

## Lecture 3 Outline:

1. Where are we now?
  - a. By now, you should have the core of your paper:
    - i. Storyline
    - ii. Methods
    - iii. Results
  - b. Today:
    - i. Finishing the story
      1. Introducing your study
      2. Saying what it all means
    - ii. Selling it to other scientists
2. Take an active role in how your audience reads your paper
  - a. Your audience should mostly conclude what you conclude after reading your paper
    - i. Don't just assume they will figure it out on their own
    - ii. Does the way you are telling your story work?
  - b. Lead your audience through your paper
    - i. Keep your storyline as simple and clear
    - ii. Set up a logical order to your paper (earlier to later, simple to complex, common to uncommon, bad to good)
    - iii. Make logical transitions between sections
3. Writing your introduction
  - a. General
    - i. Don't bury the lede
      1. What is the most exciting result of your study?
      2. Construct the story around that, if possible
        - a. You will have to determine what your data realistically support, of course
    - ii. It is O.K. to have some excitement in your writing
      1. Don't have to be dry and boring
      2. Excitement comes through strong, direct statements; active voice; and word usage
  - b. Your introduction in three acts
    - i. First Paragraph
      1. Sets up the paper – why is your study important?
      2. First Sentence
        - a. Is important – should give the setting of your first, broadest paragraph
        - b. Keep it short and direct
        - c. Support with solid references (recent, relevant, and excellent reviews and/or book chapters) or none if it is a general enough statement

3. The rest of the first paragraph
        - a. Transition to your specific problem – single it out
    - ii. The Middle
      1. Connect broad intro to your specific problem
      2. Tell the audience about your specific problem
        - a. Start broadly, narrow the information down to fit your study
        - b. Stack the deck in your favor (most examples, more citations for the elements most relevant to your study)
      3. Resist making this too long – don't lose your readers
        - a. Too much information can be a distraction
    - iii. Your Study
      1. How does your study system relate to what you have introduced so far?
      2. What have previous studies found regarding your system?
    - iv. The End
      1. Question(s), Hypotheses, Objectives
  - c. Introductions are hard to write
    - i. Many ways to get from A to B to C
    - ii. Many potential examples
    - iii. Help yourself out
      1. Know the story you want to tell
      2. Plan simplest possible path from A to B to C
      3. Prepare an extensive outline before you start
      4. Write simply, use active voice (join sentences and add transitions later)
4. Writing your Discussion
  - a. Should be the most fun to write
    - i. This is where you get to say what it all means
    - ii. Try to write with some excitement
  - b. Ordering your story
    - i. Answer your main question(s) first
    - ii. Talk about your specific results in the order you introduced them
    - iii. What do your results mean all together for the big problem?
    - iv. What remains to be done?
  - c. What to include in your discussion?
    - i. Main Question
      1. Give an answer to the question you asked at the end of the introduction – this may be all some readers remember about your paper
        - a. Give them a “take-home message”
      2. Creates a strong connection to your introduction

- ii. Specific Results Sections
    - 1. Why do you think each experiment turned out like it did?
    - 2. Talk about in relation to other studies
    - 3. Several ways to do this
      - a. Give each a paragraph
      - b. Talk about all in one paragraph, then talk about together
      - c. Only talk about together
  - iii. What do your results all mean together?
    - 1. What do your results mean for the bigger question?
      - a. Relate back to the topic you introduced in the first paragraph of your introduction
    - 2. What has to be done yet?
      - a. Set up your next paper
      - b. You can also do this for each individual experiment, usually at the end
  - d. Discussions are not as hard to write
    - i. This is the fun part of science, you get to say what you think it all means
    - ii. Have your fun within a set of guidelines
      - 1. Have a good roadmap beforehand
        - a. “Filling in the blanks” is what is fun here
      - 2. Please speculate!
        - a. Readers want to know what you think about your results
        - b. Back it up with good references
        - c. You can always cut parts out later or soften the language
5. Selling your paper
- a. In general how to get cited – People need to find your paper to use it
    - i. Referencing
      - 1. Which references do you use? How many? How good?
    - ii. Picking a title
      - 1. First thing you see in a search, email alert, etc.
    - iii. Choosing key words
      - 1. Key words help in some searches (WOS)
      - 2. Are indirectly important in your title and abstract (Scholar)
    - iv. Writing your abstract
      - 1. Will people download and actually read your paper?
  - b. References
    - i. Which references do you use?
      - 1. General statement – book chapters, reviews
      - 2. Specifics – couple of papers, most recent
      - 3. Bold or Important statements – best references possible
    - ii. Your narrative

1. Challenging paradigms, testing theory – need the best possible references
2. Other narratives – use the most recent relevant
- iii. What is a good reference?
  1. You have a few key refs
  2. Check who else has used it
  3. Don't just pick the most cited (scientists can be sheep)
    - a. All positive citations? Any negatives?
- iv. How many do you use?
  1. Not too many, you need to make some decisions
  2. Max of 4 or so, 1 may be too few, 2 probably best (most of the time)
    - a. For "Gaps in knowledge", shouldn't have too many (aren't that many available). May need to list all of them.
- c. Your title
  - i. Needs to be:
    1. Clear and descriptive
    2. As short as possible
  - ii. Components
    1. Main process, phenomenon, pattern, or theory
    2. Study subject (species, place, element, etc.)
    3. Important modifiers (novel, contaminated, etc.)
    4. Verb – you can make your title a sentence
    5. Title as a question?
- d. Key Words
  - i. Think like your potential searching audience
    1. What sort of searches do you want your paper to show up in?
    2. There will be a sequence of 2-4 words, or phrases you would use to search for similar works to yours
    3. Make sure those words/phrases are throughout your title, abstract, and keywords sections
- e. Abstract
  - i. A compact description of your narrative
    1. 200-300 words (check your journal)
  - ii. Your paper's internet "Elevator Pitch"
    1. Short description of your paper you would give to another scientist during an elevator ride
    2. What do you include?
    3. Why is your paper important?
      - a. What did you do?
      - b. What did you find?
      - c. What does it mean?

- iii. Writing your abstract
  - 1. Start with more than you need
    - a. Don't worry about word limits initially
    - b. Cut out unnecessary information
      - i. Values aren't necessary, give general trends
      - ii. Change things to active voice, combine sentences, use fewer hedging words (potentially, likely, etc.)
  - 2. Make sure all the important stuff makes it into the abstract
    - a. Most interesting questions, results, and discussion – don't bury the lede!
- f. Salesmanship
  - i. A classic notion in science is that your work should stand on its own, no marketing needed
  - ii. Give your work the edge it deserves
    - 1. Make sure people find your papers
    - 2. Make sure they read them
    - 3. Make sure they get the point of your paper