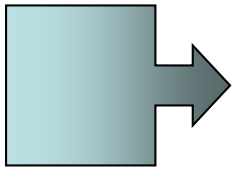
Scientific Writing and Manuscript Development

Jiquan Chen
Michigan State University
7/25/2019

Structure

- Title, Author(s), Affiliations
- Abstract
- Introduction
- Methods
- Results
- Discussion
- Conclusions
- Acknowledgements
- References
- Appendix/supplements
- Links to online information



Results & Discussion

How do you start, proceed, and complete?

- If you have a good story to tell;
- A paper is written for readers, not for yourself;
- Keep it simple stupid (KISS) model;
- Is there any new knowledge or study is unique?
- Who are your audience and what's the appropriate journal?
- Who are your coauthor(s)?

Be confident, persistent, and professional!

Have a title, author list, affiliations, target journal, and possibly potential reviewers

- Who has contributed to the study?
- Who should be the corresponding author (again, be very professional)? Keep in mind that the first author will do most of the work!
- Develop a memorandum so that all involved parties agree!
- Ask your coauthors be critical and constructive (i.e., not only raise questions and make suggestions, but also provide solutions).
- Get a copy of the instructions for authors!
- Set up a timetable and deadlines!

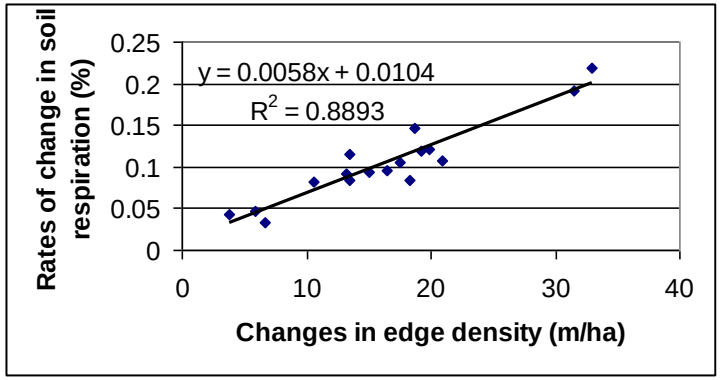
State the study objectives, necessary hypothesis, and justifications.

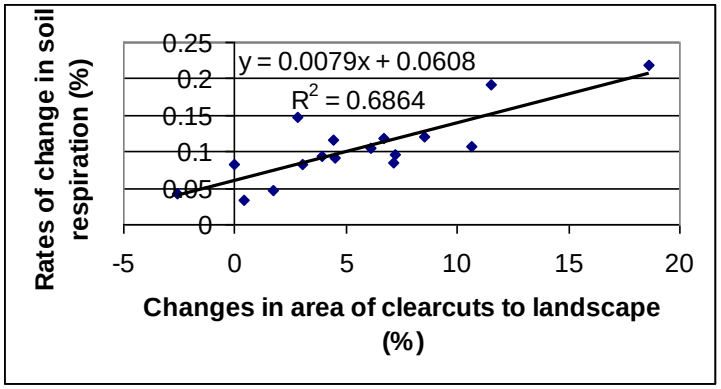
- A list of scientific questions would be of great help!
- This paragraph is usually the last one in the introduction section of a manuscript.
- Statement of attractive, testable hypothesis is a plausible way. Later you can echo your results and discussion.

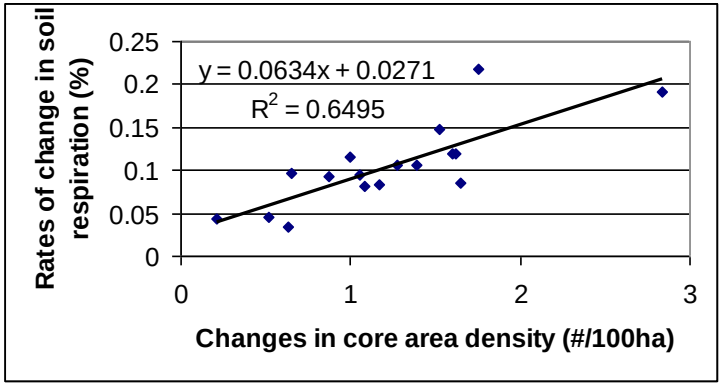
Develop illustrations (figures, tables, photos, etc.)

- Illustrations should be VERY high quality and follow journal requirements (e.g., units, spacing, lines, labeling). You want to impress the reviewers with quality artworks.
- Remember that MORE is not BETTER. I don't recommend to have more than 15 illustrations.
- All illustrations should be synthetic and easy-to-read.
- Eliminate any extra space, duplicated text.

This NOT acceptable!







Develop illustrations (figures, tables, photos, etc.)

- Figures should be easy-to-read. For example, do not use too many lines in one figure.
- Do not use color unless it's necessary (cost, copy, etc.)
- Do not duplicate in tables and figures.
- Most importantly, a detailed, self explanatory caption is needed. Many readers are lay and do not have time to read your manuscript carefully. S/he should get the messages by reading your figures and captions. This is the place that you should not worry about duplications.

Results: state your scientific discoveries objectively, i.e., no comments or speculations!

- Tape your illustrations on the wall (to see) and directly, objectively describe each figure/table.

- Do not cite any reference. If you have any text relating to other studies, move it to the discussion.

- Start a paragraph with a topic sentence (most important) – a comprehensive sentence summarizing the results of the entire paragraph. If a read can get the messages by ONLY reading the topic sentences of the manuscript, you succeed! (see example later followed by an exercise)

- Make sure your statements are backed by statistics!

Topic sentences

Case 1: Figure 2a shows the global spatial pattern for GRI.

Case 2:

RESULTS

To answer these two questions, the 15-day maximum synthesis of Global Inventory Modeling and Mapping Studies normalized difference vegetation index production (GIMMS-NDVI) were used to reproduce growing process of the double season crops (Fig. S2),

Case 3:

Figures 2 presents the change in major transportation tools from 1978–2010.

Note: “Results” are yours, not other published materials

Describe the methods, including study sites, data collection, statistical analysis.

- Your goal is to make sure readers have a complete understanding of the methods.
- Often, one needs go back and forth many times to refine your methods, especially the stats.
- Do not provide any details for widely used methods that one can find in major textbook (e.g., diversity index, linear regression, etc.).
- Proper citations are needed following journal requirements.

Discussion

- This is the most difficult section to write.

- Think about
  - what you have discovered
  - why these discoveries are important
  - what are the major points you want to make
  - Are your results supported by the literature
  - What are the implications for science or management
  - What are the shortfalls or limitations
  - What additional (or future) efforts are needed

- References are heavily used in this section. Please make sure you do not copy published text (i.e., plagiaries).

- Pay attention to TOPIC SENTENCES

Back to introduction

- Assume you have read a lot of relevant papers.
- Begin with the state-of-the-art of science on the topic.
- State what's missing in previous studies.
- What studies are needed on the topic.
- A reviewer will get his/her impression from this section. So make sure you can get reviewers' attention here.
- Again, a paper is written for others, not for yourself.

Conclusions

- What are the take-home messages?
- What do scientific challenges remain?
- Do not exceed 3 paragraphs, 2 are enough!
- Do not repeat your results, but synthesis!
- Once completed, work on the abstract.

Abstract

- 1-2 sentences on the knowledge gaps
- Brief description of the methods (often too long!)
- Highlighted major discoveries
- Pitfalls and/or importance/Implications
- Conclusions

Complete references and conduct internal reviews

- Read the instructions very carefully
- Double check citations – references
- Disconnect Endnotes!
- Now you have completed you manuscript, it is very critical for your coauthors and colleagues to review it and provide CONSTRUCTIVE SUGGESTIONS. Ask a favor for an experienced scientist to HAMMER it. It's much better to receive a friendly review.

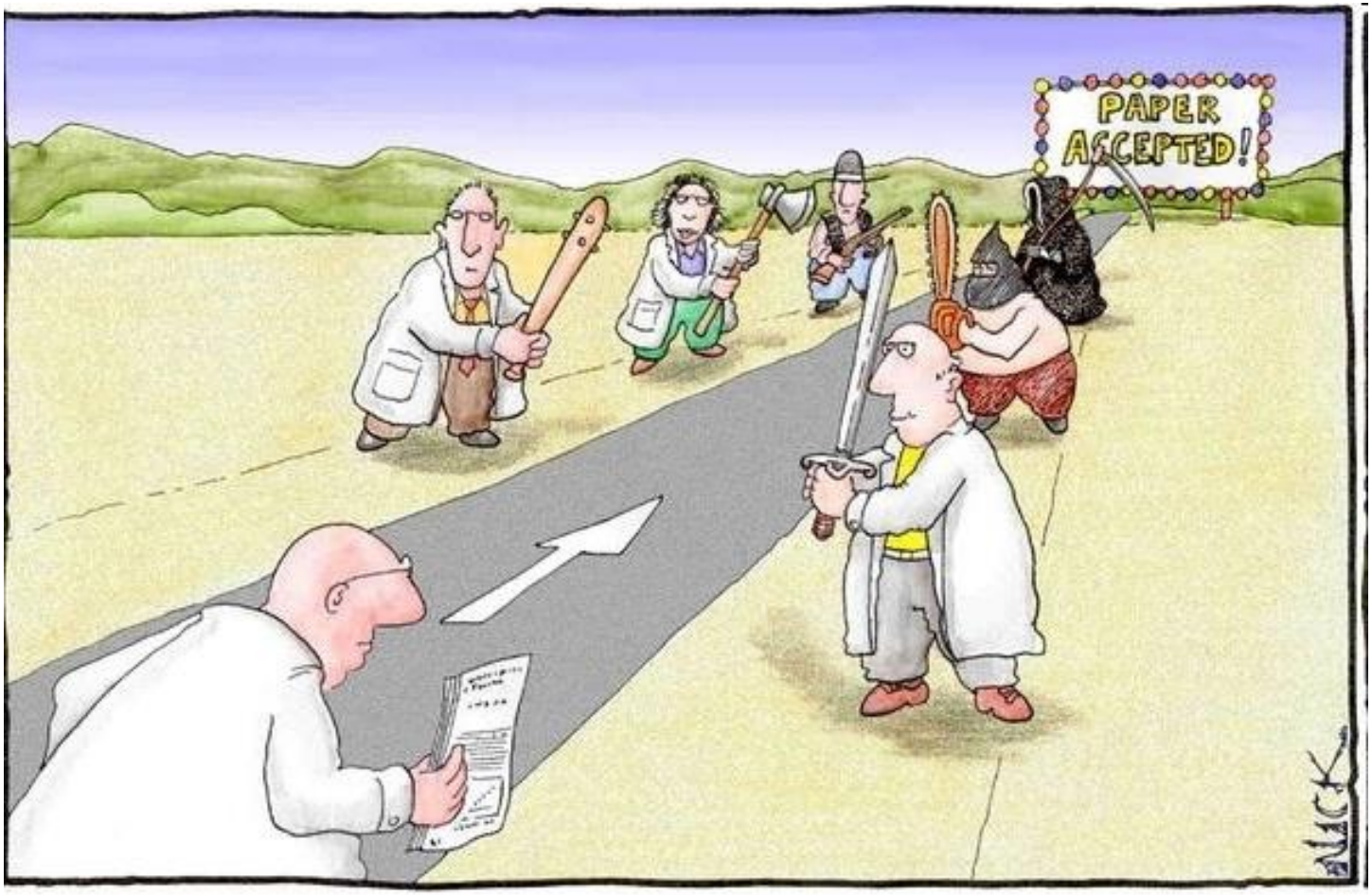
More Tips:

- Watch for parallel structure
- Junior writers pay too much attention to their methods, however LOGIC and PHYLOSOPHY are much more important. THINK, THINK, and THINK!
- What are the take-home messages? Remember our goal?
- Use written languages! Always have someone else to read your manuscript, regardless of English as a second language.
- Take reviews, especially the negative reviews positively. NEVER TAKE IT PERSONALLY!
- Be confident. Good luck to all!

Common Reasons for Rejection

- Poorly written/poor style
- Conclusions unjustified by data
- Flawed or poor design methods
- Faulty statistical analysis
- Hypothesis not adequately tested
- Back luck!

Jiquan's Advice: Be Persistent, Positive, & Strong !



Most scientists regarded the new streamlined peer-review process as 'quite an improvement.'

Ethical Issues

- Data manipulation/falsification
- Plagiarism and self-plagiarism
- Conflicts of interest

Before Writing the First Word

- Doing “Inner” Work
- Plagiarism is strictly prohibited!

Focus!

Before Writing the First Word

- Think of the skeleton of writing as order
- Think of the body mass of writing as conciseness
- Think of the muscle tone of writing as vigor

The Skeleton: Constructing a Stable Framework

Consistency

1. Format

2. Terminology (e.g., NEP, NEE, productivity, production, flux, T_{CO2}, etc.)

Vigor: Empowering Your Words

1. SENTENCE TYPE

- Simple vs. complex sentences
- Diversity is the key
- No matter how stimulating your content may be, too many sentences of the same type, the same length, or some combination of the two make for deadly dull writing.

Vigor: Empowering Your Words

2. VERB POWER

- Grammatically-correct vs emptiness
- Dynamics
- Cultural in different disciplines
- Popular words
- ?

Vigor: Empowering Your Words

3. VOICE

- Text is livelier and more informative when written in the active voice (i.e., when the subject of the sentence is the doer of the action of the verb).

- When the sentence is written in the passive voice, the subject is instead the receiver of the action.

Ending: After Writing the Last

2. Improving your prowess as a writer

However, nothing you can do will do more to improve your prowess as a technical writing than to keep on writing!