

Writing scientific papers for journal publication

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Information drawn from different sources – www.segh.net British Academy writing skills course – experience of EiCs Prof Ming Wong and Prof Mohamad Chehimi

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Experience

- 150+ peer review papers
- 16 complete PhD students
- EiC role for Environmental Geochemistry and Health
- Lessons learnt and mistakes from past experience
- Perspective as a journal EiC
- READ the journal instructions – research the editors and their interests.
- Consider the audience.

Structure of a paper

1. Each section has a defined purpose
2. Different journals have different requirements
3. Start shaping the stories with good versions of figures and tables
4. Define your Aim and the objectives to achieve the paper to structure the story – makes it easier for the reader to follow.
5. You may choose to write the paper in a different order. Methods-Results-Discussion-Introduction-Abstract-Conclusion

Title, Author(s), Affiliations – what contribution did each author make

Abstract

Introduction

Materials and Methods

Results (& Discussion)

Discussion

Conclusion

Acknowledgements

References

Supplementary Materials

Title

- A good title can convey the main findings of the research
 - meaningful, specific
 - Concise
 - Complete
 - Attract readers
 - Facilitate web searches
- Should contain the fewest possible words to adequately describe the contents of the paper
- Why should someone click on the paper to read further?

Title

- Sometimes a phrase or sentence
- Do not use excess words such as “studies on” or “observations on” or investigations on”.
- (“Studies on the”) Interaction of microbes with their host plants (.....) could be omitted.
- A subtitle could be included for more detail.
 - The role of microbes in metal transfer to plants from contaminated soil: Field Study / Lab study

Try to make titles more attractive

Title	Journal	Year	TC
Export of toxic chemicals – A review of the case of uncontrolled electronic waste recycling	Environ. Pollut.	2007	865
Spatial distribution of PBDEs & PCDD/Fs in soil and combusted residue at	ES&T	2007	781
Effect of biofertilizer containing N-fixer, P&K solubilisers and AM fungi on maize growth: A greenhouse trial	Geoderma	2005	1255
Shark fin, a symbol of wealth and good fortune may pose health risks: the case of Hg	EGAH	2014	20+

Review articles

- Do they contribute citations?
 - sometimes, but it depends on the topic, target audience and whether there is a niche or need.
- Bibliometric analyses – OK as part of a review, but do not make a useful review paper.
- Can be subject of thesis transfer, potential AI risk, paper mills – caution applied.
- Should contain a review of recent outputs in the literature, good proportion in the last 3-5 years to provide new insight and useful update to the reader.

Keywords

- 3 to 5 keywords or short phrases required for indexing
- Some journals specify that words already in the title not to be included

Example

- A comparison of aluminium levels in tea products from Hong Kong markets and in varieties of tea plants from Hong Kong and India
- *Camellia sinensis*, infusion, aluminium, Alzheimers disease

Highlights

- Significant findings
- Example paper
- Highlights

Authorship

- Multi-authorship is common – authors should contribute to be qualified as a co-author
- Some journals may require a statement of contributions
- Design, Exercise, Analysis, Writing, Funding, Supervision, Editing
- Inclusion of someone who does not deserve authorship & exclusion of someone who does are equal offences.
- All authors must read and approve the final version of the paper before it is submitted – permission maybe required by employers
- Authorship complaints will result in immediate suspension of the review process or retraction of the paper
- Resolution of the authorship complaints will be referred to your institution
- Publishers are applying increasing scrutiny to gift authorships – hit list.

Authors – how to list authors

- Previously – alphabetical order
- More usually now – reflects amount of input on the paper
- Supervisor as corresponding authors, student as first author
- One first author, one corresponding author for students
- Sometimes the project lead is second or last – depends on the journal.
- **Full name – some journals want initials – check**
- Sometimes family name first – M.J Watts or MJ Watts or Watts, MJ or Michael J Watts
- Be consistent throughout your academic life for ease of search engines

Affiliations

- Work belongs to the institution where work was performed
- Address of author should be that of the institution
- Includes – Institute, Department, Institution, city, country, postcode, country
- If author has moved by time of publication “present address” (at footnote)

Abstract

- **Structure of an abstract**

- summaries of major parts of the paper – skeleton of the paper

One paragraph, usually <250 words to summarise scope, methods used, results, conclusions and significance of the research

- **Main purposes of Abstracts**

- Enable readers to identify basic content of a paper quickly and accurately
 - Editors use them to screen papers for review and to choose handling editors
 - Prospective reviewers use them to decide whether or not to agree to review a paper
 - From a web search, readers may decide whether to purchase access to the full paper

Writing the Abstract

- Why did you study it?
- How did you study it?
- What did you find and what does it mean?

Basic contents

- State principle objective and scope of investigation
- Describe methodology employed
- Summarise results
- State principal conclusions
- Should be specific and concise and stand alone from the rest of the paper
- Should not include abbreviations or citations of other papers

Heavy Metals Concentrations of Surface Dust from e-Waste Recycling and Its Human Health Implications in Southeast China

Anna O. W. Leung† Nurdan S. Duzgoren-Aydin‡ §K. C. Cheung† Ming H. Wong*†, Environmental Science & Technology, Vol 42/Issue 7

- The recycling of printed circuit boards in Guiyu, China, a village intensely involved in e-waste processing, may present a significant environmental and human health risk. To evaluate the extent of heavy metals (Cd, Co, Cr, Cu, Ni, Pb, Zn) contamination from printed circuit board recycling, surface dust samples were collected from recycling workshops, adjacent roads, a schoolyard, and an outdoor food market. ICP-OES analyses revealed elevated mean concentrations in workshop dust (Pb 110 000, Cu 8360, Zn 4420, and Ni 1500 mg/kg) and in dust of adjacent roads (Pb 22 600, Cu 6170, Zn 2370, and Ni 304 mg/kg). Lead and Cu in road dust were 330 and 106, and 371 and 155 times higher, respectively, than non e-waste sites located 8 and 30 km away. Levels at the schoolyard and food market showed that public places were adversely impacted. Risk assessment predicted that Pb and Cu originating from circuit board recycling have the potential to pose serious health risks to workers and local residents of Guiyu, especially children, and warrants an urgent investigation into heavy metal related health impacts. The potential environmental and human health consequences due to uncontrolled e-waste recycling in Guiyu serves as a case study for other countries involved in similar crude recycling activities.

Graphical Abstract

- Increasing use of graphical abstracts by journals.
- A graphical abstract should be one image and should visualise a process or make one point clear
- For ease of browsing, the graphical abstract should have a clear start and end, preferably reading from left to right or top to bottom.
- Try to reduce distracting detail as much as possible.

Introduction

- Provides the necessary background to provide the context, novelty and need for the work
 - Review the literature – should have emphasis on recent work in the last 3-5 years to show what has been done before and where are the gaps.
 - Aim and objectives to achieve the aim – VERY IMPORTANT
- The introduction should build to A&O to explain the need for the current work having reviewed what had been done before and how it adds new knowledge to the literature.

Introduction

DO – things you should do

1. Consult Guide for Authors
2. Set the scene, outline the problem and hypotheses
3. Ensure that the literature cited is balanced, up to date and relevant
4. Define any non-standard abbreviations and jargon (words used by a particular profession)
5. *****Remember the Aim and objectives to meet the Aim to structure the paper*****

Introduction

DON'T – things you should not do

1. Write an extensive review of the field
2. Cite too much of your own work or your colleagues or work that supports your findings, while ignoring contradictory studies or work by competitors
3. Describe the methods, results or conclusions in too much detail other than to outline what was done and achieved in the final paragraph

Writing the introduction

Three parts

1. General Background
2. Previous findings by others
3. Your experiment examining the questions addressed

Essential contents

1. Present **nature and scope** of problem investigated
2. **Review relevant literature** to orient readers (cite references)
3. Include a **hypothesis** if any
4. State **specific objectives** of project (itemise one by one)
5. State method(s) of investigation but only briefly

Materials and Methods

Experimental procedures (BIG SOURCE OF INITIAL REJECTIONS)

- Describe **how, when, where and what** you did
- Give details so competent workers can repeat experiments
- State all controls, treatments and replicates that you tested (with sufficient treatments and replicates)
- Details on **QA/QC** (quality assurance and quality control) for chemical analyses – standard reference materials, code number, where obtained, blank etc.
- Whenever **hazardous materials and dangerous methods** were used the necessary precautions should be stated
- If the experiments dealt with animals (with backbone) and humans – **“Approval by Ethical Committee”** is highly essential (STROBE)

Materials and Methods

Experiments dealing with living organisms

- Both “common name” and “latin name” are necessary – genus, species, strain, cultivar
- Characteristics, age and source of all organisms
- Growth conditions, chemicals, lighting, temperature, diet, apparatus

For ecological experiments

- Maps or photographs showing sampling locations
- Collection of field samples and pretreatment etc.

For plant trials

- Random block design, temp., relative humidity, light intensity, light/dark cycle
- Watering regime, nutrient solution, growth substrates, pot size, number of pots/treatments

Materials and Methods

- **Published methods** should be cited with appropriate references (original references or any published modifications) – should be free to access and findable
- If you have modified the method, clearly indicate which parts have been modified
- **New methods**/Novel methods should provide all information on new techniques, equipment
- Precisely describe measurements and analysis
- Use ordinary statistical methods (R, Minitab etc), provide mean $\pm$ SD, level of significance ($p < 0.05$)
- **For better organisation – use sub-headings**

Experimental Organisms, Chemical solutions, Microscopy, Sampling Techniques, Statistical Analyses etc.

Results

- Entire paper stands on the results section
- The shortest section – **simple and direct**
- Present data from the present study
- **Make no comparison** with data in other papers
- No discussion - **Some journals may have joint Results and Discussion – check journal requirements**
- Use **figures/tables** to support generalisations for data
- **Avoid redundancy** – avoid repetition with the same data i.e. not in both table and figure
- **Do not describe data in detail** in the text where presented in a table or figure
- Guide reader and point to **trends and patterns**
- **Support conclusions** drawn from numerical data, with brief statements of statistical criteria used

Results - A description of the experimental approach and the main findings

DO – things you should do

1. Use **figures and tables** to summarise data
2. Include enough **statistical analysis** to persuade the reader
3. Ensure the text, **figures and tables** are consistent with one another
4. Ensure figures and tables have an **appropriate legend** – they should stand alone without having to read the text.
5. **Emphasise only important observations** that will answer the question or solve the problem raised in your introduction
6. Be selective about the results – the **supplementary material section** is a fantastic way to present lots of data – raw data to support the summarised data, observations and interpretation in the paper itself.
7. SM – **additional confidence and transparency in the study**, but also makes data more usable for other uses – e.g. reviews, database, AI etc. Open to greater scrutiny for appropriateness to future applications needing harmonised data.

Results

DON'T – things you should not do

1. Include “discussion” or “introduction” unless it is truly essential
2. Repeat material that is already in the Methods section
3. Repeat the legends for figure or titles of tables in the text
4. Repeat the data already presented in the figures and tables

Writing the Results

- Use the past tense except when referring to figures and tables

“high concentrations of Pb inhibited root growth”

“Table 1 lists the data collected of a six month period”

- Terms beginning a sentence are usually spelled out

“Figure 1 shows”, instead of “Fig. shows...”

“Lead concentrations...”, instead of “Pn concentrations....”

- A sentence should not begin with a numerical or symbol

“twelve subjects were tested”, instead of “12 subjects were tested”

- Numbers in a sentence should not begin with a decimal point

“0.46”, not “.46” and “-0.05”, not “-.05”

Figures

- Figures and tables are the most effective way to present data

BUT

- Neatness counts – they should be neat and easy to read.
- Design them carefully considering the reader and potential to shrink in size for the final published output in the journal
- A figure should be deleted if it can be replaced with one or two sentences in the text and a few numbers

Figures

Four rules for making figures

1. Design your figures carefully and make them in the final size you desire in the published paper
2. Make all your figures uniform – same line style, same font and font sizes etc.
3. No unnecessary text in the figure
4. If a colleague cannot understand, you probably need to redesign

Discussion

- Tell readers what the results mean & why they are important
- Its primary purpose is to indicate relationships for observed facts
- Interpret results relative to objectives stated in the introduction

(AIM AND OBJECTIVES MOST IMPORTANT FACTOR TO ORGANISE BEFORE WRITING THE PAPER – you can adjust later, but this creates the structure for the paper)

- Is there evidence in your data to support the hypothesis you tested?
 - Why or why not?

Discussion

- Quote relevant references in the text
- Try to avoid old references
- Do not quote too many references for one statement (not more than 3, and pay attention how to list them).

End of Discussion – Concluding remarks (or a separate section on Conclusions – check journal guidelines) regarding:

1. Significance of work based on the results
2. Whether or not the data supports or disproves the hypothesis
3. Suggestions for future studies

- **Keep your language as simple and direct as much as possible**

Discussion - fundamentals

- Begin the discussion by returning to the question raised in the Introduction
 - Mention new findings, knowledge, concepts arisen from your results
 - State whether you have achieved your goal of answering the research question or have found exceptions and unexplained results
 - Compare your results and interpretations with related published work, even if it disagrees with yours
- *Ensure comparison are broad – not focussed on your colleagues or just your own country - CONTEXT*

Conclusion

- Limit speculations – must be evidenced
- Discuss theoretical implications and possible applications of your findings
- Present the conclusions concisely
- Suggest future studies, if any
- Do not repeat materials presented in other sections of the paper

Acknowledgements

Acknowledge anyone who has helped you in the study:

- Researchers who **supplied materials or software**
- Anyone who helped with the **writing or English** or offered critical comments about the content
- Anyone who provided **technical help**
- State why people have been acknowledged and seek their permission
- Acknowledge sources of funding, including any grant or reference codes.
VERY IMPORTANT for funding agencies to evidence outputs

References

- **CHECK the journal guide for authors for the correct format**
- **Check accuracy of each citation** – common mistakes are misspelled names, added or deleted names, incorrect dates, titles, wrong journals and incomplete information - can slow the process for reviewers/editors to accept and even at Production stage.

AVOID

1. Personal communications, publications in doubt (political advocacy), unpublished data and submitted manuscripts not yet accepted
2. If you must cite a submitted manuscript, include it with your submission
3. Outdated papers
4. Citing articles published only in the local language – *although less of an issue with AI / Google Translate these days*
5. Excessive self-citation and journal self-citation

Reference style

Check the journal guidelines

- Use reference tools for ease of changing formatting
E.g. Endnote, Zotero etc.

Supplementary Materials

Materials supportive of the main text

- Data
- Code
- Video data, photographs
- If data is important to the story telling, put it in the paper
- Very useful to place large amounts of data for transparency, use by other researchers – *think harmonisation of data though*
- **Metadata and Quality of data** – include evidence to support your data here
 - All useful for incorporation of your data into AI tools
 - More likely to be cited if you provide your bulk data for others to easily use – **transparency and evidence of quality of data are critical though**

English editing – seeking help

- From an experienced colleague
 - Language editing service
 - Native English speaker who knows the science
 - AI – check journal guidelines on how to acknowledge the assistance, in particular AI tools - you may need to check its use of English-English, grammar etc.
 - **A well written paper will get more favourable reviews** – do not irritate the editor or reviewers with lazy mistakes
 - **Your paper is precious, invest in it**
 - **Don't** rely on the reviewers to improve your paper
 - FINAL CHECKS – careful manuscript preparation can prevent early rejection
- Editors and reviewers are overwhelmed with paper submissions – do not make it easy to reject*

Avoid making silly mistakes

- Balling – Bowling
- Sana – Sauna
- Guess – Guest
- Borber – Barber

Particularly important to check AI inserted mistakes

Choosing Journals

- Check the **scope of the paper** is appropriate for the selected journal – *it is an easy reject without review for editors if not in scope*
- Check **available categories** – full paper, short communication etc.
- After deciding on a journal, adhere to the **format & guidelines** – very important to avoid delays or rejection
- Some journals need the names of 4-6 potential reviewers – contact email, affiliation, sentence of why you chose them - *choose reviewers you have not worked with and from across different countries*
- **Impact Factor (IF) and Journal Ranking** according to discipline – ISI Journal Citation Report published every year (normally June).

Cover Letter

- This is your chance to speak to the editor in chief
- **Keep it brief** but convey the particular importance of your manuscript to the journal – make sure you have written the correct journal name!
- Try to convince the journal editor that they should publish your study – invest time at this stage
- Have an experienced colleague help

Suggest reviewers

- You may suggest reviewers and exclude people who you think are inappropriate due to conflict of interest or other issues
- Do not suggest colleagues, former students etc.
- If you wish to exclude someone you can say they are a competitor
- Journals such as Springer Nature do not accept recommendations – not trusted
 - You could place them in the cover letter as an alternative to help the editors – it is difficult to secure good quality reviewers, the editor may choose one or two to supplement the invitations – helps to speed up the process
 - **BUT do not waste time using friends and fellow nationals!**

Reviewing Process

- Some journals only Editor in Chief, with Co-Editors in Chief, Associate Editors – make sure you send your paper to the right Associate Editor

Step 1: Assign a coordinating editor

Step 2: send paper to 6 to 8 reviewers

Recommendations – based on comments from at least 2 reviewers

- a) Reject without review
- b) Accept with (minor/major) revision
- c) Reject after review
- d) Not suitable, but will be reconsidered after major revision

Reviewing process

- Comments will be released to the authors (corresponding author)

Very Important:

- a) Address all the items raised by reviewers, point by point – do not overlook and hope the reviewer will miss it or give up!
- b) Indicate where changes have been made on the revised paper – line number etc.
- c) Resubmit the paper within the specific deadline – the paper will be withdrawn by the journal after the deadline and you have to start all over again.

Milestones

**You can track using the journal portal – you can enquire on progress
BUT be realistic about the turnaround time.**

- Submission
- Review
- Decision
- Submission of revision
- Review
- Recommendation from Handling Editor to Editor-in-Chief
- Submission of final decision by Editor-in-Chief to Publisher

Dealing with Editors and Associate Editors

If invited to revise & resubmit

- Write a detailed response to the comments – this makes the editors job easier to tick off all the required points.
- Respond to all points even if you disagree with a reviewer, provide a polite, scientifically solid reply rather than ignore their comment
- Make changes in the revised paper
- Provide a page & line number when referring to revisions
- Perform additional calculations, computations or experiments if required; these usually make the final paper stronger

Dealing with Editors and Associate Editors

If your paper was rejected with invitation to resubmit

- Try to understand what the reviewers & editors really want you to do – if unsure, ask
- Do not take short cuts. Your paper will be rejected if you only make cosmetic changes
- Once you have decided how to proceed, do any required additional work & then proceed as indicated for a revision

Dealing with Editors and Associate Editors

If your paper was rejected without apparent reason

- Try to understand why the paper was rejected – it can feel personal
- You always have the option to appeal, but you will succeed only if you have a very good case
- If you decide to write to the editor, be thorough and explain how you would modify the paper to address the reviewers criticisms
- Most appeals are unsuccessful – be sure you have a strong case.
- Do not annoy the editor
- Make sure your comments are clear and factual – do not make personal comments

Accepting Rejection

Do not take it personally!

- Try to understand why
- Evaluate – will your paper meet the journal requirements with the addition of more data or is another journal more appropriate?
- Do not resubmit elsewhere without addressing the reasons for rejection & checking the new Guide for Authors – remember editors see 100's or 1000's of papers – they may have useful suggestions.

A possible strategy for submitting elsewhere

- In your cover letter, declare the paper rejected & name the journal
- Include the referees reports & show how each comment was addressed
- Explain why you are submitting the paper to this journal; is it a more appropriate journal?

Ethics

Unethical behaviour includes:

- Multiple submissions
- Plagiarism
- Data fabrication and falsification
- Improper use of human subjects and animals in research (STROBE)
- Improper author contribution / citations

Multiple submissions

- Multiple submissions save your time but wastes editors time
- Competing journals exchange information on suspicious papers – software will scan similarity of text to all internet sources.
- Authors may be put on a watchlist
- You must not send your manuscript to a 2nd journal UNTIL you receive the final decision from the 1st journal
- The editorial process of your manuscripts will be completely stopped, if the duplicated submissions are discovered

Plagiarism

- Plagiarism is the appropriation of another person's ideas, processes, results or words without giving appropriate credit
- It is a serious offence that could lead to paper rejection, academic charges and termination of employment – serious effect on scientific reputation.

DON'T DO IT

- Corrective Actions
- Rejection of papers
- Notice of violation posted electronically (retraction by publisher).
- Prohibition from publishing in periodical(s)

Data Fabrication and Falsification

- **Fabrication** is making up data or results and recording or reporting them
- **Falsification** is manipulating research materials, equipment, processes or changing / omitting data or results to misrepresent research
- There are self-styled publication sleuths looking for unethical practices

Redundant Publication

- Do not submit a previously published paper or data
- Previous publication of an abstract from proceedings of conferences – if so, full disclosure should be made at submission
- Many journals allow placement of a pre-print during the review process – many encourage it.
- **Remember** – anything posted previously will be counted by the plagiarism software - >20% rings alarm bells to the editors and a need to look at the sources.

Some useful references

- www.segh.net – see the British Academy Writing skills workshop area Youtube videos for lectures -
 - from EiCs Professors Ming Wong and Mohamad Chehimi.
 - Quality in measurements
 - Referencing tools
 - Promoting via social media.
- Typical book titles for writing skills are prolific – Google.
- Investigate AI tools and the consequences for using them.