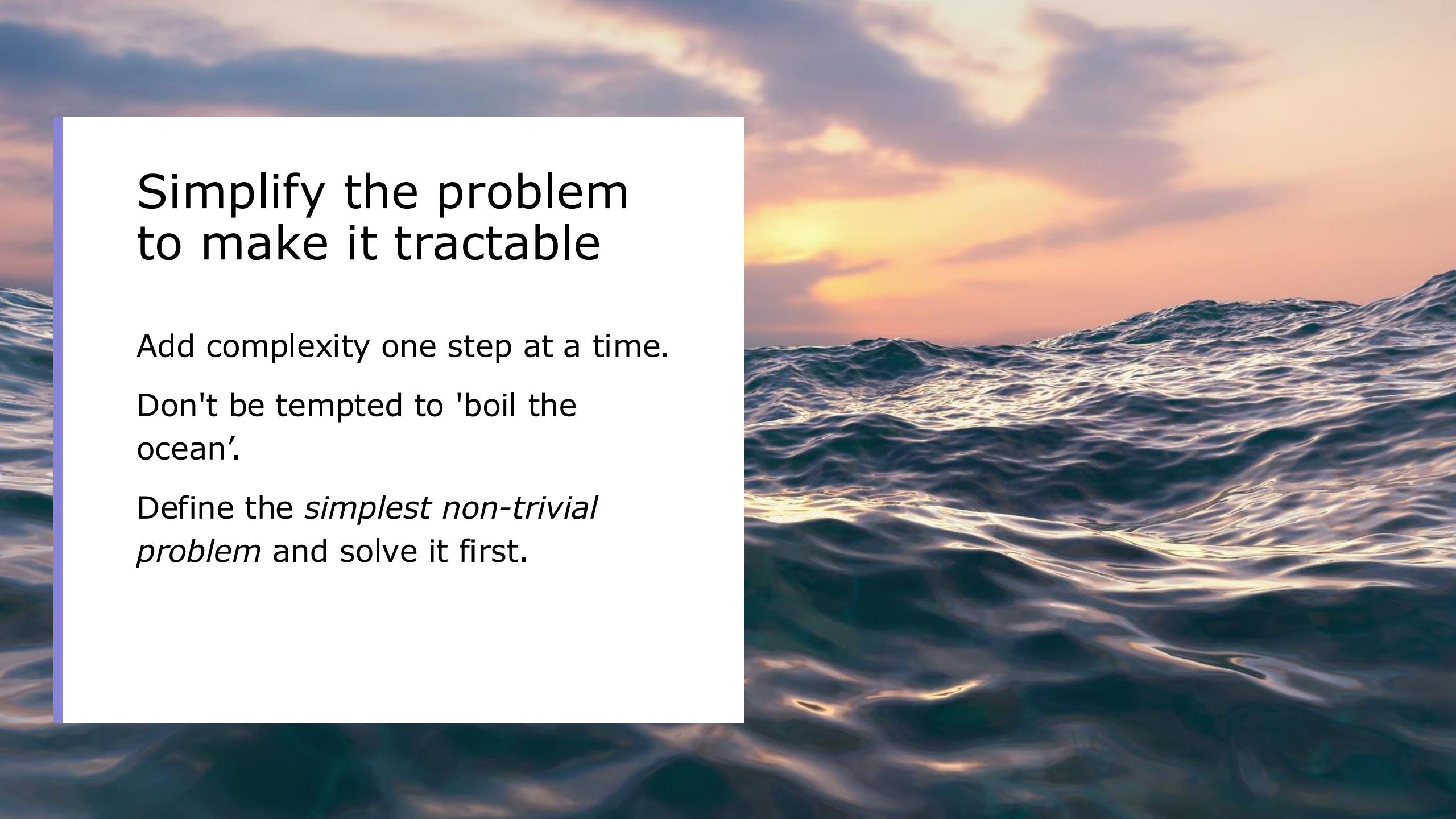


Simplify the problem to make it tractable

Add complexity one step at a time.

Don't be tempted to 'boil the
ocean'.

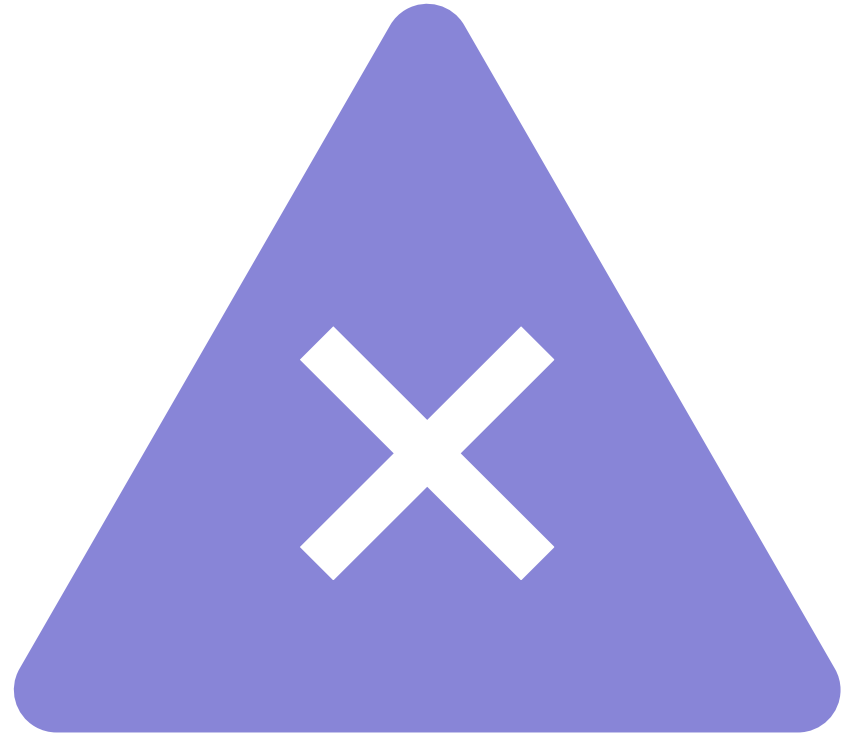
Define the *simplest non-trivial
problem* and solve it first.



Be careful in making assumptions

If you find your assumptions about your work are wrong, discard your work immediately and move on.

If you are not convinced about the validity of your work, no one else will be either.





Doing good research is like peeling an onion

It will make you cry, but the results are
better.

Abstract \leftrightarrow Concrete

- When confronted with an abstract problem, come up with a concrete example.
- When confronted with a concrete problem, generalize and make it abstract.



Choose your collaborators carefully

And let go when you need to



Write a weekly research report

It will remind you of what you did
And it will help you write a paper
on your work



Macro and micro

Like a painter who steps back from a painting from time to time to see the big picture, periodically assess the maturity, direction, and limitations of your work



Be open with your research

- Share ideas freely. Constantly explaining your work will refine your vision.
- Respect and incorporate feedback.
- Some of your ideas may be stolen, but your overall impact will be greater.



Write your ideas down

- Always carry a notebook.
- Take detailed notes at meetings and lectures. Your mind is more unreliable than you think.





How to solve it

Once you have crystallized a problem, focus on it to the exclusion of everything else.

A solution may appear.

Contact paper authors

If you do not understand something in a paper, correspond with the authors.

They will love you for it.





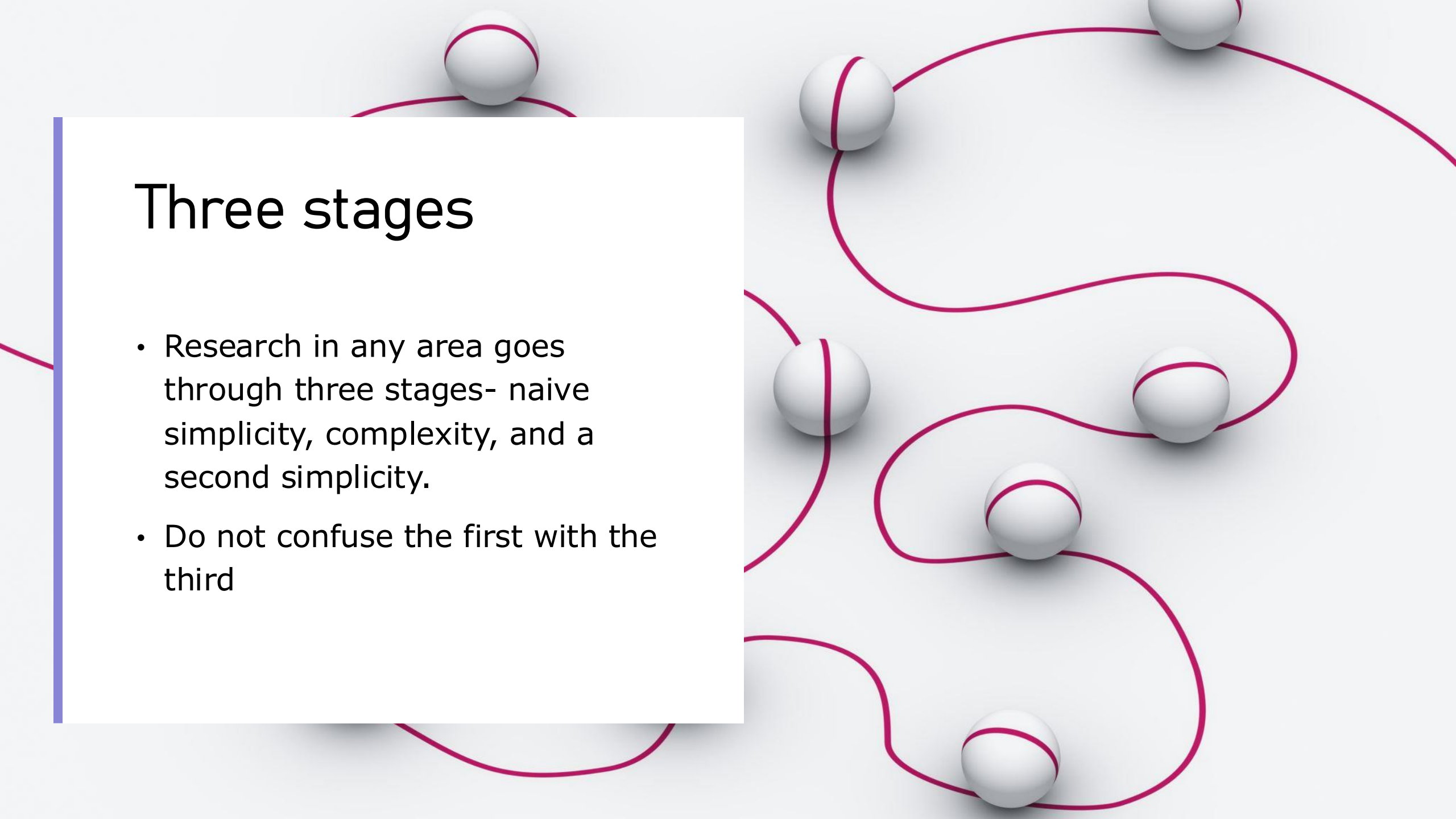
Do good work that can be published

...but don't let publications drive your work.

A few publications with great impact are much better than many publications with no impact.

Three stages

- Research in any area goes through three stages- naive simplicity, complexity, and a second simplicity.
- Do not confuse the first with the third

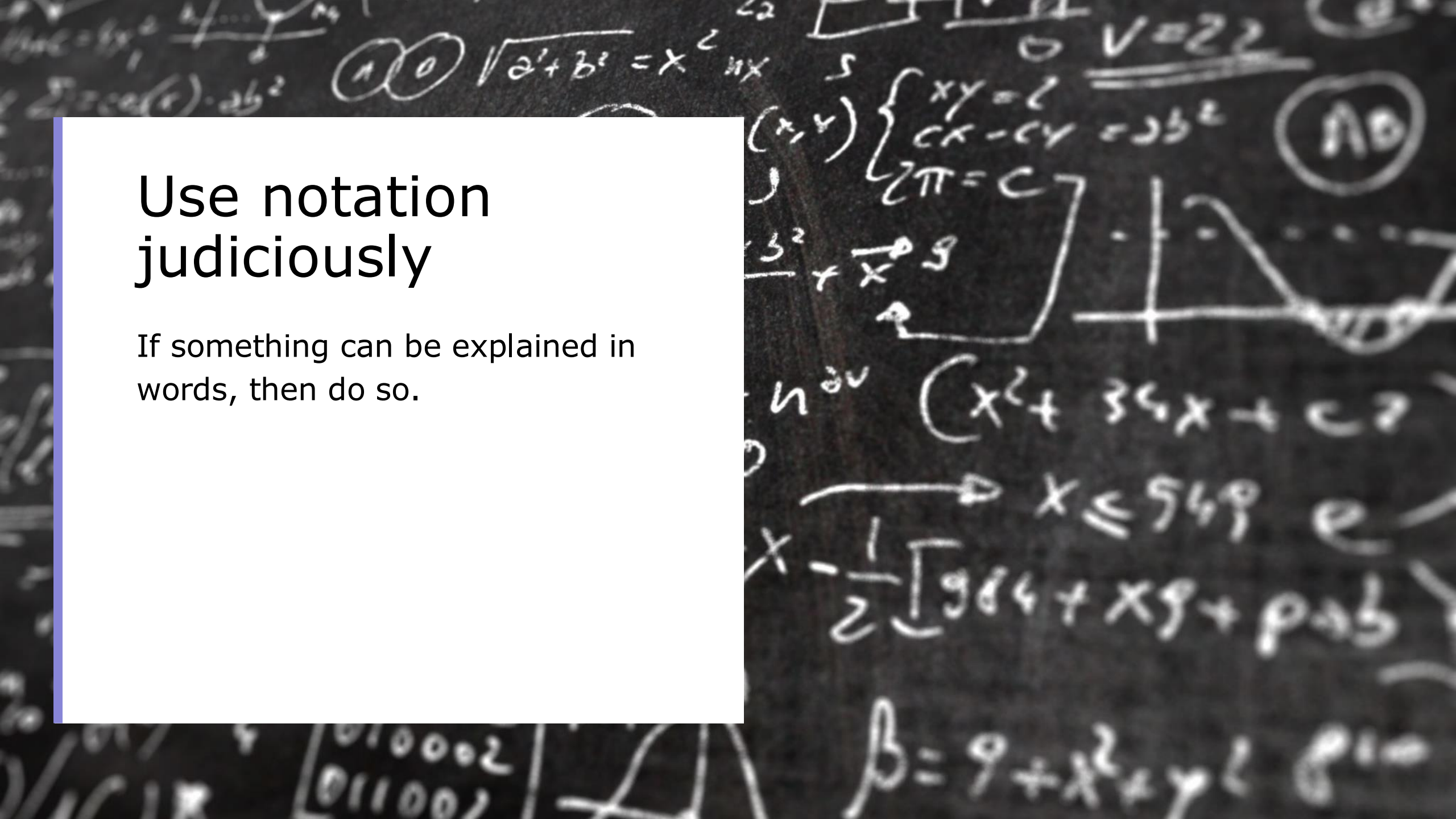


Writing and publishing



Use notation judiciously

If something can be explained in words, then do so.



Strive for precision

Fuzzy writing indicates
fuzzy thinking

Avoid both



Authorship

Don't put your name to a paper unless you believe in the paper and have made a significant contribution

Credit



ALWAYS GIVE CREDIT
WHERE CREDIT IS DUE.



BE GENEROUS.

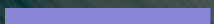
Rejection

Rejection of a paper is your chance to strengthen it.

The best papers are rejected at least once.

You should probably give up after three rejections!

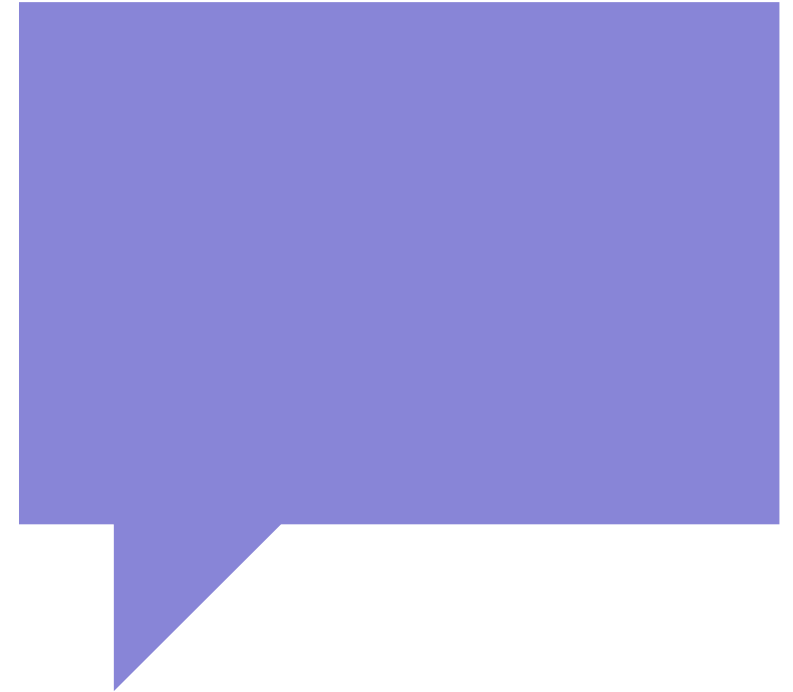
Meta



Credibility

Your research reputation is an invaluable asset.

Don't squander it.



Research website

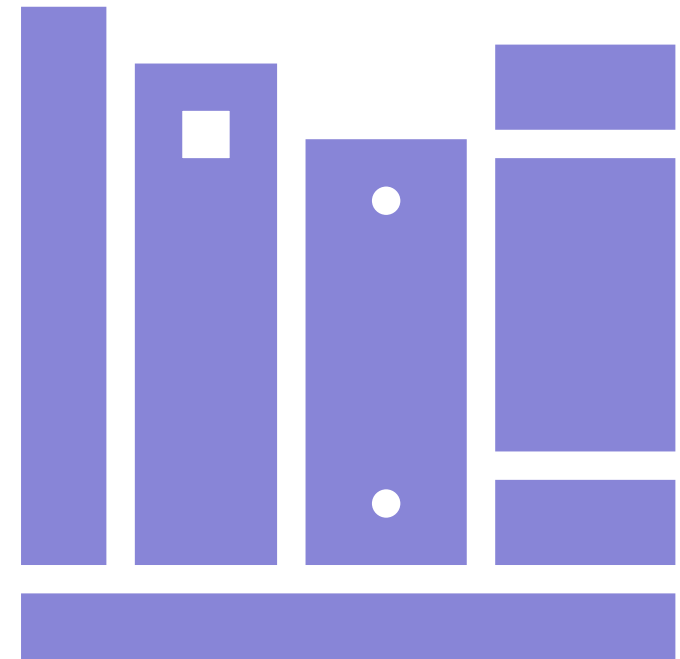
Create a research website and update it frequently.



Be curious

Read widely and attend talks in all areas of research

You never know what may turn out to be relevant!



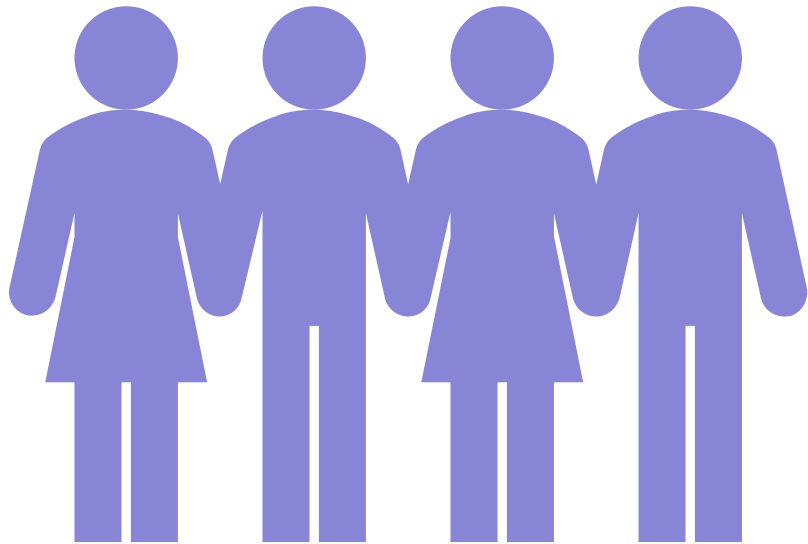


Supervisors

Supervisors and their students should be friendly but are not friends

Join a professional society

It provides a research community for life.





Be passionate about your work

If your research topic does not interest you, it is not going to interest anyone else either.



Ask questions at talks

It keeps you from sleeping



And finally...



Enjoy your work!

THERE IS NO GREATER
THRILL THAN DISCOVERING
SOMETHING NEW!



Attendance
answer