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?