



Scientific communication

WASP: Write a Scientific Paper

Writing Science

You are not just presenting your results, you are telling a story.

Brief outline

- Science writing as storytelling
- Making a story sticky
- Story structure
- Openings, challenge, action, and the resolution
- Scientific paper recipe
- Getting started...
- Common fails – and how to avoid them
- Manuscript submission

All of us known

Publish or Perish

but is about surviving, not succeeding

Writing in Science

You **don't succeed** as a scientist by getting papers *published*.

You **succeed** as a scientist by getting them *cited*.

Writing in Science

You **don't succeed** as a scientist by getting papers *published*.

You **succeed** as a scientist by getting them *cited*.

You succeed when your peers **understand your work** and **use it** to motivate their own.

As a scientist, you are a professional writer.

Science Writing as Storytelling

- A paper doesn't only present our data — it also interprets them.
- Somewhere in that mass of data is a story trying to come out. Find it.

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- The role of *scientist*: collect data and transform them into understanding
- The role of *author*: present the understanding

Making a story sticky

How long after you read it do you remember it?

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SUCCES

Making a story sticky

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S: simple

U: unexpected

C: concrete

C: credible

E: emotional

S: stories

Making a story sticky

How long after you read it do you remember it?

SUCCES

S: simple: “the chief virtue that language can have is clarity” (Hippocrates)

U: unexpected

C: concrete

C: credible

E: emotional

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Making a story sticky

How long after you read it do you remember it?

SUCCES

S: simple

U: unexpected: make a good story by *identifying the knowledge gap* we will fill

C: concrete

C: credible

E: emotional

S: stories

Making a story sticky

How long after you read it do you remember it?

SUCCES

S: simple

U: unexpected

C: concrete: science is about data, and data are concrete.

C: credible

E: emotional

S: stories

Making a story sticky

How long after you read it do you remember it?

SUCCES

S: simple

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C: concrete

C: credible: methods description, data presentation, and appropriate statistics

E: emotional

S: stories

Making a story sticky

How long after you read it do you remember it?

SUCCES

S: simple

U: unexpected

C: concrete

C: credible

E: emotional: move from “*What is my answer?*” to “*What is my question?*”

S: stories

Making a story sticky

How long after you read it do you remember it?

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S: stories: discuss your data and ideas with a reader

Story structure

- All stories have common elements that are necessary to make them engaging and memorable

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novels

OCAR

O: opening

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scientific writing

IMRaD

I: introduction
M: materials
R: results
D: discussion

Story structure

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novels

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scientific writing

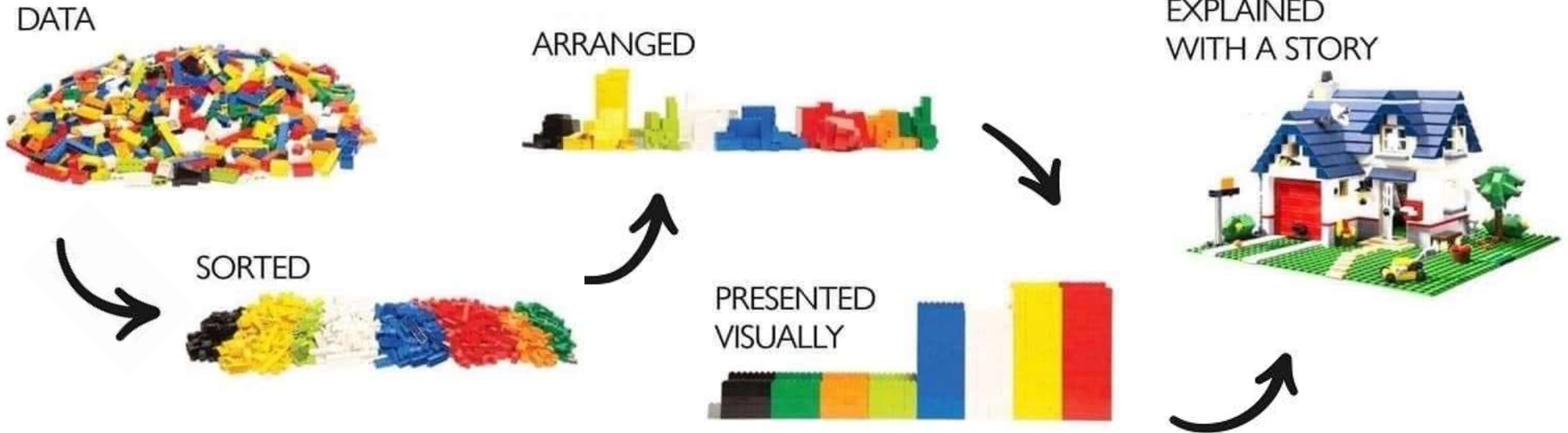
IMRaD

I: introduction
M: materials
R: results
D: discussion

Opening: introduces the larger problem the paper is targeting
Background: why it is important, and what it will contribute to the larger issue.
Challenge: What are the specific questions/goals of the current work?

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Openings

- Identify the **gap in the knowledge**

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Effect *X* occurs (Smith 2003).

Smith (2003) found effect *X*.

Although Smith reported effect *X* (2003), Jones found effect *Y* (2005).

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- **Question** vs. **Objective**

Authors should synthesize existing knowledge to pose a clear hypothesis and afterwards the challenge is to test that hypothesis.

Remember that the critical part of the challenge is not “we did Y” but “to learn X.”

Action

- Two distinct parts
 - **Materials** and **Methods**: describing what you did
 - **Results** and **Discussion**: describing what came of it

Action

- Materials and Methods

- other researchers should be able to repeat a piece of work
- we evaluate the methods to assess the credibility of the data and conclusions

Action

- **Results and Discussion** - to Separate, or Not to Separate: That Is the Question
 - Two core principles of writing and science:
 1. Present results and interpretations in a way that best develops the story
 2. Readers must be able to distinguish what you found from what you think

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The second principle includes:

- a) **Data** – your actual results
- b) **Inference** – clear and robust interpretations of the data
- c) **Interpretation** – your thoughts, hypotheses, and speculation what it means for the larger problem you identified

The resolution

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Note:

You didn't fail to fill one knowledge gap but identified a new one. Ending with a concrete new question engages a reader's curiosity and can be a powerful way to resolve a paper.

Scientific paper recipe

- Construct an **introduction** that puts your work in context for your readers
 - Show present knowledge and find the gap.
 - Tell them why it is important.

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 - Write it such that they can reproduce your work if they want to.

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 - Leave readers in no doubt about what you did.
 - Write it such that they can reproduce your work if they want to.
- Present your **results**
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- **Discuss** your findings
 - enabling readers appreciate the implications of the work.

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- Write a discussion on results. Make it **useful** and applicable for the Reader.
- Be sure you **tell a single story**. If you have too many highlights it looks like a Christmas tree.
- **Target your story** to the audience. Explain how your research fits with their goal and style.

Common fails – and how to avoid them

- **Mismatch with journal aims and scope.**

How to avoid:

- Read carefully the aims and scope of the target journal
- Skim over the papers published in recent issues of the target journal
- Volunteer yourself as the potential reviewer for the target journal

Common fails – and how to avoid them

- Mismatch with journal aims and scope.
- **Lack of novelty and significance.**

How to avoid:

- Communicate the novelty and significance of your work
- Pay attention to the structured abstract and use it as an opportunity to highlight the novelty and significance of your research

Common fails – and how to avoid them

- Mismatch with journal aims and scope.
- Lack of novelty and significance.
- **Grammar and poor writing and formatting related issues.**

How to avoid:

- Follow the authors' guidelines in preparing your submission
- Use professional copy-editing services or software tools

Common fails – and how to avoid them

- Mismatch with journal aims and scope.
- Lack of novelty and significance.
- Grammar and poor writing and formatting related issues.
- **Inadequate connection with existing work published in the journal.**

How to avoid:

- Submissions should show an adequate connection with the recent work published in the target and closely related journals

Common fails – and how to avoid them

- Mismatch with journal aims and scope.
- Lack of novelty and significance.
- Grammar and poor writing and formatting related issues.
- Inadequate connection with existing work published in the journal.
- **Plagiarism (Extent of similarity with other sources)/ Self-Plagiarism**

How to avoid:

- Use professional software tools to avoid similarity with published works

Manuscript submission

- Carefully read **Guide for Authors** of the selected Journal

Manuscript submission

- Carefully read the **Guide for Authors** of the selected Journal
- **List of Authors** and Author contributions

Note:

First authors is usually the one who did the most of the work (student?), follow other scientist who contributed to the work and the last is the professor (supervisor).

Manuscript submission

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- **List of Authors** and Author contributions

AUTHOR CONTRIBUTIONS

Conception and design: SJ, YB, BZ. Sample preparation and collection of data: SJ, YB, BZ, and XR-C. Algorithm implementation: YB, BZ, and SJ. Analysis and interpretation of data: YB, BZ, SJ. Contribution of reagents and tools: HC, MM, CC, T-HS, DM, JE, and LK. Supervision: SJ and GN. Manuscript preparation: SJ, YB, BZ, and GN. The co-first authorship order was determined *via* the best of three rounds in Super Smash Bros. Both YB and BZ contributed equally and have the right to list their name first in their CV. All authors contributed to the article and approved the submitted version.

Example of Author contributions

Manuscript submission

- Carefully read **Guide for Authors** of the selected Journal
- **List of Authors** and Authors contributions
- **Manuscript**, all Figures, all Tables, Supplementary material

Manuscript submission

- Carefully read **Guide for Authors** of the selected Journal
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- Keywords

Note:

There are some standard keywords such as “Physics and Astronomy Classification Scheme” (PACS)

84. Electronics; radiowave and microwave technology; direct energy conversion and storage	
84.30. -r	Electronic circuits (<i>for integrated circuits, see 85.40. -e, for microwave circuits, see 84.40.Dc</i>)
84.30.Bv	Circuit theory
84.30.Jc	Power electronics; power supply circuits (<i>see also 84.70. +p High-current and high-voltage technology; for superconducting high-power technology, see 84.71. -b</i>)
84.30.Le	Amplifiers
84.30.Ng	Oscillators, pulse generators, and function generators
84.30.Qi	Modulators and demodulators; discriminators, comparators, mixers, limiters, and compressors
84.30.Sk	Pulse and digital circuits
84.30.Vn	Filters
84.32. -y	Passive circuit components (<i>see also 07.50. -e Electrical and electronic instruments, and components</i>)

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- **Highlights** and the Graphical Abstract

Note:

Most important knowledge gained from your work.

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- **Highlights** and the Graphical Abstract
- **Cover letter** to Editor

Note:

You need to explain the Editor why to assume your manuscript for the peer-review process

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- **Copyright**

Double-check everything prior submission



Earth-Science Reviews

Available online 7 October 2022, 104198

In Press, Journal Pre-proof



The authors name and address was included above the abstract in the submission. If it is difficult to stop, it is

Laurence Noel Warr

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volume of about 1ml, and diethyl ether was added in a dropwise manner to the stirred solution to precipitate a yellow solid. The vial was centrifuged so the supernatant solvent could be decanted off by Pasteur pipette. The yellow solid was washed twice more with ether and the dried completely under high vacuum to give 99mg (93% yield) of product.

Emma, please insert NMR data here! where are they? and for this compound, just make up an elemental analysis...

Pt(II)((*M,S,S,S*)-*p*-tolyl-binaso)(acac)(BF₄)₂ (154): A vial was charged with 100 mg (0.126 mmol) **5a** and 24 mg (0.126 mmol) AgBF₄. 2 mL CH₂Cl₂ was added, the vial was covered and the reaction was left stirring in the dark for 2 hours. After this time, the

Several comments of experts

- Don't write any words until you've selected your figures (very important).
- Make sure the abstract, introduction, and conclusions touch all the same points. There should be a one-to-one correspondence between the points made in each.

Prof. Robert Houze, University of Washington

- If I come to an impasse, it usually means that I don't thoroughly understand what I'm writing about.

Dr. Richard Rotunno, National Center for Atmospheric Research