A. INTRODUCTIONS

My motivation for teaching this class is basically that I saw a need. Publishing a paper gives you a sense of fulfillment – after all the hard work. Currency for getting jobs. Very uneven abilities and mentoring in writing. Camaraderie amongst students – should take advantage of it. Personal lack of guidance as a graduate student, was a handicap in my early career.

My experience with teaching about writing. I taught a “W” credit class at UCSC for many years. I am currently teaching a DC (writing in the discipline) course for upper division undergrads.

But, I’ve never been taught how to teach a class about writing, so this is an experiment. In the reading I have done about ‘how to write a scientific article’ I see all kinds of different advice. So, there’s not one technique or approach that works for everyone. But, all of you bring your own experience to the course. Six students here have at least 1 first authored publication, they are a source of diverse opinions and experiences.

My Goals:
1. **Provide some structure, but make this a forum for discussion.** Please ask question. Please provide answers – bring your personal experiences into it. What works for you? What doesn’t work?
2. **Provide you with a synthesis of ideas** that come from my own experiences, but also from books and articles that I have read.
3. **Facilitate ways for you to make progress:** make deadlines, get feedback on your work from your peers and from me, strategies to handle challenges.

What you won’t get from this class. It is true that the writing process itself can help you develop your ideas; in trying to express your ideas clearly, you gain clarity in your understanding, which in turn allows you to express your ideas with increasing brevity and precision. HOWEVER, you need to attain a basic understanding/interpretation of your results BEFORE you start writing. And, this is something you can’t necessarily get out of this class – you need to talk to experts, your advisor, other people in your field. It will be difficult for you to do the assignments without knowing what your data mean.

B. WHEN ARE YOU READY TO WRITE?

You need a module of data/results that tells a compelling and novel story. You basically have to know what that story is. Some people say you need all your basic figures done.

GETTING STARTED

Scientific writing is difficult because 1. the subject matter is inherently complex, intricate and/or abstract; and 2. complexity of the English, especially Scientific English, language.

Question for class: How do you start?
Alley says that the huge variety of answers to this question shows why so many scientists struggle with their writing. Yet, it doesn’t have to be a struggle if you first frame your results.

**First - FRAMING YOUR RESULTS:**
(Cargill & O’Conner, 2009)

Result govern the entire content and structure of your paper. It is important to know what your main points are before you start writing.

Identify from your results a clearly connected story that leads to one or more take-home messages. This term refers to what readers remember after they have put the paper down: what they talk to their colleagues about over a cup of coffee the next day, for example.

To move toward a clear story, focus on your tables and figures first. For each one, write a list of one or two bullet points highlighting the main message(s) of the data presented. Sort the figures and tables into the best order to connect the pieces of the story together. Draft some bullet points into a list to form a take-home message. Then sit down with your co-authors and discuss the story of the paper that you will write. Aim to reach agreement on:

- What data should be included?
- What are the important points that form the story of the paper?
- What is/are the take-home message or messages?

**TASK (see Assignment #1):**
Answer the following questions:

1. What do my results say? (2 sentences maximum, a very brief summary of the main points, with no background!)
2. What do these results mean in the their context? (i.e., what conclusions can be drawn from the results?)
3. Who needs to know about these results? (i.e., who specifically forms the audience for this paper you are going to write?)
4. Why do they need to know? (i.e., what contribution will the results make to ongoing work in the field? Or, what will other researchers be missing if they haven’t read your paper?)

Once you can answer these questions, you are ready to start writing the sections of your paper. You are ready to refine your figures and tables, so that they present as forcefully and clearly as possible, the data that support the components of your story. The rest of the writing process is about refining and expressing this story.

**Second - ESTABLISHING YOUR CONSTRAINTS:**

**AUDIENCE**
- Who will read the document? What do they know about the subject? Why and how will they read the document?
- determines the words you use
- determines the types of figures/graphs you make
- determines the depth you need to achieve
- keep your audience in mind all the time – this helps you write accurately (you are focused on communicating), and at the right level.

**FORMAT**
- Journal specific – page length, limits on figures, structure/sections. These are the simple boundaries.
- How to select a journal? (see page 6 of Cargill & O'Connor)
  - Does the journal normally publish the kind of work you have done?
  - Does the journal publish papers with a format that can effectively convey your results/story?
  - What is the impact factor of the journal? Aim for the highest impact you can, but weigh the risks of rejections, which can slow down publication if you have to resubmit somewhere else.
  - Does the journal publish reasonably quickly?
  - Does your target audience read the journal?

**MECHANICS & POLITICS:** We’ll skip this for now.

**C. SETTING GOALS, STAYING MOTIVATED, MAKING PROGRESS**

Scientific writing is hard work. It requires concentration and patience.

No one can tell you the most productive way to get your words onto paper.

There are lots of books that recommend routine – same time every day, etc. It is hard work – not meant for after a heavy meal or drinks.

It requires COMMITMENT, meaning making sure that all the other things you have to do don’t fill up your time. Think about filling a jar with a cobble, gravel, pebbles, sand. If you start filling up the jar with gravel, pebbles and sand, you’ll never be able to fit the cobble in.

This means being consistent, steadfast, and thoughtful about your approach.

Get in the mood: **CLEAR YOUR MIND**

Some people find first thing in the morning is the best time. Maybe after exercise. Writing requires intense concentration – use the part of the day that is best for you.

Question for class: What works for you?

Be realistic: **CHUNKING**

Some people chunk by time:
- 45 – 60 minute units of time – hard to do it longer than that.
- Does not include prep time – if you need to read an article, sketch out an outline, consult with someone, this must be done ahead of time.
- Breaks should be physical breaking away from your computer – not checking email, reading the newspaper – need to do something that clears your mind.
- Last thing you do at the end of your last chunk: sketch out what you will do during your next chunk and write some notes for yourself. This helps you keep your momentum going.

Questions for class: What things work for 10-15 minute breaks?

Some people chunk by words:
- 200-300 words a day of new text per day; or rewriting 2 pages of text per day. If you get this done, you could have your paper written by the end of the quarter.

For major progress on your paper – you need 3-4 chunks per day. This requires your entire morning. 3 chunks of 45 minutes plus breaks takes up your whole morning. BUT, you can also make significant progress on your paper even you can only manage 1-2 chunks per day.

Get organized: **OUTLINE**

For outlines to be helpful, they need to be detailed. Once organization and structure are mapped out with an outline, this allows you to only have to think about language and communication. Some people don’t work with outlines – I find they are essential especially for medium to longer papers.

Get words on paper: **TO BRAIN-DUMP OR NOT TO BRAIN-DUMP**

Some people, in an effort to get something in writing, just start writing anything that comes to mind. This can be very effective, but I find it is inefficient if done on a large scale. On paragraph to section scale, it can work well. Whatever you do, remember that you should not aim for perfection while writing the first draft. It can work well to write the long version of each section/paragraph first, and shorten it later.

Always write with the audience in mind. Who are you talking to?

Put it all together: **KEEPING MOMENTUM**

Set up a routine, but keep your goals realistic – how many chunks per day are reasonable for you this quarter?
End your chunk by writing notes that will help you when you sit down to write the next chunk – keep your train of thought going with some notes to help you pick up where you left off.
Put your random thought aside by keeping another file open where you jot down things you want to think about or do later, but don’t use your chunk to read a new reference, work on a figure, etc.
Drink water, or find a way to feel settled, when you write.