



USAID
FROM THE AMERICAN PEOPLE

CIMMYT
International Maize and Wheat Improvement Center



Agricultural Innovation Program (AIP) for Pakistan

Scientific Writing

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Mark A. Bell and Thomas L. Rost

University of California, Davis, CA 95616

tlrost@ucdavis.edu

mark.andrew.bell@gmail.com

Why are we here?"

Who has published?



Introductions and expectations

- Write out 1-2 expectations and submit
- Then introduce your neighbor
 - Name
 - Institute
 - A Hobby



Who is Tom?

- PhD – Iowa State University 1971
- UC Davis Professor since 1972 (Plant biology, plant structure and development)
- Department Chair, Associate Dean, Executive Associate Dean, etc...
- Professor Emeritus since 2006
- Special Assistant – College of Agriculture and Environmental Sciences, International Programs since 2009
- Experience – curriculum development – Vietnam, Slovakia, Afghanistan, Pakistan, Myanmar ++



Who is Mark?

What is expected



- Involvement: Get involved.
 - Put more in, get more out.
- Comments & discussion
 - Brief
 - Respect
 - Not personal – focus on content not person



- Veto power
 - Instructor can call for closure – again not personal – but must keep on track.

- Break

- Revive, refresh!

- Cell phones?

- Other?



Daily schedule

- Start? Finish?
- Breaks?
- Lunch?

Class Objectives

After going through this learning module, the participants will

- know the primary sections included in a standard scientific paper
- understand the primary content and purpose of each section, and
- have drafted (selected sections of) a Scientific paper.



Class Structure

Class activities will be conducted in the following order:

- Review the sections and order of elements in a scientific paper;
- Describe the elements included in each section of a scientific paper; and
- Summarize, practice and review the activities and key points in writing a scientific paper.

Ending and beginning

- End day 1. 5-10 minute reflection – what covered? major points learned?
- Begin day 2. Reflections on Day 1. Content and style.
- End Day 2. Evaluation and closing ceremony.



Key Concepts



Key points that should be remembered at the end of the class:

- A scientific paper follows set structures (as defined by the journal involved), and
- Each section has a clear and separate purpose.

Elements of a paper

In small groups quickly

Look at some example papers and

- identify the usual elements common to major scientific publications (e.g., Title,?).
- share



Common elements of a scientific paper

Do we agree?

1) Title; (with a list of Author/s);

2) Abstract (with Keywords);

3) Introduction;

4) Materials and Methods;

5) Results;

6) Discussion;

Note: some papers combine “Results and Discussion”

7) Conclusion;

8) (Sometimes) Acknowledgments; and

9) Literature Cited (References).

What makes a good paper?

Discussion.

- What makes a good paper?
- What is most difficult in writing a paper?
- What is the difference between a scientific paper and the “grey” literature?



What makes good writing?

Discussion.



What makes good writing



Be simple, clear and logical

Avoid....

- unnecessary or fancy words and phrases
- Generalities (Not being specific).

See “More” in booklets.

Rewrite these examples

1. We utilized the tractor which was owned by the farmer for ploughing the fields before planting the wheat.
2. The new technology which involves drip irrigation run by a diesel motor was beneficial to the stakeholders by improving their daily livelihoods.

What makes good writing



Be simple, clear and logical

We utilized the tractor which was owned by the farmer for ploughing the fields some 2 weeks prior to the planting of the wheat crop.



Fields were ploughed 2 weeks before the wheat was planted.

The new technology which involves drip irrigation run by a diesel motor was beneficial to the stakeholders by improving their daily livelihoods.



Drip irrigation improved farmers' livelihoods.

Defining each section or element?

In small groups, write one sentence to describe:



- Title.
e.g., The title indicates the subject and what aspect of the subject was studied.
- Abstract
- Introduction
- Methods and Materials
- Results
- Discussion



Share your descriptions. How do they compare with.....

Why each section?

- Title
 - The title indicates the subject and what aspect of the subject was studied.
- Abstract
 - The summary of paper: The main reason for the study, the primary results, and the main conclusions
- Introduction
 - Why the study was undertaken
- Methods and Materials
 - How the study was undertaken

Why each section?

- Results
 - What was found
- Discussion
 - Why these results could be significant (what the reasons might be for the patterns found or not found)
- Conclusion
 - Was the work conclusive and/or recommended next steps.

Where do I start?

- How to actually write a paper...
- Ideas? What order would you pick?



Tom's Order

Actual order depends on the author, but one option is:

1. Results (analyze data)
2. Materials and methods
3. Introduction
4. Discussion and conclusion
5. Abstract
6. Authorship
7. Title
8. Revisit title



1. Authorship

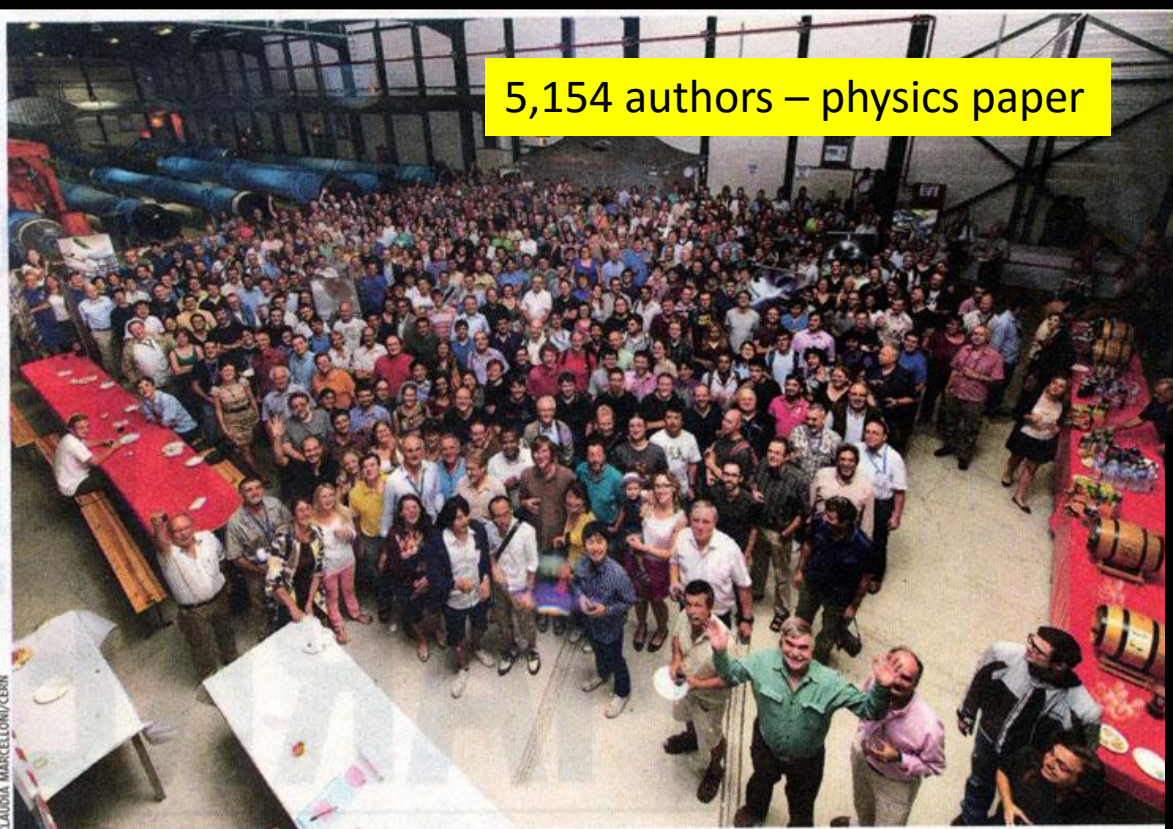


- How to decide who should be an author?
- In addition to the main or senior author who performed the bulk of experimentation and writing of the paper, people who actually contributed substantially during the conduct of the study and preparation of the paper are listed as co-authors.
- The order in the by-line is based on the degree of contribution of each co-author.

1. Authorship

I ♥
AUTHORS

5,154 authors – physics paper



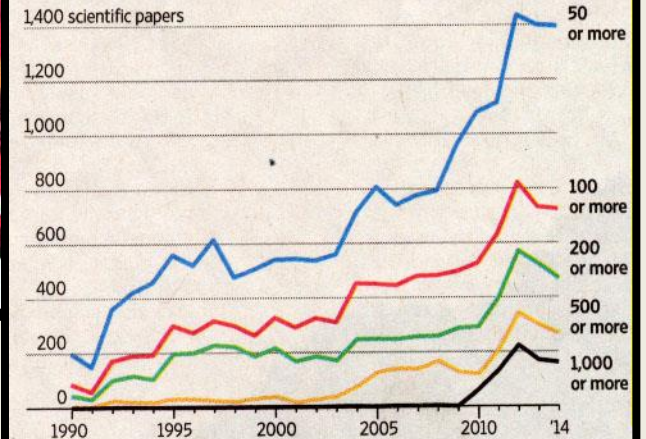
CLAUDIA MARCELLONI/CERN

Scientists who regularly share co-author credit on physics papers gathered at the Large Hadron Collider in Switzerland in 2012.

AUTHOR INFLATION

Credit Inflation

More and more scientists are sharing credit as co-authors on research papers, with a sharp increase in reports whose author counts exceed 1,000 people.



Source: Thomson Reuters Web of Science

THE WALL STREET JOURNAL

The Wall Street Journal, 10 August 2015

1. Authorship



For your data set, make two lists:

1. Possible Authors
 2. Possible people to acknowledge
- Authorship versus acknowledgments
- What's the difference?



2. Title



What makes a good title?

Keypoint. In the title describe what is the subject and what aspect of the subject is studied.

The title should be very limited and specific - a “pithy” summary of the article's main focus.



2. Title



Rate the examples:

What is the subject and **what aspect** of the subject was studied.

- "Renal disease susceptibility and hypertension are under independent genetic control in the fawn hooded rat"
- "Territory size in Lincoln's Sparrows (*Melospiza lincolnii*)"
- "Replacement of deciduous first premolars and dental eruption in archaeocete whales"
- "The Radio-Frequency Single-Electron Transistor (RF-SET): A Fast and Ultrasensitive Electrometer"

2. Title



Activity

- Pick a topic you are familiar with and draft a title.
 - Describe **what** is your subject and **what aspect** of the subject is studied.
- Share a few examples.



3. Results



Keypoint. The Results describe what was found

This section presents

1. The facts-- what was found in the course of this investigation, Illustrations, figure legends,
2. Detailed data--measurements, counts, percentages, statistics,
3. Patterns--usually appear in tables, figures, and graphs,
4. Text - drawing attention to the key data and relationships among data.



3. Results

Three rules of thumb will help you with this section:

1. present results clearly and logically
 2. avoid excess writing
 3. consider a one-sentence summary at the beginning of each paragraph, if you think it will help your reader understand your data
- **Activity.** Make a brief list of the types of data collected (e.g., weather data, soil data, plant or animal observations, yields, incomes,) and how it might best be presented (text, table, figure or..)

ACTIVITY

3. Results

For your data set, what are the main findings?





Materials and methods

Key point. Materials and Methods describe how the study was done

Activity. Indicate: Where the study occurred

- Make a list of the important activities and procedures – in the order they were implemented
- Don't just cite a reference to a procedure
- Note
 - Any assumptions underlying the study?
 - Statistical methods used (including software programs)



5. Introduction



Key point. The Introduction describes why the study was done. Do your example as you proceed.

1. Start with two or three sentences placing your study subject in context.
2. Follow with a description of the problem and its history, including previous research.
3. Describe how your work addresses a gap in existing knowledge or ability (here's where you state why you've undertaken this study).
4. State what information your article will address.

The word "ACTIVITY" is written in a bold, orange, sans-serif font with a slight shadow effect, set against a dark green rounded square background.

ACTIVITY

5. Introduction



Develop one sentence for each of the following

1. Describe the problem area you addressed (e.g., weeds in wheat),
2. What are the objectives and knowledge gap you are addressing (e.g., new weed, new product, new cropping system)

6. Discussion and conclusion

Key point. The Discussion describes why the results could be significant (what the reasons might be for the patterns found or not found)

Activity.

- What was your study question (gap or need being addressed)?
- What do you see as the main points of interest? (make a list)



6. Discussion and conclusion

- Indicate any idea(s) that seem more important to highlight.
- Work out any logical relationships between the ideas and develop a logical flow of ideas.
- What point is most clearly made by your data?



6. Discussion and conclusion

Conclusion Key point. Was the work conclusive and/or recommended next steps.

Indicate which is true for your work:

1. The findings are conclusive - research is complete,
2. There is a need for further validation of inconclusive results,
3. There is a need for further investigation based on research output gaps.



6. Discussion and conclusion

- Conclusions should be based on objectives and any recommendations are clearly stated in this section.



7. Abstract

Keypoint

The Abstract is a summary of paper, (generally 50-100 words) indicating:

- 1) the main reason for the study (why),
- 2) the primary results (What you found), and
- 3) the main conclusions.





7. Abstract

You can think of writing the abstract as taking one or two sentences from each of your sections

- an **introductory** sentence,
- the specific **question** addressed (1 sentence),
- The main techniques or **procedures** (when and where was it conducted, if applicable; your sample size; the specific species, proteins, genes, etc., studied), (1 sentence)
- The main **results** (2-3 sentences), and
- The main **conclusion** (1 sentence).



7. Abstract



Critique an abstract in terms of the three elements.

- 1) the main reason for the study (why),
- 2) the primary results (What you found), and
- 3) the main conclusions.

Note: The abstract will usually be the final piece written.

7. Now write your Abstract

Draft your abstract.

The Abstract is a summary of paper,

1. an introductory (1 sentence),
2. the specific question addressed (1 sentence),
3. The main techniques or procedures (when and where was it conducted, if applicable; your sample size; the specific species, proteins, genes, etc., studied), (1 sentence)
4. The main results (2-3 sentences), and
5. The main conclusion (1 sentence).



7. Abstract (Keywords)

Note on keywords - why have them?

- List 6-8 keywords (preferably arranged alphabetically).
- Keywords indicate the major subjects or concepts dealt with in the paper. Keywords in the title need not be repeated
- Keywords can be very useful in literature searches.



8. Revisit Title



- Now look at your original title
- Want to make any changes?
- **What** is the subject and **what aspect** of the subject is studied.

WORKING) TITLE

Debrief

- What happened yesterday?
- What did you take away?
- Have we made any progress?



Literature Cited (References).

- List all references cited and **follow the journals' or publishers' guidelines.**
- Examples of formats:
 - Choat B, Gambetta GA, Shackel KA, Matthews MA (2009) Vascular Function in Grape Berries across Development and Its Relevance to Apparent Hydraulic Isolation. *Plant Physiol* 151: 1677-1687
 - **Hamamoto L, Hawes MC, Rost TL.** 2005. The production and release of living root cap border cells is a function of root apical meristem type in dicotyledonous angiosperm plants. *Annals of Botany* 97: 917-923.

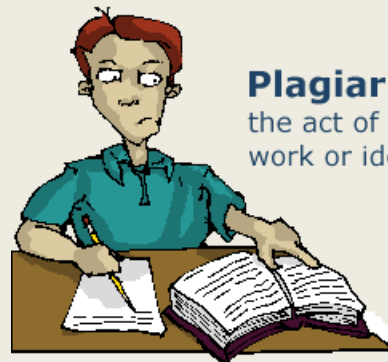
How to cite others



Note – a word on Plagiarism?

The practice of taking someone else's work or ideas and passing them off as one's own

- When is it okay to copy someone's work?
- How is it done appropriately?



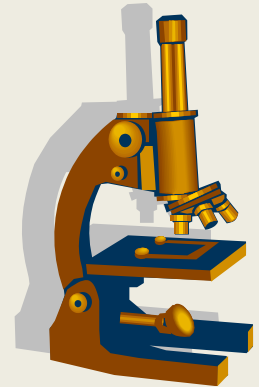
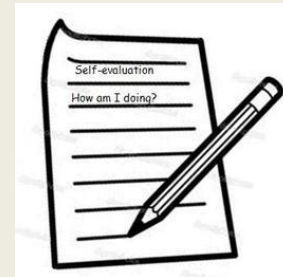
Plagiarism:

the act of presenting another's work or ideas as your own.



Today's activities

- WRITE!!! (WE WILL ASK TO SEE YOUR PROGRESS.)
- Tea break
- Class photo
- Course evaluation
- Certificates
- Lunch / *Per diem* payments



Reflections



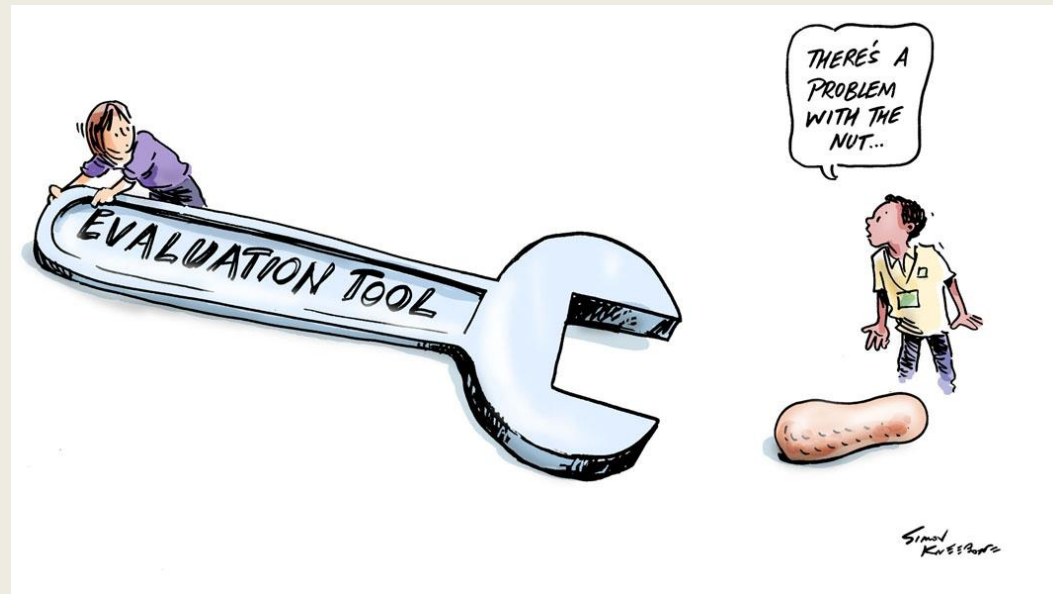
- Course reflections?

Objectives

- know the primary sections included in a standard scientific paper
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- have drafted (selected sections of) a Scientific paper.

Course evaluation

- Evaluation



Excellent
 Very good
 Good
 Average
 Poor





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Closing Award Certificates

