How do I build up my article properly?
General structure of a Research Article

- Title
- Abstract
- Keywords

- Main text (IMRAD)
  - Introduction
  - Methods
  - Results
  - And
  - Discussions

- Conclusion
- Acknowledgement
- References
- Supplementary data

Make them easy for indexing and searching (informative, attractive, effective)

Journal space is not unlimited, more importantly, your reader’s time is scarce.
Make your article as concise as possible.
The process of writing – constructing the article

Title & Abstract

Conclusion

Introduction

Methods

Results

Discussion

Figures / Tables (your data)
Policies regarding authorship can vary

One example: the International Committee of Medical Journal Editors (“Vancouver Group”) declared that an author must:

1. **Substantially contribute** to conception and design, or acquisition of data, or analysis and interpretation of data;
2. **Draft** the article or **revise** it critically for important intellectual content; and
3. **Give their approval** of the final full version to be published.
4. **All three** conditions must be fulfilled to be an author!

All others would qualify as “Acknowledged Individuals”
Authorship - Order & Abuses

- General principles for who is listed first
  - **First Author**
    - Conducts and/or supervises the data generation and analysis and the proper presentation and interpretation of the results
    - Puts paper together and submits the paper to journal
  - **Corresponding author**
    - The first author or a senior author from the institution
      - Particularly when the first author is a PhD student or postdoc, and may move to another institution soon.

- Abuses to be avoided
  - **Ghost Authorship**: leaving out authors who should be included
  - **Gift Authorship**: including authors who did not contribute significantly
Acknowledged Individuals

Recognize those who helped in the research, but do not qualify as authors (you want them to help again, don’t you?)

Include individuals who have assisted you in your study:

- Advisors
- Financial supporters
- Proof-readers
- Typists
- Suppliers who may have given materials
Author names: common problems

- **Different Spellings**
  - Järvinen / Jaervinen / Jarvinen
  - Lueßen / Lueben / Luessen
  - van Harten / Vanharten / Van

- **First/Last Names**
  - Asian names often difficult for Europeans or Americans

- **What in case of marriage/divorce?**

**Be consistent!**

If you are not, how can others be?
Title

- A good title should contain the **fewest** possible words that **adequately** describe the contents of a paper.

- **Effective titles**
  - Identify the main issue of the paper
  - Begin with the subject of the paper
  - Are accurate, unambiguous, specific, and complete
  - Are as short as possible
  - Articles with **short, catchy titles** are often better cited
  - Do not contain rarely-used abbreviations
  - Attract readers - Remember: readers are the potential authors who will cite your article
# Title: Examples

<table>
<thead>
<tr>
<th>Original Title</th>
<th>Revised</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preliminary observations on the effect of Zn element on anticorrosion of zinc plating layer</td>
<td>Effect of Zn on anticorrosion of zinc plating layer</td>
<td>Long title distracts readers. Remove all redundancies such as “observations on”, “the nature of”, etc.</td>
</tr>
<tr>
<td>Action of antibiotics on bacteria</td>
<td>Inhibition of growth of mycobacterium tuberculosis by streptomycin</td>
<td>Titles should be specific. Think to yourself: “How will I search for this piece of information?” when you design the title.</td>
</tr>
<tr>
<td>Fabrication of carbon/CdS coaxial nanofibers displaying optical and electrical properties via electrospinning carbon</td>
<td>Electrospinning of carbon/CdS coaxial nanofibers with optical and electrical properties</td>
<td>“English needs help. The title is nonsense. All materials have properties of all varieties. You could examine my hair for its electrical and optical properties! You MUST be specific. I haven’t read the paper but I suspect there is something special about these properties, otherwise why would you be reporting them?” – the Editor-in-chief</td>
</tr>
</tbody>
</table>
Keywords

In an electronic world, keywords determine whether your article is found or not!

Avoid making them
- too general ("drug delivery", "mouse", "disease", etc.)
- too narrow (so that nobody will ever search for it)

Effective approach:
Look at the keywords of articles relevant to your manuscript
Play with these keywords, and see whether they return relevant papers, neither too many nor too few
Graphite intercalation compounds (GICs) of composition $C_xN(SO_2CF_3)_2 \cdot \delta F$ are prepared under ambient conditions in 48% hydrofluoric acid, using $K_2MnF_6$ as an oxidizing reagent. The stage 2 GIC product structures are determined using powder XRD and modeled by fitting one dimensional electron density profiles. A new digestion method followed by selective fluoride electrode elemental analyses allows the determination of free fluoride within products, and the compositional $x$ and $\delta$ parameters are determined for reaction times from 0.25 to 500 h.
Introduction

The place to convince readers that you know why your work is relevant, also for them

Answer a series of questions:

- What is the problem?
- Are there any existing solutions?
- Which one is the best?
- What is its main limitation?
- What do you hope to achieve?
Pay attention to the following

- Before you present your new data, put them into perspective first

- Be brief, it is **not** a history lesson

- Do not mix introduction, results, discussion and conclusions. Keep them separate

- Do not overuse expressions such as “novel”, “first time”, “first ever”, “paradigm shift”, etc.

- Cite only relevant references
  - Otherwise the editor and the reviewer may think you don’t have a clue where you are writing about
Methods / Experimental

- Include all important details so that the reader can repeat the work.
  - Details that were previously published can be omitted but a general summary of those experiments should be included.
- Give vendor names (and addresses) of equipment etc. used.
- All chemicals must be identified.
  - Do not use proprietary, unidentifiable compounds without description.
- Present proper control experiments.
- Avoid adding comments and discussion.
- Write in the past tense.
  - Most journals prefer the passive voice, some the active.
- Consider use of Supplementary Materials.
  - Documents, spreadsheets, audio, video, .....
Experiments on humans or animals must follow applicable ethics standards

- e.g. most recent version of the Helsinki Declaration and/or relevant (local, national, international) animal experimentation guidelines

Approval of the local ethics committee is required, and should be specified in the manuscript

Editors can make their own decisions as to whether the experiments were done in an ethically acceptable manner

- Sometimes local ethics approvals are way below internationally accepted standards
Results – what have you found?

- The following should be included
  - the **main findings**
    - Thus not *all* findings
    - Findings from experiments described in the Methods section
  - Highlight findings that **differ** from findings in previous publications, and **unexpected** findings
  - Results of the **statistical analysis**
Results – Figures and tables

- Illustrations are critical, because
  - Figures and tables are the most efficient way to present results
  - Results are the driving force of the publication
  - Captions and legends must be detailed enough to make figures and tables self-explanatory
  - No duplication of results described in text or other illustrations

"One Picture is Worth a Thousand Words"
Sue Hanauer (1968)
Results – Appearance counts!

- Un-crowded plots
  - 3 or 4 data sets per figure; well-selected scales; appropriate axis label size; symbols clear to read; data sets easily distinguishable.

- Each photograph must have a scale marker of professional quality in a corner.

- Text in photos / figures in English
  - Not in French, German, Chinese, Korean, ...

- Color must be visible and distinguishable when printed in black & white.

- Do not include long boring tables!
Discussion – what do the results mean?

- It is the most important section of your article. Here you get the chance to SELL your data!
  - Many manuscripts are rejected because the Discussion is weak

- Check for the following:
  - How do your results relate to the original question or objectives outlined in the Introduction section?
  - Do you provide interpretation for each of your results presented?
  - Are your results consistent with what other investigators have reported? Or are there any differences? Why?
  - Are there any limitations?
  - Does the discussion logically lead to your conclusion?

- Do not
  - Make statements that go beyond what the results can support
  - Suddenly introduce new terms or ideas
Conclusions

- Present global and specific conclusions
- Indicate uses and extensions if appropriate
- Suggest future experiments and indicate whether they are underway
- Do not summarize the paper (The abstract is for that purpose)
- Avoid judgments about impact
References: Get them right!

- Please adhere to the Guide for Authors of the journal
- It is your responsibility, not of the Editor’s, to format references correctly!

Check
- Referencing style of the journal
- The spelling of author names, the year of publication
- Punctuation use
- Use of “et al.”: “et al.” translates to “and others”,

Avoid citing the following if possible:
- Personal communications, unpublished observations, manuscripts not yet accepted for publication
  - Editors may ask for such documents for evaluation of the manuscripts
- Articles published only in the local language, which are difficult for international readers to find
Supplementary Material

- Data of secondary importance for the main scientific thrust of the article
  - e.g. individual curves, when a representative curve or a mean curve is given in the article itself
- Or data that do not fit into the main body of the article
  - e.g. audio, video, ....
- Not part of the printed article
  - Will be available online with the published paper
- Must relate to, and support, the article
Typical length of a full article

- Not the same for all journals, even in the same field
- “…25-30 pages is the ideal length for a submitted manuscript, including ESSENTIAL data only.”
  - Title page
  - Abstract 1 paragraph
  - Introduction 1.5-2 manuscript pages (double-spaced, 12pt)
  - Methods 2-4 manuscript pages
  - Results & Discussion 10-12 manuscript pages
  - Conclusions 1-2 manuscript pages
  - Figures 6-8
  - Tables 1-3
  - References 20-50

- Letters or short communications usually have a stricter size limitation, e.g. 3,000 words and no more than 5 figures/tables.
Abbreviations

- Abbreviations must be defined **on the first use** in both abstract and main text.

- Some journals do not allow the use of abbreviations in the abstract.

- Abbreviations that are **firmly established** in the field do not need to be defined, e.g. DNA.

- Never define an abbreviation of a term that is only used once.

- Avoid acronyms, if possible
  
  - Abbreviations that consist of the initial letters of a series of words
  
  - Can be typical “lab jargon”, incomprehensible to outsiders
Dear Professor Schmidt,

Enclosed with this letter you will find an electronic submission of a manuscript entitled “Mechano-sorptive creep under compressive loading – a micromechanical model” by John Smith and myself. This is an original paper which neither previously nor simultaneously in whole or in part been submitted anywhere else. Both authors have read and approved the final version submitted.

Mechano-sorptive is sometimes denoted as accelerated creep. It has been experimentally observed that the creep of paper accelerates if it is subjected to a cyclic moisture content. This is of large practical importance for the paper industry. The present manuscript describes a micromechanical model on the fibre network level that is able to capture the experimentally observed behaviour. In particular, the difference between mechano-sorptive creep in tension and compression is analysed. John Smith is a PhD-student who within a year will present his doctoral thesis. The present paper will be a part of that thesis.

Three potential independent reviewers who have excellent expertise in the field of this paper are:

Dr. Fernandez, Tennessee Tech, email1@university.com
Dr. Chen, University of Maine, email2@university.com
Dr. Singh, Colorado School of Mines, email3@university.com

I would very much appreciate if you would consider the manuscript for publication in the International Journal of Science.

Sincerely yours,

A. Professor