Recipes for cooking a successful paper

Preparing a manuscript for a peer-reviewed international journal

Lecture 2: Writing
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Going step by step

Before you start writing
- What is scientific publication? Who are its authors? Scholarly journals. Citing others. Impact factor. The story, message, carrier, target group.
- Writing: the simplest step of publication
  - Structuring the manuscript: IMRAD. Titles and subtitles. The role of and rules for Abstract, Introduction, Theory, Methods, Results, Discussion, Acknowledgements.
  - Illustrating the message
    - Figures. Figure captions. Mandatory images. Design principles.
    - Crowds or emptiness? Tables. Internal and external links & cites.
- Ready to print?

After the choice of the journal: Journal Format and Conventions

- Ensure familiarity with journal format and style in all aspects
- Follow journal convention for annotation and institution
- Do not expect the reviewers/editors to reformat your ms – especially references –
  - you will annoy them
  - you will be seen as lazy
  - Your chances will be smaller

Components of writing

I: Structuring the manuscript
- IMRAD
- Titles and subtitles.
- The role of and rules for
  - Abstract
  - Introduction
  - Theory/Model/Material
  - Methods
  - Results
  - Discussion
  - Acknowledgements

II: Expressing the thoughts - From words to sections

1. Decide on the message
2. Decide on a journal
3. Develop the story
4. Write Material/Methods
5. Summarise results
6. Write Introduction and Discussion
7. Finalise the references
8. Assemble/order the tables and figures (in numerical order)
9. Select a tentative title
10. Write the abstract
11. Revise the entire draft
12. Sleep on it
13. Revise the manuscript
14. Repeat (12)-(13)
15. Re-read the MS
16. Ask colleagues to read MS
17. Have the text polished by a native speaker
18. Submit the manuscript

Procedure

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I: IMRAD: format of a regular manuscript

Basic content
- Title
- Authors
- Abstract
- Introduction
- Material and Methods
- Results
- (And)
- Discussion

Technical details and supporting information
- Affiliation
- Acknowledgement
- References
- Tables
- Figures
- Legends/captions
- Appendices
- Keywords
- Highlights
**General hints & conventions**

- Scientific writing: **Brevity & Clarity**
  - Many journals have limits on length
  - Less is more: avoid ballast

**Usual conventions**

- **Introduction:** present tense
  - What has been previously published
  - Why the study was done
- **Materials/Methods:** past tense
  - How the study was conducted
- **Results:** past tense
  - What was found
- **Discussion:** present tense
  - Explanation of the results;

**Title: principles**

- Should be **generic** – projecting the principles:
  - Cusp formation as a function of sand and re-packing,
  - rather than: Cusps developed at Pinta Beach, Tallinn.
  - NOT location specific [= local interest, not international]
- Short but specific
- Expressing the core development
- Select words suitable for a “running head”

**Hints for a title**

- Provide specific information
  - in as few words as possible
- Be informative and lucid (easily understood, completely intelligible)
  - Nonlinear components of ship wake waves
  - Joint influence of river stream, water level and wind waves on the height of sand bar in a river mouth
- Include a subtitle, if further detail is needed
  - Fast ferry traffic as a qualitatively new forcing factor of environmental processes in non-tidal sea areas: a case study in Tallinn Bay, Baltic Sea
- You report changes: show the direction
  - Poor: Effect of amino acids...
  - Good: Reversal effect of amino acids ...
  - In doubt or challenged: Do amino acids reverse ...?
- Avoid (nonstandard) abbreviations

**Hints for a title II**

- Begin with an important term
  - Avoid beginning with A, The, Results, Study, etc.
  - Poor: An experimental study of wind waves and ship wakes in Tallinn Bay (Soomere and Kannan, 2003)
  - Good: Sand accumulation under varying lithohydrodynamic conditions in the coastal area of the north-eastern Baltic Sea (Kask et al. 2010)
- Avoid evaluations
  - Omit subjective terms such as novel or innovative
  - The reader is appropriate one to make such judgements
  - Poor: A novel method for determining the molecular weights ..
  - Good: A rapid method for determining ...
- Avoid serial titles
- Check the Instructions to Authors
  - Nature: no active verbs, numerical values, abbreviations
- Provide a running title (<50 characters)

**The meaning of Abstract**

- **A mini-paper**
  - Gives actual data in extremely condensed form
- **Presents the core Message**
- **Explains what has been done**
- **Should be understood on its own**
- **certainly without reading the paper**
- **Used as the 2nd level in search for information**
- **Gateway to the paper:** to read or not to read

- **Is NOT a plan or indicative summary**
  - (these explain what will be done)
Writing an Abstract

- Must be concise
- It is NOT a detailed summary of the entire paper
- Normally references not quoted
- Overall: < 1 typescript page
- Usually <150 words or <500 characters
- No room to waste words
- A common error: saying "The results will be discussed..." – tells really nothing

Abstract: 4 components only

- 1-2 sentences each ONLY!
  - (i) the aims of the paper
  - (ii) the methods & techniques used
  - (iii) the major results or findings
  - (iv) the main implications from the research

Curiosities


Abstract. Chairman Mao taught us, “One should seriously sum up one’s experience.” Looking back at the experiences of our own and of others in the past decade or so on the total synthesis of [....], we have analyzed the inherent contradictions of the two alternative routes of synthesis on the basis of the dialectical viewpoint of “one divides into two.” [...] A new synthetic strategy was developed ...


Key words

- They do not reflect the quality of research
- Used for indexing for electronic searching
- Some journals: Title words are already key words
- Other journals: Key words must be taken from a specific list
- List ‘additional’ key words

Modelling of wave climate and sediment transport patterns at a tideless embayed beach, Pirita Beach, Estonia

Keywords
- Sediment transport
- Sediment distribution
- Beaches
- Wave climate
- Wave modelling

Yan and Jiang, 2011, under review
Typical sequence of reading

1. Title: Does it have any relevance to my interests?
2. Abstract: Could the paper be important for me?
3. Introduction: Does it give something to me now?
4. Conclusions: Anything to remember?
5. Rest of the paper: dedicated reader, in very few cases

The Introduction

- Read before the rest of the paper
- Perhaps the most difficult part to write
- The purpose: provide the background information that the reader needs to understand your paper
- States the nature of the problem
- Sets the scene
- Leads on to the purpose/aims
- Contains a part of literature
  - The reason
  - The findings
  - Specialized background

“Trinity” of a good introduction

(I) General background
(II) Previous findings by others
(III) Your examination of the questions addressed

- Very briefly: your approach
- Ask The Question
- [principal finding – on the level of keywords]
  - Organisation of the paper

Hints

- The reader is assumed to have a basic familiarity with subject
- Exclude elementary information
- Normally no references to standard textbooks
- Present only what a specialist should know
- Specifies nature and scope
- Gives a brief summary of previous work
  - Just to bring the reader up to date on the topic
  - Including your own previous work
  - Not a place to show your talents
- Aims to evoke interest
- Brief enough to avoid losing the readers’ attention

Example

The existence of particularly high (freak or rogue) waves on the sea surface is often observed. Freak waves occur much more frequently than it might be expected from surface wave statistics whereas they are particularly steep.

This interesting (and dangerous) phenomenon is explained by various theories (see, for example, Kharif and Pelinovsky [1] and references therein). Stressing the importance of currents, bathymetry, interaction with internal waves, etc. that may contribute to forming of freak waves (see Peregrine [2], Jonsson [3], Shyu and Phillips [4], Donato et al. [5], White and Fornberg [6] and bibliography therein), we focus here on interaction of solitary waves.

Abbreviations and footnotes

- Abbreviations save space
  - South-western  \( \rightarrow \) SW
  - Environmental Impact Assessment  \( \rightarrow \) EIA
- Define at the first mention
  - Only reasonable if used \( \geq 4-5 \) times
- Footnotes generally not recommended
- Still extremely useful during writing
  - Additional information that would make the body text too complicated
  - Details of references (which pages, citation)
  - Notes for yourself
Literature search and overview

- Usually a part of Introduction & Material & Methods
- Frequently important in Discussion
- Demonstrates your knowledge in the field
- Credits important previous work
- Helps you greatly in putting your work into proper context
- Benefit from large databases

Introduction

- Introduce the topic
- Relate to current knowledge
- Indicate the gap
- Introduce your work
- State research questions and objectives

Search results

Look through titles: could the paper be relevant to your work?

Search the database for papers on the same topic.

Found something to rely on?

Coastline change of [...] is dominated by mechanisms [...] on different timescales. The coastlines of [...] are mainly reshaped by long-term effects of waves and longshore currents, while coastline change [...] is a combination of long-term effects of waves and short-term effects caused by extreme wind events.

- Note it down immediately
- Save full text of the claim
- Together with full bibliographic information
  - Include the citation and bibil.inf into the text as a footnote

Some papers are more popular than others

- Sorted by default: according to publication date
- Try: sorted by Times Cited

Heavily cited papers probably contain something interesting.
Working with quotations

- Seemingly strange text: 5-7 lines of quotations in footnotes for each line of main text
- Check from the source whether or not the quotation/fact/result is relevant to your paper
- Note the exact place/page of the result in the source
- Condense the text iteratively
  - Move a double-checked previous result into the main text
  - Keep the core of quotation
  - Move the bibliogr. inf. into References
  - Group similar and repeating claims

Methods / Experimental procedures

- Usually the easiest part to write
  - You do not interpret data or reach conclusions
  - Unless the paper is on methodology
- References to standard textbooks are fine
- Briefly summarise
  - Basically the reader can repeat the work
  - And judge whether your procedures were sufficient
- Refer to authoritative standard methods
  - e.g. CERC method for wave-driven sediment transport
- Reference others who have used the same
- Note differences
- Give in detail only if a "new method" which is the purpose of the paper

Theory and Background

- Very much the same as Methods
- Literature search normally necessary, see above
- Reference others who have used the same methodology or theory
  - Web sites are not authoritative references (no quality control)
- Refer to authoritative standard methods
- Concise but explicit
- Verbs usually in the past tense
  - Prefer: Enzyme A was purchased from Sigma
  - Worse: We purchased enzyme A from Sigma
  - because here emphasize should be on the material, not authors

Materials / Data

- Very much the same as Methods
- Describe data acquisition procedure
- Indicate possible uncertainties/errors or inhomogeneities
- Give an estimate of accuracy/error (both physical and of the procedure), reasons of exclusion of some data points (if any)
- Use subsections if necessary
  - Rule of thumb: one printed A4 double column page – one subsection
  - Subsection titles – "small sisters" of the Title

Results

- Feature main results of the stated aims of the paper
- Present 'analysed' data, not raw data
- Present as:
  - tables
  - graphs, or
  - model figures where possible

Two ways of saying things

The major reason for including two simulated data sets is that these sets reflect somewhat different features of waves in the study area.

The two simulated data sets reflect somewhat different features of waves in the study area

You have reason anyway
Economic use of words

- Communication is better through concise and lucid writing in a well-organised manner
- Avoid uninformative words
- Brief in duration
- Sufficient in number
- The wound was of serious nature
- The solution was red in color
- It was precooled before use
- We repeated the experiment again

Economic use of words II

- Many popular expressions can be expressed as a single word, or are better omitted altogether
  - At this point of the time
  - The reason was because
  - In view of the fact that
  - Was observed to be
  - In most cases
  - It would appear that
  - Is suggestive of
  - As to whether
  - In the vicinity of
  - It was evident that
  - In the event that

Economic use of words III

- Avoid grandiloquence = pompous style
- Impresses no one and provokes ridicule
- Avoid cliches and euphemisms
  - All in all → delete
  - If and when → if
  - The patient breathed his last → The patient died
- Use exact synonyms
  - Words that have nearly the same meaning
- Use tesaurus
  - Check the exact meaning of words from a dictionary, Google, Wikipedia etc.

Alternatives to one word “marked”

- Appreciable
- Considerable
- Conspicuous
- Extreme
- Great
- Intense
- Signal
- Significant
- Striking
- Decided
- Definite
- Distinct
- Remarkable
- excessive
- remarkable
- Profound

Building a sentence

- A good sentence is topical: begins with the important item
  - The relationship F=ma was discovered by Newton
  - Suitable in a text on the history of physics
  - Newton discovered the relationship F=ma
  - Suitable in a biography of Sir Isaac Newton
- As short as possible
  - Avoid ambiguities
  - “The monkey was operated on by the surgeon when he was six weeks old”
  - “The monkey, when he was six weeks old, was operated by the surgeon”
- Being clear has the priority over perfect style
  - “… as of September 1, 257 people were dead …” How many?

Scattered hints

- Follow either American or British style
  - but never a mixture of both
- Be careful with several adjectives in sequence
  - Sometimes the most concise is not the clearest
    - “Simian virus transformed fetal mammalian heart fibroplast”
    - “Simian virus-transformed fibroplast from fetal mammalian heart”
- Phrases longer than 3-4 words from other sources MUST be highlighted as quotations
- Even if coming from your own previous work
  - Slightly longer quotations without special highlighting sometimes accepted in review works and monographs
Bricks of writing: paragraphs

- A paragraph = step in your story
- Describes a clearly identified part of the content
- Remember “roadmap” for writing
- Normally 5-10 lines, 3-7 sentences
- Organise each paragraph!
- Start with a topic sentence
  - that explains the main point or idea
- Subsequent sentences provide the detail
  - This formula: sometimes considered less polished
  - But direct and intelligible; thus, perfectly acceptable
  - Start with this style, adjust when you gather experience

Writing a good paragraph

- Each paragraph expresses/covers only one point
- Each sentences establishes or supports this point – the topic of the paragraph
- The sentences should illustrate their overlapping effect
- Explain why actions were taken
  - “All of the patient data were kept in paper files. The absence of even one clerk caused delays in the monthly reporting. Finally, management decided to interview some systems analysts”
  - “All of the patient data were kept in paper files. Which took too much staff time to maintain. The absence of even one clerk would delay the monthly patient reports. Management wanted computerised recordkeeping, which would take less time and be more reliable, and finally decided to interview some systems analysts to develop the new system”
  - From J.T. Yang, An outline of scientific writing.

Discussion

- Takes the data reported in the Results section
  - Interprets the findings
  - Evaluates their significance
  - Examines the implications
- Usually the most challenging section to write
- Demonstrated how well you understand the results
- No need to be lengthy
- Sometimes merged with Results or Conclusions

Discussion: hints by Terry Healy

- Elaborate upon the findings
- Emphasise what is new, different to earlier authors
- Refer extensively to other authors
- Place your contribution in relation to existing published work and programs
- This is an essential characteristic of a paper for international readership
Writing a good Discussion

- Begin with a topical sentence that returns to The Question
- Mention shortly new findings, knowledge or concepts that resulted from your study
- Do NOT introduce again data or methods that were already presented
- Do NOT introduce data that were not presented in the text before
- Do NOT copy sentences from Results
- State whether you have achieved your goal
- Perhaps found exceptions? Unexplained effects?
- Compare your results and interpretations with previously published work
- Even though it may disagree with yours
- Give fair credit to others whose work has been confirmed. Cite!
- Be fair with those whose results differ
- Explain, if possible, the disagreement impartially
  - From J.T. Yang, An outline of scientific writing.

Acknowledgements II

- Used to give credit to those who have materially or intellectually contributed to the research
  - Technical assistance
  - Advice from colleagues
  - Other research-related contributions
- Do NOT include: Contributions that do not involve research
  - Clerical/administrative assistance
  - Word processing, Translation, Copy-editing
  - Encouragement from friends
- Refer to funding assistance
  - Mandatory for research supported by targeted financing in Estonia from 01.01.2010
  - Success of Estonian Science Foundation grants counted based on paper with the relevant acknowledgement

Authorship versus crediting in Acknowledgement

- Authorship is limited to those who have made a significant contribution to the conception, design, execution, or interpretation of the reported study.
- All those who have made significant contributions should be listed as co-authors.
- Others who have participated in certain substantive aspects of the research project should be acknowledged or listed as contributors.

Acknowledgements

- Keep short
  - A standard formulation:
    - "This work was supported by the Estonian Science Foundation (grant No. 9125) and targeted financing by the Estonian Ministry of Education and Research (grant SFI04000/711). We thank Prof. A.X for his comments on the manuscript and Dr. X.Y.Z. or his technical assistance."
  - Be aware of misinterpretations
    - Maybe Dr. X.Y.Z performed the experiments and Dr. A.X explained the data, and your contribution was limited to being the armchair general?
    - Make certain that Acknowledgements accurately reflect the situation
    - Obtain prior permission from the person being acknowledged
    - Maybe he/she only read the draft and fully disagreed with your treatment?
    - Maybe he/she should be a coauthor?