

Brief Overview of Aspects of the Scientific & Technical Literature

Outline

- Anatomy of a research paper
 - Title, authors, abstract/keywords, intro, methods, results, discussion, acknowledgments, references
- The larger research literature
 - Forward and backward pointers from references
 - Searching: Library tour
 - **15 Oct., Meet in MRC-164 at the Ayala Science Library**

Anatomy of a Research Paper Title

- The title briefly tells what the paper's about
 - Identify briefly what's interesting/important
 - Help the reader quickly identify useful papers
- Avoid jargon
 - Title is understandable to a broad audience
- Include useful keywords in the title
 - Help the paper be found by search tools

Anatomy of a Research Paper

Authors

- Who is an author?
 - Authors are those responsible for the paper
 - Generally, those who made an intellectual contribution to the paper contents
 - Non-intellectual contribution (e.g., loan of specialized equipment) goes in Acknowledgment
 - Authorship is a sensitive issue
- Author order?
 - Varies by discipline: Alphabetical order, order of contribution, first junior/last senior, etc.

Anatomy of a Research Paper

Abstract

- Briefly describe what is important in the paper
 - Answer the reader’s question:
“Is it worth my time to read this paper?”
 - State the general problem area, the specific problem here, and main results/conclusions
- Usually a word limit; often 100, 150, or 250
 - If no word limit, still keep it brief (150 is good)
- Include keywords in text to help search tools

Anatomy of a Research Paper

Introduction

- Orient the reader to the paper
 - Explain what the problem is & why it's important
 - “Hitch your wagon to a star.”
 - Hitch your paper to AN IMPORTANT PROBLEM.
 - Begin general, become specific
 - The broad area -> the small problem addressed here
 - Often provides an overview of methods & results
 - Often provides literature review (may be separate)
- Intro **MUST** provide background info for the reader to understand why the paper is useful

Anatomy of a Research Paper

Methods

- Describe what you did to get your Results
 - Omit obvious details, include crucial details
- Sometimes a separate section, sometimes interspersed with Results
 - Sometimes follows Results
- Key requirement: Reproducibility
 - Others should be able to reproduce your results

Anatomy of a Research Paper

Results

- The important scientific/technical findings
 - The heart of the paper
- Explain and describe the results
 - Relate results to important questions
- Use graphs, tables, charts, etc.
 - Make the results comprehensible to the reader
- Often, paper contains only important results
 - Details are in online Supplementary Information

Anatomy of a Research Paper

Discussion/Conclusion

- Step back and explain things to the reader
 - What is interesting about the results?
 - How do they relate to the larger picture?
- Authors often become prolix and verbose
 - Preferable to be brief and terse
- Many readers don't read this section
 - They assume the authors have misinterpreted their own results, so they read only the Methods & Results, then form their own conclusions

Anatomy of a Research Paper

Acknowledgments

- Acknowledge every entity that helped
- Acknowledgment order
 - Personal acknowledgments
 - “We thank Dr. Smith for loan of a teleoperator.”
 - Institutional acknowledgments
 - “We thank the US Antarctic Center for providing space.”
 - Funding acknowledgments
 - “This work was funded by the US National Science Foundation under grant number IIS-1234567.”
- Sometimes a disclaimer
 - “This work does not necessarily reflect the views of the US National Science Foundation.”

Anatomy of a Research Paper

References

- Demonstrate scholarship --- cite related work
- Situate the paper in the larger literature
- Enable forward/backward citation searching
 - Strive for accurate references
 - Lets your paper be found by citation searching
- Provide the reader more details if desired
- Format of references differs by venue
 - Check journal style sheet (“Info for authors”)
 - Conference proceedings usually free-form
 - Alphabetical order? Order of appearance in paper?

The larger research literature

- No paper exists by itself in a vacuum
 - It is part of a larger ongoing literature
- The references (citations) do the embedding
- Search backward: find background & past work
- Search forward: find subsequent developments
- Generally useful strategy for lit searching:
 - Search backward to find “key” papers in the field
 - Search forward from them to find new work

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Any Questions?