


Quality Research in Affordable Ways

J's Legacy

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Ep1: Seeking skills

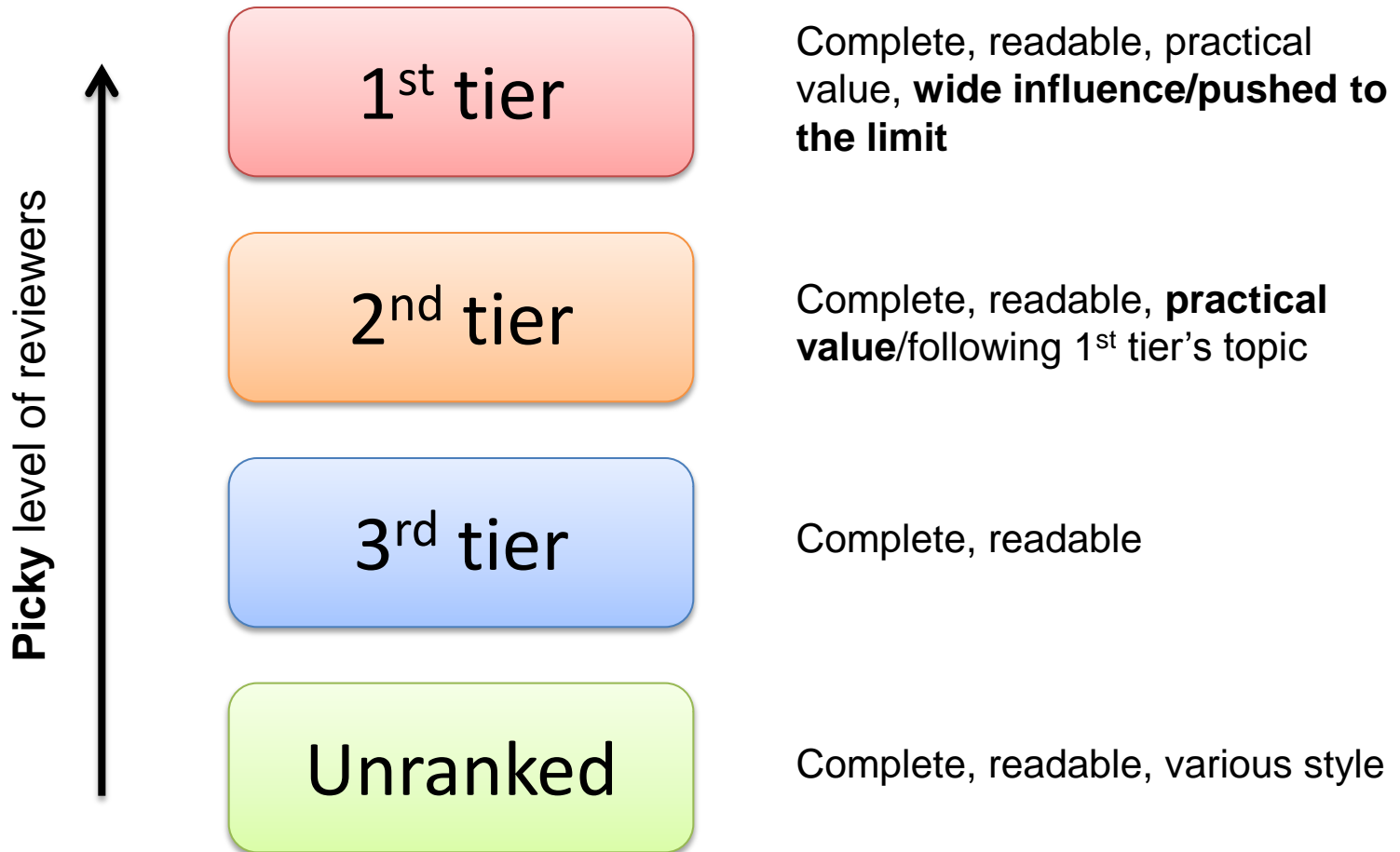
What can I do?



Quality Research

- Quality research creates **values**.
 - Academic value [**our focus**]
 - Accepted by top-ranked conference/journal
 - Social value
 - Get media attention
 - Business value
 - found a startup company
- Quality research thinks about **the real problem** not just the research problem.

Conference Ranking Systems



Avoid instant kills

- Questionable value of your topic
 - *“more generally, I get the feeling that [what we did] is a losing battle ...”*
 - Rejected by **CCS '10**: 3 WAs and 1 WR
- Over-claimed sentence
 - *“Some assertions are stronger and more general (applying to all systems) than supported by evidence presented ...”*
 - Rejected by **CCS '11**: 1 WA, 1BD, and 2WR
- Other **questionable** things you **cannot deny** unless properly addressed by prior literature

Easy Types

- If your major contributions are related to **unquestionable** facts.
 - Attack
 - Say something is bad
 - Analysis
 - Dig out the ugly truth
- Life becomes harder, if you
 - Propose something
 - Say something is good
 - Involved in an arms race
 - Can never claim you are the best
 - Develop pure theory/technology
 - Don't know how it can be used

Your Choices

- **Theory or Application?**
 - Theory: many citations, less engineering work
 - Application: predicable progress, less argument
- **Classic or fashion?**
 - Classic: less competitors, deep insight
 - Fashion: tight schedule, sufficient if touching the point (e.g. sufficient impact)
- Different people have different **talents** and **favors**.

What do you want to do? What can you do?

LOOK INSIDE. FIND YOUR MISSION.

Judgment decided by mission



As a human, no judgment is objective.

No absolutely right or wrong.

Your mission tells the rules of making judgments.

If the thing is consistent with your mission, you **feel** right; otherwise wrong.

A wise mission helps you make a wise judgment.

Be aware of the role of your mission from the beginning.

The way we were told

Fortune



Fame



*If you are expecting these, you probably choose the wrong way.
Try to find a more **honorable** mission.*

The right attitude

Pretend to be a master



The feeling is important.

You will become the person you want to be.

You will only accomplish the mission you want to take.

Pretending to be a master increases your confidence, helps you think **independently**.

Its official name is **autosuggestion**.

You will feel right for the thing you are doing.

You will feel responsible for doing the thing better.

It is not a shame to make mistakes.



It is a shame if you cannot **recover** or **learn** from a mistake.

Find something you are **proud** of,
something you will **never doubt**.



Everyone
is unique
and gifted.

Inner peace
gives you
power.

Back to the earth

- Start from literature reading
 - Learn the **terminology**
 - white-box cryptography, steganalysis, retrospective interference, ...
 - Learn the **assumptions**
 - Research problem is usually simplified based on certain assumptions.
 - Learn the **presentation skills**
 - How to properly define, argue, organize the contents?
 - Learn the **trends**
 - What do people care most?

Literature reading does not directly tell a good research idea.

- If you are **reading** a paper accepted by a **top-tier** conference, and you find:
 - Limitations
 - Most limitations are **inherent** limitations.
 - It cannot be resolved if the problem settings are not significantly changed.
 - Future work
 - The **hardcore** work that the authors doesn't want to touch.
 - It can be accomplished if you have more resources.
 - The **dirty** work
 - It is a just implementation issue, not so valuable.

But attending a conference gives good insights

- If you are **attending** a paper presentation at a **top-tier** conference, and you find:
 - Questions
 - Unaddressed or unclarified issues **pinpointed** by experts
 - Comments
 - Significance and **value** of a paper
 - Usually only interesting papers got comments
 - Tell whether you should follow this research direction
 - Discussions
 - Potential future work **valued** by experts
 - They will acknowledge your contribution if you can answer their questions raised during a discussion
 - Mental association and analogy
 - **Similar** but not the same idea for a good research topic
 - If this paper can be accepted, my work on similar topic or technical depth should also have a chance to be accepted.

Confirm your idea

Think beyond the research problem



The **simplified** research problem (e.g. related to a specific forest)

Remove all academic assumptions



Stop. The problem is **fictional**.



Go on. The problem is **real**.

Refine your idea

Discover the implications

3rd tier paper



Your research
is about a leaf.

*Your research may be the same, but the
outcome can be totally different.*

2nd tier paper



Your research about a
leaf impacts a forest.

1st tier paper



Your research
about a leaf impacts
the whole planet.

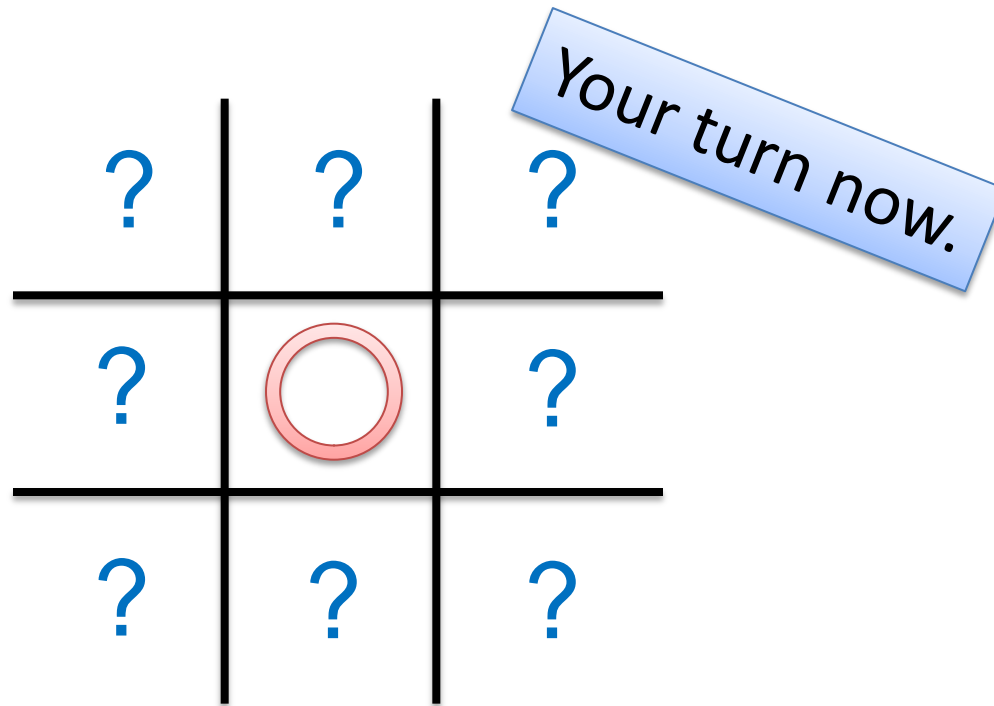
Understand the reviews

- Common meanings of scores
 - Strong accept (SA)
 - I like it very much. The reviewer must be a real expert.
 - Accept (A)
 - The highest score given by a non-expert reviewer.
 - Weak Accept (WA)
 - The work is good enough. The highest score given by a hostile reviewer.
 - Borderline (BD)
 - The work can somehow be improved.
 - Weak Reject (WR)
 - The work has major drawbacks.
 - Reject (R)
 - The work goes in the wrong direction. It is totally meaningless.
 - Strong Reject (SR)
 - I feel threatened by letting the work published.

Pinpoint the positive feedbacks

- You are on the right track. 😊
 - *“An improved version of this paper will advance the field, and I encourage the authors to continue this line of research. We need more such papers ...”*
 - *“I am borderline for this paper: while the proposed concept is interesting and [what we try to solve] are an interesting problems, ...”*
- You may be on the wrong track. ☹️
 - *“more generally, I get the feeling that [what we did] is a losing battle ...”*

Make the judgment early



Tic-Tac-Toe Game

A good question to think about.

Doctor of **Philosophy** (Ph.D.)
or Doctor of **Engineering** (D.Eng.)?

The skills shown here are essentially strategic thinking.
Strategic thinking may corrupt your integrity.
Please use it defensively.

WARNING

Final words

FOLLOW YOUR HEART

Ep2: Working skills

How can I do it?



Work efficiently and sustainably

- Smart working or hard working?
 - **Smart** working
 - Find an easy way to accomplish something.
 - **Hard** working
 - Keep working until the mission completed.
- We need both.
 - Make sure when you work, your work produces results.
 - *Time and youth are most valuable resources.*

A plan makes you work



Try to make progress everyday.

Most people feel reluctant to work.

Deadline-oriented planning sets an objective that motivates you more effectively.

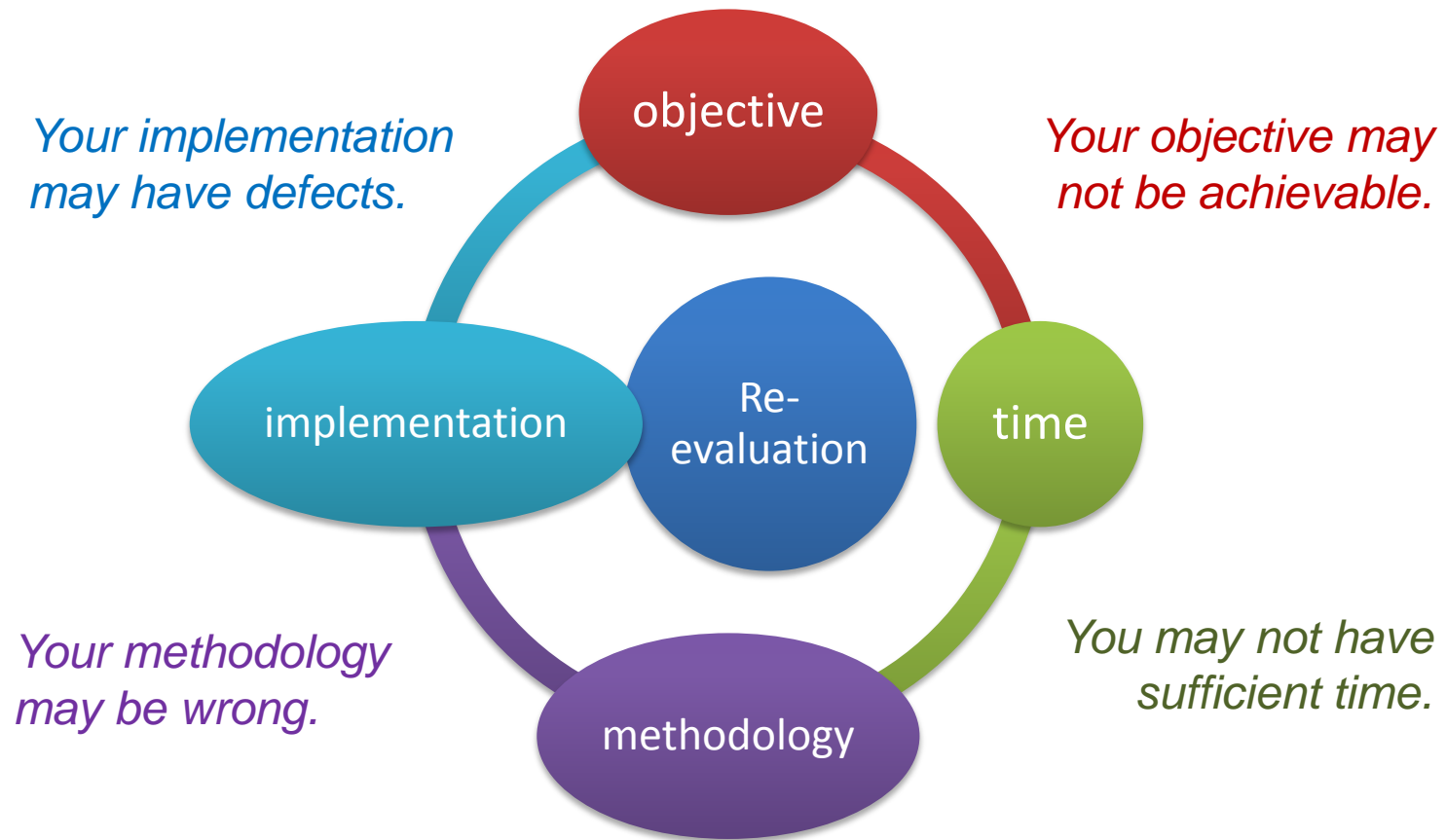
A **reasonable** plan shows the feasibility of catching the deadline.

A plan keeps you working and helps you track the progress.

Paper-driven scheduling

- **The space of a paper is limited.**
 - Top tier conference: 8000~9000 word limit
 - Other: even less space
- Raise the **priority** of the tasks that may contribute to the paper content.
 - Resolve the uncertainty in **key selling points** first.
 - Do **necessary implementation** only.
 - Save more time for **paper writing**.
 - If time is so limited, write the paper **as earlier as possible**, and do the other things simultaneously.

A good plan is not fixed



Feel tired? Bored?

Research Work



Thinking required for each move.
Your brain consumes more energy.

Casual Activity



Just **Clicking**.
Your body consumes more energy.

Feel sick? Dying?



Back pain



Eye disease
(e.g. myopia)



Skin disease
(e.g. toasted skin syndrome)

*Be aware of **Karoshi** (i.e. death from overwork)*

A small cup makes you healthier



Large bottle



Small cup

A small cup contains little water.

You feel thirsty more frequently.

You **have to** stand up and walk to refill the water.

Your sitting time decreases.

The radiation exposure time also decreases.

Work Under the Interference (WUI)



WUI conditions include all the previously mentioned negative conditions, and also **emotional interference**.

WUI reduces the efficiency and increase the error rate.

WUI may completely deplete your thinking ability.

You usually save time for getting rid of **WUI** status before working.

Deadly Stress

Stress (Internal, Feel) != Pressure (External, Fact)



**Source: American Psychological Association's "Stress in America" report, 2010*

How to Stress Less



IQmatrix.com

IQX0168p

“Adopting the right attitude can convert a negative stress into a positive one.” ~ Hans Selye

Mind clearing technology



Play **Fruit Ninja**
(NOT other game)



Wander in **the Circle**
(available 24/7)

Time Segmentation



Doing the **right thing** at the **right time** will save your time.

Legend:

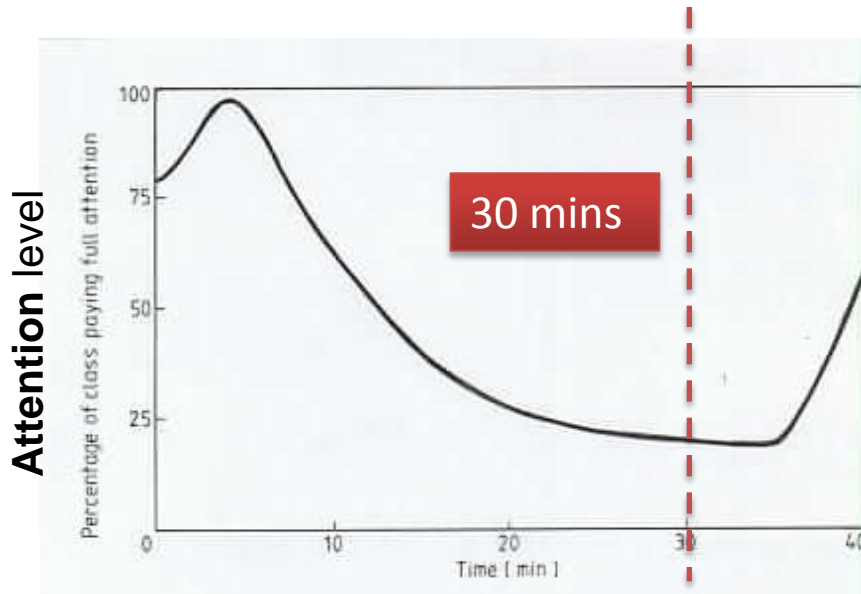
Best for thinking

Just rest

Any tasks

Only brainless tasks

Less is More



*Attention span of students
for a 40-mins class*

You can focus your attention only for a short time (**less than 1 hour**).

If you are doing something complex, you will need a long time segment.

To avoid from feeling tired or bored, divide the tasks into several steps, where each step takes only a short time segment.

Use planned resting.

0.8hr + 0.8hr > 2hrs

Coffee and Tea



Coffee and tea keep you **awake**,
but don't keep you **thinking**.



Try to take a **nap** next time.



You are not alone

Isolation does no good.
Collaboration makes us strong.

Most of our major competitors
are working in team.

How are you going to compete
with them?

Let's team up!

Voiceover:

Isolation caused Kryptonians to lose their opportunity to leave Krypton, and eventually led to the extinction of Superman.

Good Teamwork: 1 + 1 > 2

- Key features of a good teammate:
 - **Trustworthy**
 - Be aware that your teammate may steal your idea.
 - **Responsible**
 - Have a sense of time.
 - Continue the task when you feel tired, bored, disgusting, sick, ...
 - **Prudential**
 - Validate the outcome before sharing.
 - **Independent**
 - Work separately without detailed instructions.
 - Inspire you with new information or thoughts.
 - **Complementary**
 - Do the thing you cannot do.

Meeting Time

- The purpose of a meeting:
 - Brainstorm for **hard** problems.
 - Share the **new** progress within a **big** team.
 - Introduce **new** team members.
 - Report the **new** progress to supervisors.
- Reduce **unnecessary** meetings
 - Too many meetings waste time and disturb the tasks requiring long time segments.
- Make an **agenda** before every meeting.

Take care of yourself.

Everything else can wait.

It is worth the effort to find good teammates.

There is no big difference between individuals, but there is between teams.

KEY ADVICES

Final words

**TIME IS NOT IMPORTANT;
EFFICIENCY IS.**

Ep3: Presentation skills

How should I present it?



Effective Expression

- Express **what you want** to express to the **right audience** in a language they **understand**.
 - Be concise
 - Avoid misunderstanding
 - Defend yourself
- Non-interaction presentation
 - Paper writing
- Interactive presentation
 - Oral talk

Your Role



Jean-Luc said “you are the host and the audience are the guests”.

In fact, your guests are not willing to come even if you sincerely invite them, as you are their **competitor**.

You have to be more aggressive.

You are now a **missionary** who are going to convert “heretics”.

In the area of information security, you are a missionary who sends the black mail (i.e. your paper) to “terrify” the reviewers.

Reviewer Characteristics

- For a top-tier conference, you will get comments from 4~5 reviewers.
 - Your paper was disqualified in the early stage of multi-stage review if it only got 2 or less reviews.
 - Your paper usually focuses on a **very specific** topic.
 - At most 1 reviewer may claim to be an expert.
 - The other reviewers will be in medium or low confidence.
 - Most reviewers are usually not familiar with what you are doing.
- One reviewer, one vote.

Clarify your scope

- Difficult than you might think.
 - **Overstated**
 - *“Some assertions are stronger and more general (applying to all systems) than supported by evidence presented ...”*
 - Even disagreeing in minor point may result in instant kill.
 - **Understated**
 - *“The key insights in the paper aren't very deep.”*
 - Demean your contribution.
 - **Not stated**
 - *“There is a mismatch between the security claims, the threat model, and the proposed approach ... The type of [an attack technology] is not specified.”*
 - Unstated facts may also result in instant kill.

Show the difference

- Avoid the term 'NOVEL'
 - Most things are **conceptually similar** to some other things that appeared before.
- Show the key facts:
 - Why is the **problem** important?
 - Does your **solution** solve the problem?
 - How better your **solution** is comparing with prior work?
 - What is the **key finding** not discovered by prior work?
 - What is the implication of your **key finding**?

Deal with limitations

Enjoy 30%

Discount

by visiting our store
before 2013.

T&C apply.

Terms and conditions: The
discount rate is valid only for
purchase amount over \$1000.

Spend \$1000 or
more to enjoy
30% discount in
our store before
2013.

*Make sure that the **first** limitation
appears after all your major benefits.*

Result-driven paper layout

- Organize the paper to express your **key findings** to its maximum extent.
 - Follow a template **only when** you have no idea how to organize your contents.
 - Always re-evaluate the **necessity** and **relevance** of a content.
 - Fit into 8000~9000 or even smaller word limit.
 - Present **attractive** key findings as soon as possible.
 - The reviewer loses patience after a long reading.

Common Sections

Recommended
writing order:

1 6

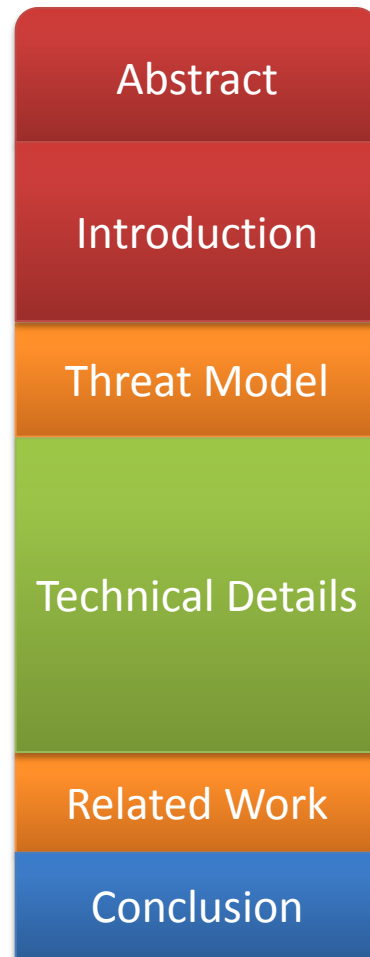
2 7

3

4

5

8



Summarize the key findings and decide the tone of the paper.

Introduce the problem, show the difference, and emphasize the implication of your key findings.

Clarify your scope.

Provide necessary support for your findings. All the key contents need to be justified.

Re-emphasize the difference, and discuss the limitations.

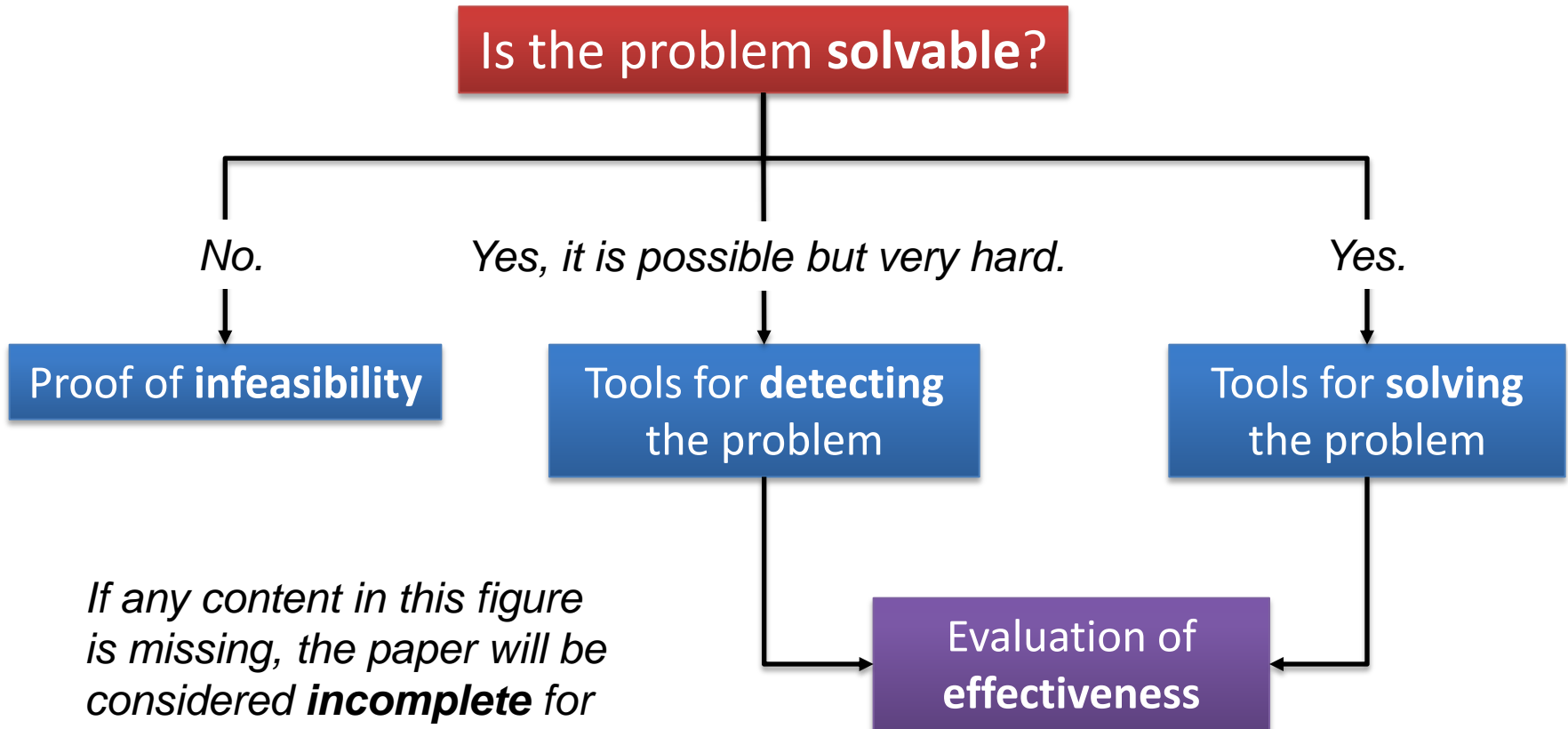
Re-state the key findings concisely, and give the vision if space is available.

Related Work can be moved to the position between Introduction and Threat Model.

Related Work and Threat Model are optional in a short paper.

Limitations can be a separate section before Related Work.

Content completeness



*If any content in this figure is missing, the paper will be considered **incomplete** for a top tier conference.*

Formula/Symbol?

Do you want to become an IEEE author?

$$1 + 1 = 2$$



$$\ln(e) + (\sin^2 \theta + \cos^2 \theta) = \sum_{n=0}^{n=\infty} \frac{1}{2^n}$$



$$\ln \left[\lim_{z \rightarrow 0} \left(1 + \frac{1}{z} \right)^z \right] + (\sin^2 \theta + \cos^2 \theta) = \sum_{n=0}^{n=\infty} \frac{\cosh y \sqrt{1 - \tanh^2 y}}{2^n}$$



More complex formula ...

*Avoid using abstract symbols unless they are more **concise** than human language.*

Pseudo-objective

Our solution is able to speed up the computation **by 500%** and reduce the CPU and memory usage **by 20%**. But it is completely incompatible with the existing systems, which may requires 6 months or more to implement and deploy our solution. Other extra costs may be involved.

Our solution is able to speed up the computation **by 500%** and reduce the CPU and memory usage **by 20%**.

...

...

...

Although our solution requires modifying the existing systems to be integrated, it is just a **one-time cost** especially after considering its **great advantages**.

*Only tell the **partial** truth that benefit you.
Be aware that the partial truth could be a **lie**.*

Connect Sentences

Yesterday was **Monday**.

Working day?

It was a holiday.

I went to my **grandma's** house.

Why not going to school?

My grandma was sick. My uncle was taking care of her.

I had lunch with my **uncle**.

Why not being with your grandma?

My teacher is my grandma's friend. I told her about that.

My **teacher** also came.

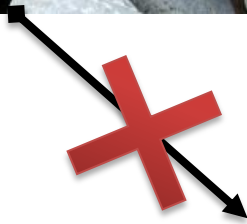
Why did your teacher come?

You may need more sentences to connect the key points that you want to express. Otherwise the readers will feel confused.

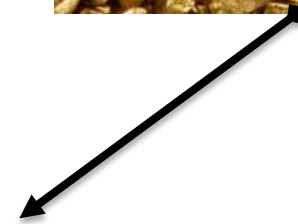
Pre-review

- Pre-review helps to find out the problems that **you cannot find by yourself**.
 - You are too familiar with the contents.
 - You focus too much on the details.
 - Lookers-on see most of the game.
 - It is easy to criticize **others**.
- You need three types of reviewers:
 - Who is **familiar** with your work
 - Who **knows nothing** about your work
 - Who has good **language** skills

Polish



*Polish is a **deceptive** term, which seems to indicate that it is possible to convert stone into gold.*



*Only the real gold can be polished to exhibit its supreme value. Always focus your **contents** first.*

Technical Depth

FORMULA + IMPLEMENTATION + DATA

*Generalize the
scope and
applicability*

*Show the
feasibility and
labor*

*Support the
findings and
implications*

Good **argument** and **reasoning** are important but do **NOT** contribute to **technical depth** in the field of computer science.

The **ultimate writing** skill:

*Think like a good **storyteller**.*

***Anticipate** the expectation/reaction of your readers.*

READ LIKE A READER

You need a **reason** to be rejected

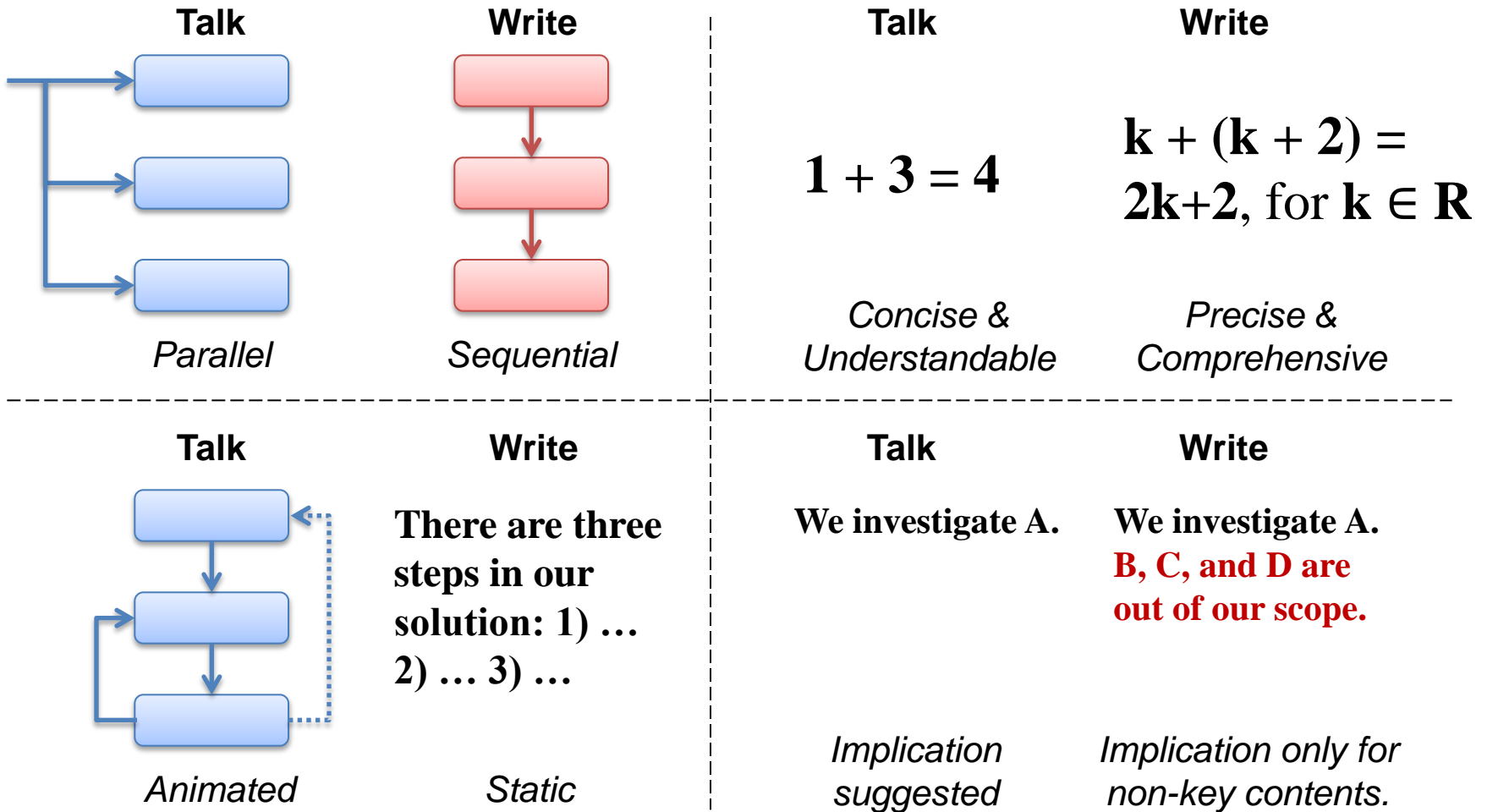


An accepted paper may not be an interesting paper but must be a hard-to-reject paper.

Audience Psychology

- Conference talk has a time limit.
 - 20 minutes or fewer
- Audience have various background knowledge.
 - Most audience are not familiar with what you are doing.
 - They are not expecting to know **all** the technical details.
 - They want to learn something they don't know before, and feel better if you can give some **unusual insights**.
 - They feel **bored** if they know everything you talk.
- **Golden ratio**
 - 90% understandable + 10% mystery
 - Your **problem** and **key findings** must be clarified.

Differences between talking and writing



Implication

Telling without speaking

We will focus on this problem.

We will not discuss all the other problems.

This assumption is widely used in prior literature.

We are not going to justify this assumption.

Their solution needs almost \$30k to deploy.

Our solution is much cheaper.

We will leave it for future work.

We have some trouble to deal with it.

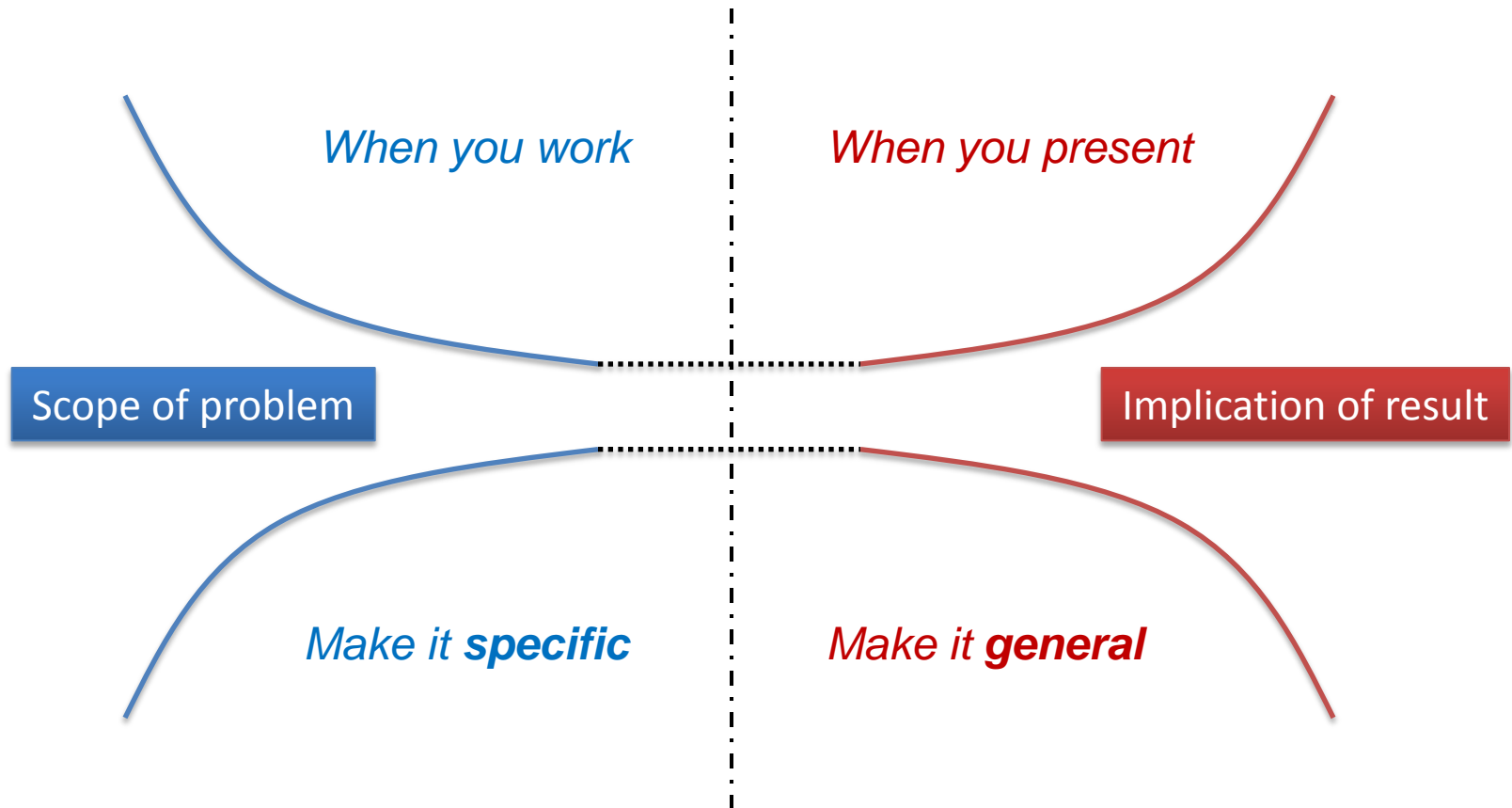
*The proper use of implication **saves many words**, and makes your presentation more **objective** and **polite**. Be aware that **every word** you said has an implication.*

Be considerate

- Abc 40pt
- Abc 36pt
- Abc 32pt - preferred
- Abc 28pt
- Abc 24pt
- Abc 20pt
- Abc 18pt - minimal font size
- Abc 16pt - too small
- Abc 14pt
- Abc 12pt

- Black
- Dark red
- Dark blue
- Dark green
- Golden
- Purple - low contrast below
- Green
- Light blue
- Orange
- Yellow

Difference between working and presenting



Acceptance is not guaranteed.

NOTICE

Final words

**RESPECT YOUR AUDIENCE;
SPEAK HUMAN LANGUAGE.**