Reflection Activity

1. Why might we care about scientific communication?
   When will we need to communicate science?

2. What makes you feel that any communication has been successful?
   As a receiver?
   As a sender?

What makes you feel that communication has been successful?

As a receiver?

Clear message, logic flows, you can find your way around, visual appeal

As a sender?

Reward (citation, grade, funding), good feedback: questions or criticism

We often blame ourselves for struggling to understand talks or papers…

> "I got stuck here. I feel like there was a huge logical leap I couldn't follow."

> "There's way too much going on in this plot. What am I supposed to be looking at?"

but poor communication is often the barrier, not your scientific understanding.

In these workshops, we'll turn your instincts as a reader of science into tools for identifying…

- WHEN scientific communication is confusing
- WHY it's confusing
- HOW to fix the problem

…and start applying these tools to your 20.109 work.

What we'll do in a workshop:

1. Discuss an example from the field
2. Derive principles and strategies
3. Practice strategies
4. Go home with a checklist/rubric

Practice with a fellow at the

be.mit.edu/communicationlab

MIT BIOLOGICAL ENGINEERING
COMMUNICATION LAB

20.109 Communication Workshop 1: Titles and Abstracts

Untitled
Mark Rothko, 1968
Phillips Collection (Washington, DC)

Dr. Prerna Bhargava and Dr. Sean Clarke
BE Communication Lab Instructors

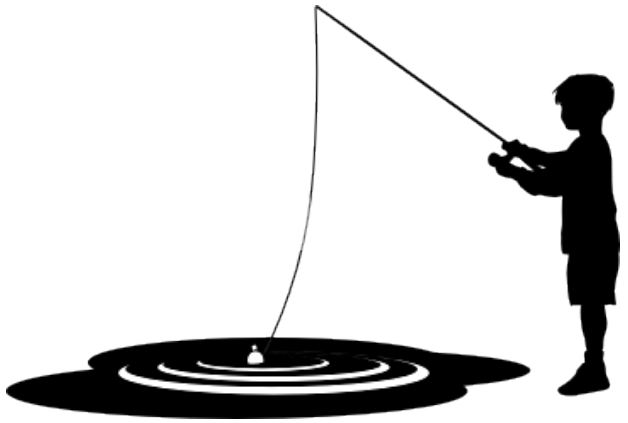
Helping you communicate effectively.
be.mit.edu/communicationlab

Titles & Abstracts:
Why do they matter?

Attracting your audience: first judgment

Influencing whether someone will read or cite your paper

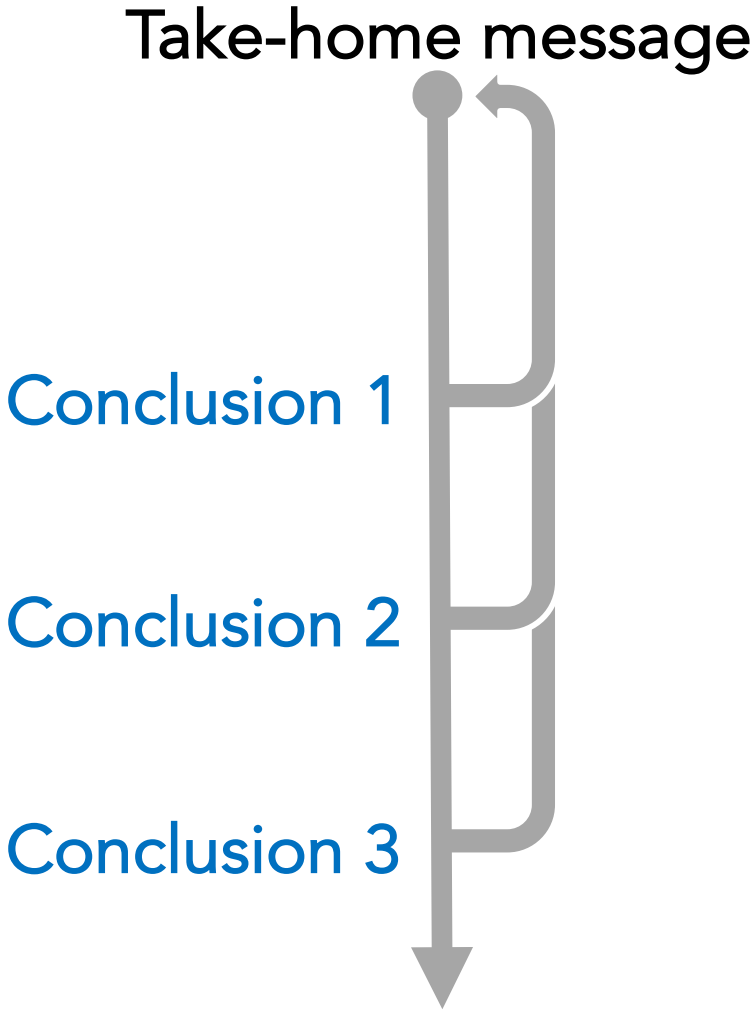
Indexing – Will readers even find your paper?



Titles & Abstracts:
Who is your audience?

- People in your field
- Editors, reviewers
- Researchers outside your field
- Students like you!
- Reporters
- Funders, politicians
- Anyone looking for information

Your abstract and title convey your central hypothesis and take-home message.



Why was this an important study?

How does it further scientific thinking?

Why should anyone read your paper?

Titles

Think about the last lit search you did.

You probably picked what to read based largely on the title!

Search results

Items: 1 to 20 of 573

<< First < Prev Page 1 of 29 Next > Last >>

1. Onychomycosis due to dermatophytes species in Iran: Prevalence rates, causative agents, predisposing factors and diagnosis based on microscopic morphometric findings.
   Babayani M, Salari S, Hashemi SJ, Ghasemi Nejad Almani P, Fattahi A.
   J Mycol Med. 2018 Feb 12. pii: S1156-5233(17)30288-3. doi: 10.1016/j.mycmed.2017.12.009. [Epub ahead of print]
   PMID: 29449074
   Similar articles

2. The *Troika* Host-Pathogen-Extrinsic Factors in Tuberculosis: Modulating Inflammation and Clinical Outcomes.
   Bastos HN, Osório NS, Gagneux S, Comas I, Saraiva M.
   Front Immunol. 2018 Jan 9;8:1948. doi: 10.3389/fimmu.2017.01948. eCollection 2017. Review.
   PMID: 29375571 **Free PMC Article**
   Similar articles

3. Assessment of ocular toxoplasmosis patients reported at a tertiary center in the northeast of Iran.
   Hosseini S, Moghaddas E, Sharifi K, Moghaddam MD, Shamsian SA.
   Int Ophthalmol. 2018 Jan 15. doi: 10.1007/s10792-017-0764-3. [Epub ahead of print]
   PMID: 29335806
   Similar articles

4. Fauna, Ecological Characteristics, and Checklist of the Mosquitoes in Mazandaran Province, Northern Iran.
   Nikookar SH, Fazeli-Dinan M, Azari-Hamidian S, Nasab SNM, Aarabi M, Ziapour SP, Enayati A, Hemingway J.
   J Med Entomol. 2018 Jan 6. doi: 10.1093/jme/tjx228. [Epub ahead of print]
   PMID: 29325101
   Similar articles

5. On the relationship of anthranilic derivatives structure and the FXR (Farnesoid X receptor) agonist activity.
   Kronenberger T, Windshügel B, Wrenger C, Honorio KM, Maltarollo VG.
   J Biomol Struct Dyn. 2018 Jan 10:1-14. doi: 10.1080/07391102.2017.1417161. [Epub ahead of print]
   PMID: 29237358

Effective titles are messages:

What did you find? So what?

A survey of small molecules with ligand binding activity

vs.

Conserved hydroxyl and carbonyl ligand structures are implicated in high-affinity receptor binding

Frame titles for your audience

The level of detail can vary for the same paper

Inulin modulates conspecific antagonism towards vancomycin-resistant *B. subtilis* strain BF819 in the human gut microbiome

vs.

A human gut commensal exhibits targeted antagonism towards an antibiotic-resistant clinical counterpart

Build and simplify your title with key terms

KEY NOUNS

KEY VERBS

Novel methods for early prediction of undesirable interference by microbial inhabitants of the human gut with metabolism of the cardiac drug digoxin give rise to strategies for alleviating drug inactivation

NEW AND IMPROVED TITLE

Predicting and alleviating drug interference by human gut microbiome

TOO SIMPLIFIED = LESS INFORMATIVE

Novel methods for prediction of drug interference

How might we modify this title?

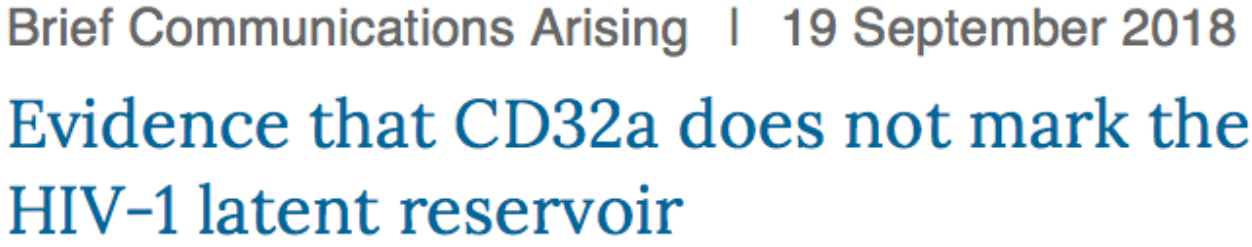
Surveying somatic mutations in P53, EGFR, BRCA1, and HRAS for impact on MCF7 tumors with heterogeneous cell composition.

Replace jargon to attract a broader audience

Surveying the impact of breast cancer oncogenes on tumor heterogeneity

If your story doesn't seem conclusive, what can you do?

- Tell your story in a different way--focus on the technology? what did you learn?
- Convey a message of negative results



- Write a descriptive title that is as clear and interesting as possible

Abstracts

Unscramble this real abstract

In 5 minutes:

- Read all the sentences
- Look for signaling language
- Number the sentences in logical order

Clonal dynamics of native haematopoiesis.

Nature. 2014 Oct 16; 514(7522): 322–327.
Sun J, Ramos A, Chapman B, Johnnidis JB, Le L, Ho YJ, Klein A, Hofmann O, Camargo FD.

Assemble this abstract

1. It is currently thought that life-long blood cell production is driven by the action of a small number of multipotent haematopoietic stem cells.

2. Evidence supporting this view has been largely acquired through the use of functional assays involving transplantation.

3. However, whether these mechanisms also govern native non-transplant haematopoiesis is entirely unclear.

4. Here we have established a novel experimental model in mice where cells can be uniquely and genetically labelled *in situ* to address this question.

5. Using this approach, we have performed longitudinal analyses of clonal dynamics in adult mice that reveal unprecedented features of native haematopoiesis.

6. In contrast to what occurs following transplantation, steady-state blood production is maintained by the successive recruitment of thousands of clones, each with a minimal contribution to mature progeny.

7. Our results demonstrate that a large number of long-lived progenitors, rather than classically defined haematopoietic stem cells, are the main drivers of steady-state haematopoiesis during most of adulthood.

8. Our results also have implications for understanding the cellular origin of haematopoietic disease.

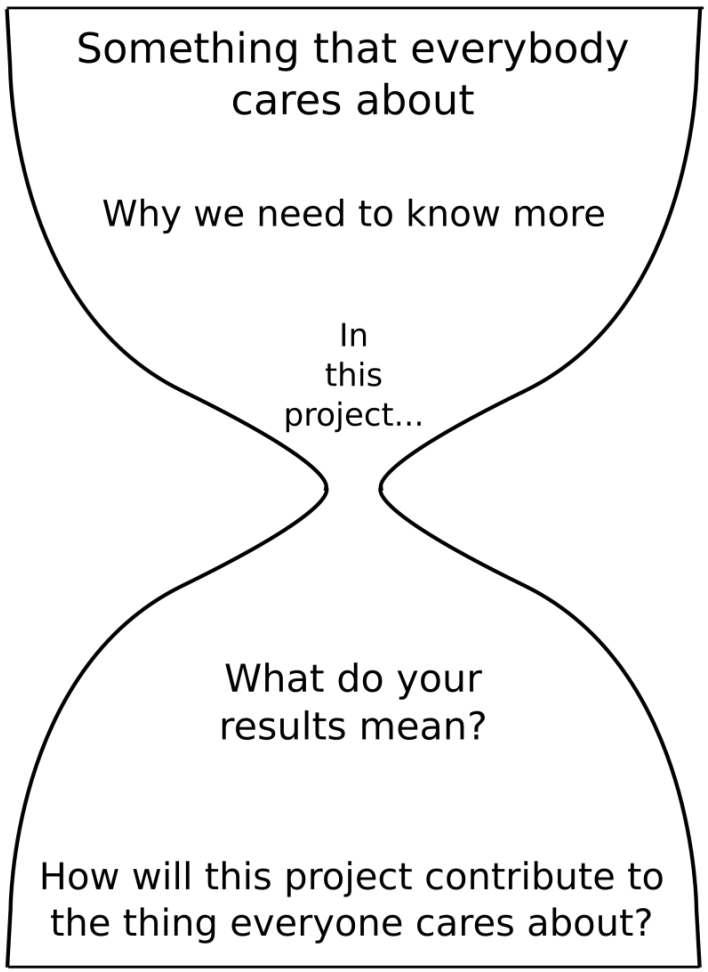
Clonal dynamics of native haematopoiesis.

Sun J, Ramos A, Chapman B, Johnnidis JB, Le L, Ho YJ, Klein A, Hofmann O, Camargo FD.

Abstract

It is currently thought that life-long blood cell production is driven by the action of a small number of multipotent haematopoietic stem cells. Evidence supporting this view has been largely acquired through the use of functional assays involving transplantation. However, whether these mechanisms also govern native non-transplant haematopoiesis is entirely unclear. Here we have established a novel experimental model in mice where cells can be uniquely and genetically labelled in situ to address this question. Using this approach, we have performed longitudinal analyses of clonal dynamics in adult mice that reveal unprecedented features of native haematopoiesis. In contrast to what occurs following transplantation, steady-state blood production is maintained by the successive recruitment of thousands of clones, each with a minimal contribution to mature progeny. Our results demonstrate that a large number of long-lived progenitors, rather than classically defined haematopoietic stem cells, are the main drivers of steady-state haematopoiesis during most of adulthood. Our results also have implications for understanding the cellular origin of haematopoietic disease.

An effective abstract is an hourglass-shaped message.



General background

Specific background

Knowledge gap, Unknown

HERE WE SHOW...

Results

Implication

Significance

The hourglass structure mapped onto our abstract

1. It is currently thought that life-long blood cell production is driven by the action of a small number of multipotent haematopoietic stem cells.

General background

2. Evidence supporting this view has been largely acquired through the use of functional assays involving transplantation.

Specific background

3. However, whether these mechanisms also govern native non-transplant haematopoiesis is entirely unclear.

Knowledge gap, Unknown

4. Here we have established a novel experimental model in mice where cells can be uniquely and genetically labelled *in situ* to address this question.

HERE WE SHOW…

5. Using this approach, we have performed longitudinal analyses of clonal dynamics in adult mice that reveal unprecedented features of native haematopoiesis.

Results

6. In contrast to what occurs following transplantation, steady-state blood production is maintained by the successive recruitment of thousands of clones, each with a minimal contribution to mature progeny.

Results

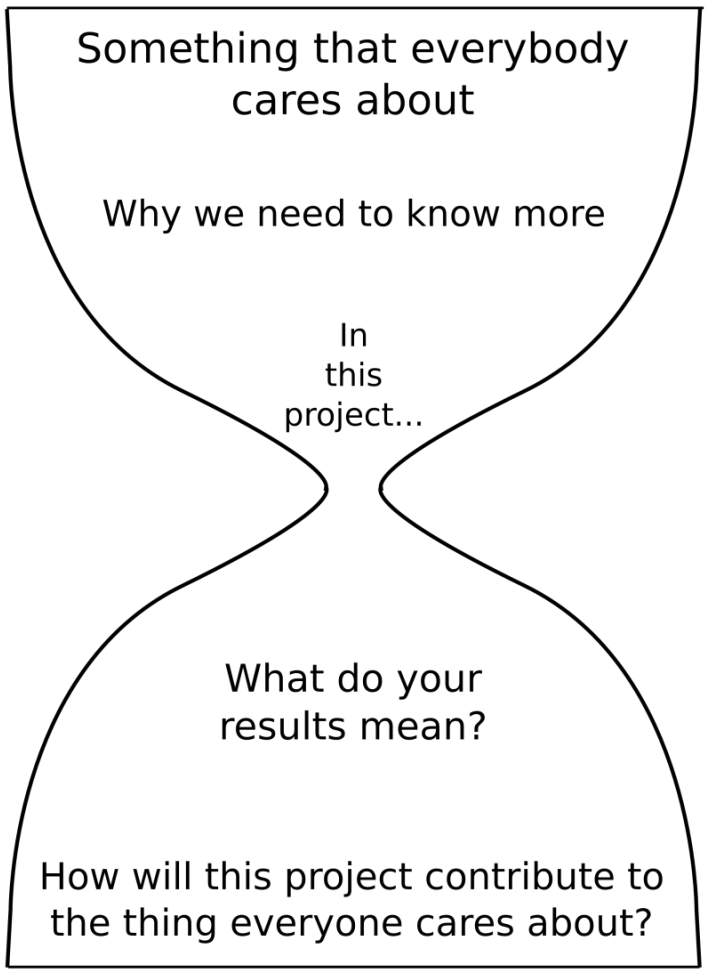
7. Our results demonstrate that a large number of long-lived progenitors, rather than classically defined haematopoietic stem cells, are the main drivers of steady-state haematopoiesis during most of adulthood.

Implication

8. Our results also have implications for understanding the cellular origin of haematopoietic disease.

Significance

Create an argument to convince readers that your work is important



General background

Specific background

Knowledge gap, Unknown

HERE WE SHOW...

Results

Implication

Significance

argument = claim + evidence + reasoning

Claim	A statement of our understanding about a phenomenon, about the outcome of a study, or about the author's view of the field
Evidence	Data to support the claim
Reasoning	Justification of the claim that shows **how** the evidence specifically supports the claim

Your abstract should contain at least one claim, which is your take home message

Here we have established a novel experimental model in mice where cells can be uniquely and genetically labelled *in situ* to address this question.	**HERE WE SHOW… (CLAIM)**
Using this approach, we have performed longitudinal analyses of clonal dynamics in adult mice that reveal unprecedented features of native haematopoiesis.	**Results (Evidence)**
In contrast to what occurs following transplantation, steady-state blood production is maintained by the successive recruitment of thousands of clones, each with a minimal contribution to mature progeny.	**Results (Evidence)**
Our results demonstrate that a large number of long-lived progenitors, rather than classically defined haematopoietic stem cells, are the main drivers of steady-state haematopoiesis during most of adulthood.	**Implication (Reasoning)**

The knowledge gap and “here we show” are typically next to each other, creating a logical flow for the reader.

However, whether these mechanisms also govern native non-transplant haematopoiesis is entirely unclear.

Knowledge gap, Unknown

Here we have established a novel experimental model in mice where cells can be uniquely and genetically labelled *in situ* to address this question.

HERE WE SHOW…

From this “here we show” statement, what would you expect the title of the paper to be?

Title and here we show reflect content

Clonal dynamics of native haematopoiesis.

However, whether these mechanisms also govern native non-transplant haematopoiesis is entirely unclear.

Knowledge gap, Unknown

Here we have established a novel experimental model in mice where cells can be uniquely and genetically labelled *in situ* to address this question.

HERE WE SHOW…

Your results should reflect your take home message

Technology Focus

Here we show that RNA-seq can be used to identify mechanisms of drug action within a cell.

1. What data did you use?
2. What analysis tools?
3. Did you find any interesting pathways?

Biology Focus

Here we use a cell viability assay and analysis of RNA-seq data to understand the mechanism through which target cells have increased survival after drug treatment.

1. What did you learn about the mechanism from these assays?
2. What can you do next?

What level of detail should you include for your results?

Signaling words help guide the reader

Question + Experiment	Results	Answer/ Conclusion	Implication
To determine whether…, we…	We found…	We conclude that…	These results suggest that…
We asked whether…	Our results show…	Thus,…	These results may play a role in…
To answer this question, we…	Here we report…	These results indicate that…	Y can be used to…
X was studied by…			

Read lots of abstracts and collect useful phrases, choose clarity over originality.

Tense in abstracts is a little tricky

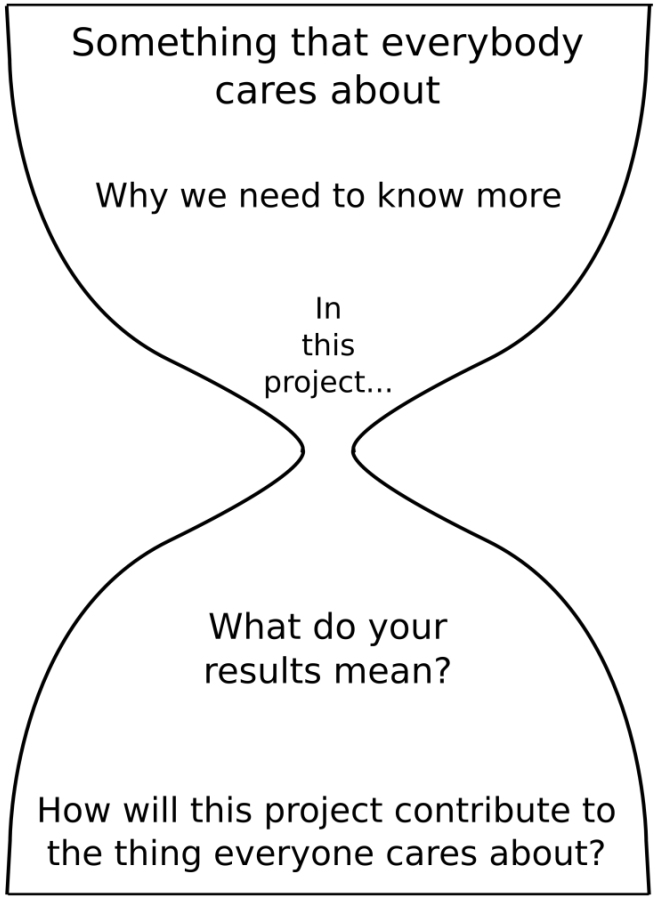
Present Tense | Past Tense

Abstract

It is currently thought that life-long blood cell production is driven by the action of a small number of multipotent haematopoietic stem cells. Evidence supporting this view has been largely acquired through the use of functional assays involving transplantation. However, whether these mechanisms also govern native non-transplant haematopoiesis is entirely unclear. Here we have established a novel experimental model in mice where cells can be uniquely and genetically labelled in situ to address this question. Using this approach, we have performed longitudinal analyses of clonal dynamics in adult mice that reveal unprecedented features of native haematopoiesis. In contrast to what occurs following transplantation, steady-state blood production is maintained by the successive recruitment of thousands of clones, each with a minimal contribution to mature progeny. Our results demonstrate that a large number of long-lived progenitors, rather than classically defined haematopoietic stem cells, are the main drivers of steady-state haematopoiesis during most of adulthood. Our results also have implications for understanding the cellular origin of haematopoietic disease.

When drafting your abstracts and titles, consider these questions.

1. What is the **problem**?
2. Where is the **gap**?
3. What did you **do**?
4. What is the **implication**?



Quick Writing Improvements

Word Choice:

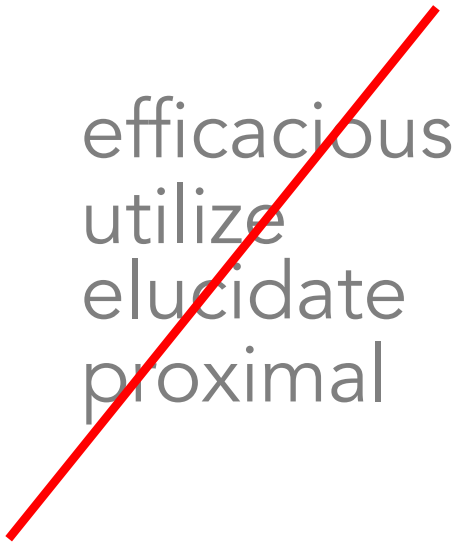
Choose the right word for the context.

Word Choice:
Choose the right word for the context.

- The response was blocked by phentolamine but was not *affected* by propanolol.
- The digoxin *concentration* was increased from 0.5 to 2.5 ng/ml.
- At frequent *intervals* we measured pH, P_{O_2} and P_{CO_2} in arterial blood, and during each *period* of study we measured pulmonary blood flow two or three times.
- 75 percent nitrous oxide *is* a subanesthetic concentration in the dog.

Word Choice: Simplify.

efficacious	effective
utilize	use
elucidate	explain
proximal	close



Word Choice: Be quantitative.

development rate was fastest at the higher temperature

development rate at 30°C was 10% faster than at 20°C

Sentence Structure:
Make the topic the subject.

The patient showed no change in symptoms.

The patient's symptoms did not change.

Provide a logical relationship between your sentences with transition phrases.

As a result,…
Given this observation,…
According to this theory,…
In order to accomplish…

Protip: Avoid novelty claims.

- Unless you've read every paper, you don't really know if you're the first to discover something.
- A surprising result: unanticipated, or against common dogma, but not unprecedented
- Appropriately qualified, there are certain "firsts" you do know…

Take-homes for Titles and Abstracts:

- **Highlight your take-home** message: identify your research question & your contribution
- Focus on **findings**, not methods.
- Be **succinct**.
- Be **quantitative**.