7.02/10.702
Scientific Communication

Spring 2005

Section G (Thr 9-11 a.m.)
Section H (Thr 1-3 p.m.)

Neal Lerner

Office hours: M 12-1; Tue 3-5.

Send an email to Neal.

Tell me about the following:

1) What have been your experiences with writing up scientific content (e.g., lab reports, reviews, research papers)?
2) How would you describe yourself as a writer?
3) What are your writing goals for 7.02/10.702 SciComm?
4) What do you as a reader expect to happen in a research article?

7.02/10.702 SciCom Schedule

- **Course goals**: By the end of the semester, you will
  - Understand the seven components (***title, abstract, introduction, methods, results, discussion/conclusion, tables/figures***) of a laboratory research paper.
  - Understand the ***writing process*** and its application to ***scientific writing.***
  - Understand the importance of ***communicating in writing as a scientist.***
  - Apply an understanding of scientific writing to your ***subsequent independent research.***
- Six Meetings focus on seven components of a research paper:
  - **Introduction** **Meeting 1**
  - **Methods** **Meeting 2**
  - **Figures/Legends** **Meeting 3**
  - **Results** **Meeting 4**
  - **Discussion/Conclusion** **Meeting 5**
  - **Title and Abstract** **Meeting 6**

SciComm consists of the following components:

In-class exercises
--Collaborative writing exercises
--Peer feedback on long-term projects
--Brief oral presentations
20% of final grade

Out-of-class exercises
--One paraphrase of an introduction
--Four critiques
30% of final grade

Long-term projects
--One of six choices
--Produced in revisable increments corresponding to the topic of each meeting.
50% of final grade

SciComm Revision Policy

Revision allowed for most out-of-class and long-term project assignments:

- One rewrite allowed per assignment.
- Rewrites must be turned in by the date indicated on the class calendar.
- Higher grade of the two versions is recorded.

Grading of Written Work

+	Thoroughly superior work. A model of good scientific writing
✓+	Good work. Requires only minor improvements in any of the following areas: organization of ideas; economy of expression; diction (word choice); grammar/punctuation/ spelling.
✓	Acceptable work. Requires moderate revision in one or more of the areas above.
✓–	Acceptable but rough work. Requires substantial revision in many areas.
–	Unacceptable work.
0	Assignment not handed in.

Grading of oral presentations

+	Superior presentation. Talk has structure/organization; presenter has good eye contact/rapport with audience; speaks clearly and correctly. Uses visuals where appropriate.
✓+	Good presentation. Requires only minor improvements in any of the areas above.
✓	Acceptable presentation. Requires moderate improvements in one or more of the areas above.
✓–	Poor presentation (doesn't care or prepare).
0	Fails to complete oral presentation.

To make life easier for Neal, please…

- **Label computer files with your last name and assignment (e.g., Lerner_LTP_Intro.doc).**
- **Indicate** in the upper right hand corner of every document you turn in.
  - **Name**
  - **Section**
  - **Exercise**
- **Double space** all work.
- **Save all drafts of your work** - I may ask for it all at the end of the term.

Choosing a long-term project

1. *7.02/10.702 Learning as Data*: Reflexive reflection.
2. *Re-presenting Gregor Mendel* (my favorite monk): Note that Mendelweb address is now www.mendelweb.org/.
3. *Giving Oswald Avery a chance*: Less is more.
4. *Writing up your UROP*: Done is best!
5. *Into the field*: The scientists' point of view.
6. *Textual analysis*: Not all research articles are created equally.

Meeting 1: Introductions

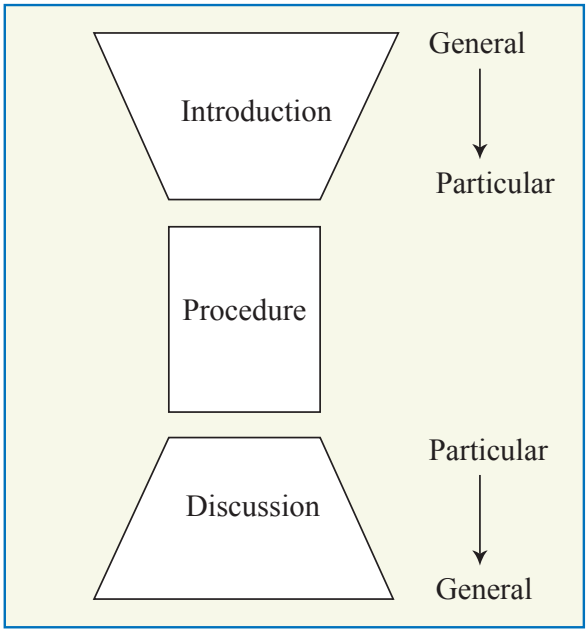
A Brief History of the Research Article

from Swales (1990)

- Mid-17th century: Robert Boyle presents his pneumatic experiments to the Royal Society, public presentations before "witnesses" in order to seek agreement on the results.
- 1665: *The Philosophical Transactions of the Royal Society* is established, the first scientific periodical.
- By 1800 "the definition of experiment moves from any made or done thing, to an intentional investigation, to a test of theory, to finally a proof of evidence for a claim" (Bazerman 1983).
- By 1900, the current format of research article is largely established.

Macrostructure of a Research Article

- ***Introduction*** provides general field or context.
- ***Methods*** follows a particularized path.
- ***Discussion*** moves from specific findings to wider implications.



Overall Organization of the Research Paper (Hill, et. al., 1982.)

Image by MIT OCW.

What is the form and function of an Introduction?

- An introduction is a method to ***familiarize and orient*** your readers.
- The content of an introduction depends on its ***purpose*** and the ***audience***.
- All models share a ***direct approach***. Don't hide your main point or save it until the end of the paper.

Introductions across disciplines contain the essential elements of *context*, *focus*, and *justification*.

Context: Orient your reader to the published literature related to the topic and to essential background information

Focus: Define the research space, stake out territory. What questions are you addressing? What is your hypothesis?

Justification: Show how your work fits into and extends previous work. Argue for the importance of your work.

Swales (1990)

CARS Model of Introductions

Create **a** **R**esearch **S**pace

1. Re-establish significance of research field.

2. Situate actual research in these terms.

3. Show how this niche will be occupied and defended.

Figure 10 in: Swales, J. M. *Genre Analysis: English in Academic and Research Settings.* Cambridge, UK: Cambridge University Press, 1990.

What are Some Common Pitfalls of an Introduction Section?

- Including ***unnecessary background*** or being repetitive.
- ***Exaggerating*** (or understating) the importance of your work.
- Using ***lackluster*** openers and ***weak*** follow-through in the body of your introduction.
- Not grounding the work in a ***context*** that will be important to your reader.
- Not ***focusing*** on a clear and compelling research question or hypothesis.

Tips on Writing Introductions

See the UW Madison Writing Center at http://www.wisc.edu/writing/.

Guidelines for Introductions from Two Scientific Publishers:

From the International Committee of Medical Journal Editors:

State the **purpose** of the article and summarize the **rationale** for the study or observation. Give only strictly pertinent references and **do not include data or conclusions** from the work being reported.

From the American Society for Microbiology:

The introduction should **supply sufficient background information** to allow the reader to understand and evaluate the results of the present study without referring to previous publications on the topic. The introduction should also **provide the hypothesis that was addressed or the rationale** for the present study. Use only those references required to provide the most salient background rather than an exhaustive review of the topic.

Guidelines for Introductions are consistent across journals and, often, scientific fields.

An Example of An Introduction from the *New England Journal of Medicine*

Murphy, Timothy F. "New Strains of Bacteria and Exacerbations of Chronic Obstructive Pulmonary Disease." *New England Journal of Medicine* 347 (August 15, 2002): 465-471.

Today's In-Class Exercises

1. Send an email to Neal describing 1) your experiences with writing up scientific content (e.g., lab reports, reviews, research papers), 2) how you would describe yourself as a writer, 3) your writing goals for SciComm, 4) your expectations as a reader of research articles.
2. Three research articles will be distributed in class. Review the introductions and break into small groups to discuss the features they share and the differences between them. What general properties of introductions can you distill?

Today's Out-of-Class Exercises

Due by next class meeting, Thursday, Feb. 24:

- Write the **introduction to your long-term project.**
- Four students (to be contacted) will prepare **oral presentations** (5 min. max) on the Druker et al. article:

  Role 1: Summarize the article as a whole.

  Role 2: Identify how introduction establishes context, justification, and focus.

  Role 3: Identify pitfalls of the introduction.

  Role 4: Prepare two to three open-ended questions to lead a class discussion of the article.

Due by the next off week--Thursday, Mar. 3, by 5 p.m.:

- Paraphrase in plain language (suitable for a high school senior) the **Introduction** to the Druker et al. article. Email as an attached file.