Manuscript Writing Workshop

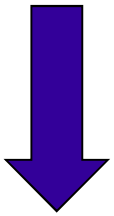
Sustainable Sciences Institute
(SSI)

Getting Started

This is an interactive workshop meant to teach you the basics of scientific writing AND help you progress on your current manuscript

FORMAT

Lectures and exercises



Followed by

One-on-one tutoring

To help you write your manuscript

Why Publish?

Because this is how we build the body of knowledge that is science!

- Dissemination of new information
- Establishes you as a member of the research community; allows feedback

Scientific knowledge is “constructed…not just in labs or field sites, but in arguments that scientists conduct through the medium of scientific papers.”

Winsor 1993. Understanding Scientific Prose

Goals of Writing

- Goal of scientific research is to further scientific knowledge
  - –Can't be achieved unless describe results to others

- Primary aim is to communicate

- You need to convince your readers WHY your research is important

Ref: V. McMillan
and Penrose & Katz

Types of articles

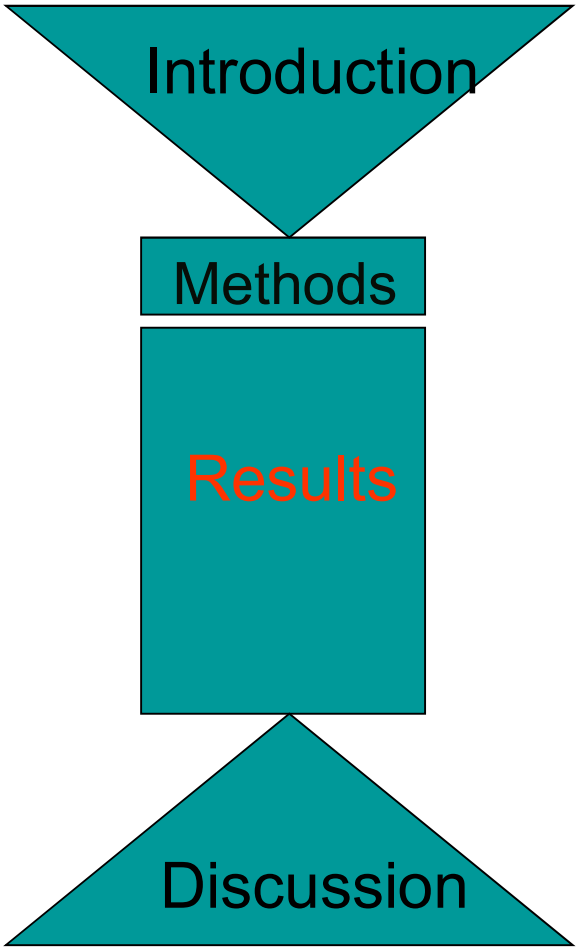
- Original Research
- Hypothesis – Intervention
- Descriptive, Surveillance
- Methods or Procedures
- Case Series/Meta-Analyses
- Case Reports
- Literature Reviews

All have a solid structure and need a ‘main point’!

Article Format

5 Sections

- Introduction
- Materials and Methods
- Results
- Discussion
- Abstract

Part	Answers	Goal
	Why?	Motivate reader
	How?	Enable replication
	What did you find out?	Share data
	Significance?	Suggest interpretation
Acknowledgments	Who helped?	Give thanks
References	Papers cited?	Give credit

Format of the Research Paper allows you to:

- State your assumptions and “main point” in multiple places
  - The Abstract, Introduction, Results, and Discussion
- Describe your research so others can repeat the experiment
  - Materials and Methods
- Clearly separate:
  - *Interpretations* (Discussion) from the
  - *Data* (Results)

Science Writing

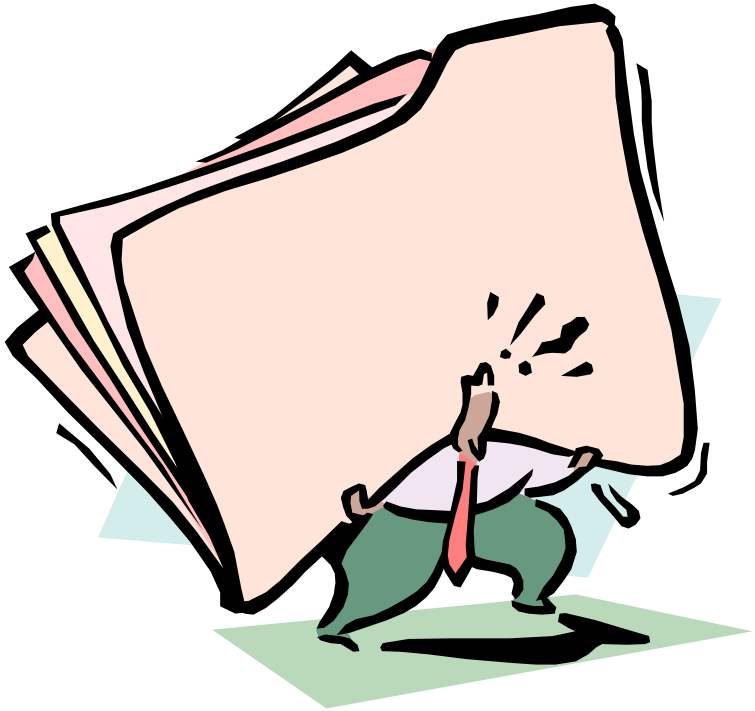
Science writing is different than literature writing.

- Short, direct sentences are used.
- Clarity is the most important factor in making sure your message is communicated and understood.
- Appropriate language is critical to communicate your specific meaning.

When do I start writing?

When do you have enough data for a paper?

- Analyze data and prepare figures first – do they tell a story?
- Try writing an outline or rough draft
  - This may expose a hole in your data. (Tree of Ideas)
  - Are your sample sizes meaningful?
    - Size of confidence intervals
    - Data reaches statistical significance?



Ref: K. LaMarco & R. Ward

Create a rough draft or outline

Start with your tables and figures

- WHAT data will you present and HOW?
  - Decide what data NOT to show as well as what to show
- Write a sentence or phrase about what each table or figure shows
- If these sentences tell a story….then you are ready

Ref: K. LaMarco & R. Ward

Receive feedback

Present your work orally – formally or informally

- Reveals holes
- Receive suggestions

Ref: K. LaMarco & R. Ward

What is your ‘main point’?

-What is the one most important finding that you want the reader to know?

-Which aspect you consider is the main finding or **interest to be published** and the reader deserves to know?

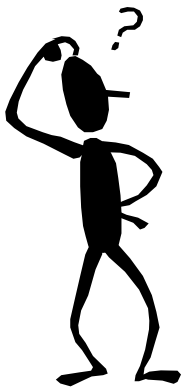
-This is your “main point” or ”**global message**” Repeat it again and again in your article.

The Main Point or Global Message

- Title → Main point (if possible)
- Introduction → Main point
- Materials and Methods → Not here
- Results → Main point
- Discussion → Main point
- Abstract → Main point

Who should be an author?

Those who contributed substantially to the work by doing ALL 3 of the following:



1. Substantial contributions to the conception and design, acquisition of data, or analysis and interpretation of data
2. Drafting the article or revising it critically for important intellectual content
3. Final approval of the version to be published

- Deciding who is an author may depend on the rules of your institution/lab and/or the journal!

Ref: R. Day

Authors

- Once you decide who should be an author be sure to
  - Talk with them and make sure they agree (should be willing to take public responsibility for the work)
  - Have them review final draft
- Many journals will ask for details of how each author contributed and confirmation from each author.

Ref: R. Day

Authors: What order?

- In order of importance of the experiments/work that they contributed
- First author is the primary author
  - Did most of the experiments and writing
- Last author is typically the head of the laboratory
  - However, this may differ

Ref: R. Day

Writing Style Advice

- Science writing is different from other writing

The language used in science writing is more direct and short

- Make it easy-to-follow

  Present a direct story that supports your main point

- Show your line of thinking

- Help the reader understand your thought process

Style Recommendations

1. Think about paragraph structure
2. Place emphasis deliberately
3. Link ideas into logical sequence with transitions
4. Be concise

Style recommendation #1: Think about paragraph structure

1. Each paragraph is a new thought and should have a **main point**

2. Each paragraph should be only **ONE** new thought

3. Sentences within a paragraph need to be connected by an obvious **flow of ideas**

Paragraph Structure

Begin with a topic sentence that is short and clear.

Next, add evidence, support, and illustrations of the topic sentence.

End by restating the main point in new words and transitioning to the next paragraph.

(Or begin the next paragraph with a transitional phrase). Then continue…

Paragraph Example

The key characteristic of scientific writing is clarity. Ideally, clarity should be a characteristic of any type of communication; however, when something is being said *for the first time*, clarity is essential. Most scientific papers, those published in our primary research journals, are accepted for publication precisely because they *do* contribute ***new* knowledge**. Hence, we should demand absolute clarity in scientific writing.

Style recommendation #2: Place emphasis deliberately

1. To emphasize important information
    - Repeat it
    - Highlight the point:

        “The **most important** finding was that...”

2. For less important information
    - Make it shorter

Emphasis: Power Positions

The first and last sentences of a paragraph are the power positions. Middle sentences often are buried. Readers tend to be less conscious of what the middle is saying. They may be in a hurry and will consciously or unconsciously just read the first and last sentence of a paragraph.

So, use those stress positions to your advantage!

Emphasis: Repeat Key Words

Repeat key words to make your message clear
– so the reader will remember them

"There is abundant evidence for the public health **benefits** of bed-net use. **These benefits** include the following: low cost, ease of use and can be used with insecticides."

Readers will not notice the repetition as much as you do!

Emphasis:

Repeat key terms early in sentence

Example:

"Digitalis **increases the contractility** of the mammalian heart. Changes in the calcium flux through the muscle cell membrane cause **this increased contractility**."

Better:

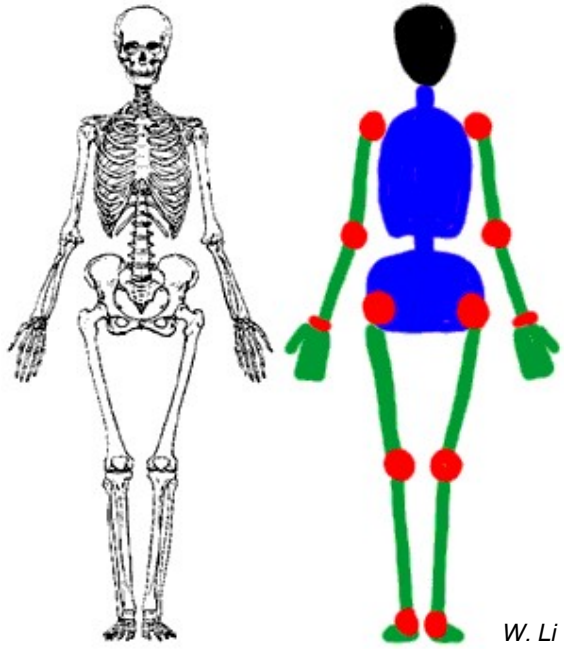
"Digitalis **increases the contractility** of the mammalian heart. **This increased contractility** results from changes in the calcium flux through the muscle cell membrane."

Style recommendation #3:

- Connect ideas into logical sequence
  Transitions Are Essential!

- Each paragraph represents **one** thought/idea.

- It should be clear how each
- NEW thought follows from
- the PREVIOUS one.



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- **Show your line of thought**

Connect Ideas:

Help reader with signs directing them

- Subheadings

- Transition words and phrases

Common transition words
Therefore, / Thus, /In conclusion
First, Second, Finally
For example
However, / In Contrast, / Instead
In addition, / Similarly, / Furthermore, / Also,
Although / Despite / Nonetheless

Connect Ideas: Transition examples

Not as clear:

"Malaria infections have decreased, malaria drug usage has decreased and hospitalizations have decreased. The conclusion is bed-nets are decreasing the incidence of malaria."

Preferred:

"Malaria infections have decreased, **suggesting** that bed-nets are impacting malaria transmission. **Similarly**, hospitalizations have decreased, **lending additional support** to this hypothesis. **Furthermore**, malaria drug usage has decreased. **Thus**, it seems likely that bed-nets are effective.

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Connect Ideas: Transition phrases and clauses

A phrase is stronger than a single-word transition

Less Clear

"During the DEAE elution step, we increased the **salt concentration** from 5 mM to 25 mM NaCl. **Thus,** the recovery of transfer RNA improved two-fold."

More specific

"During the DEAE elution step, we increased the **salt concentration** from 5 mM to 25 mM NaCl. **As a result of the increased salt concentration,** the recovery of transfer RNA improved two-fold."

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Style recommendation #4: be concise!

- Sentences should be: short and to-the-point.
- The point should be obvious

Eliminate extra words:

• The evidence is suggestive that there is a possibility that LIF3 cells do not divide in culture.

→ These findings suggest that LIF3 cells may not divide in culture.

→ LIF3 cells did not divide in culture.

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• Examination of the patients was carried out.→ The patients were examined.

Other ways to cut words

- Use colons or semicolons:

"Good writing has three qualities: brevity, clarity, and good structure."

- Omit filler phrases

- It is…….
- There is……
- It is clearly…….

Be simple. Be concrete. Be specific.

Word or Phrase scientific papers	**Preferred for**
Looked at	Examined
Prior to	Before
Due to the fact that	Because
The vast majority of	Most
Utilize	Use
At this point in time	Now
It has long been known that	GIVE A REFERENCE!!!

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