Instructor: Gerald Callahan  
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Time: 12:30 – 1:45 Tuesdays and Thursdays  

Overview  

Language, at its heart, is ambiguous, lumpy, and untrustworthy. It is rotten with metaphors, swampy with similes, and ringing with tintinnabulations. Not the sort of stuff that any scientist, given a choice, would choose to convey his or her science. Science, after all, is the stuff of objective reality and absolute reproducibility. But we have no choice. Language, lumpy or not, is all we have.  

In spite of its shortcomings, though, language has powers that stretch our imaginations. Words have taken us beyond Darwin and into the realm of Lamarck. They have created gods, destroyed demons, raised the dead, and spread the laws of science where once there was only mystery and superstition.  

Without language, even the great truths of science would have died, locked up inside dingy laboratories, forgotten. Language is our link to one another, our conduit to the world, and our only key to the riches of our pasts – including our scientific past.  

And it is the key to publication, to funded grants, and to long and productive careers in science. As a practicing scientist, ninety, perhaps ninety-nine, percent of those who will come to know you, will come to know you only through your written words – your manuscripts, your grant applications, your reviews, and your abstracts. If the words you write can’t carry the force of your science, you might as well not bother. Science without the words isn’t truly science at all.  

I have designed this course specifically for writers of biological science manuscripts for publication in primary research journals. And I have chosen the topics to provide an overview of the tools and talents needed for writing well. At the end of the semester each student will understand the structure and function of scientific communication and will appreciate the skills required to effectively construct, revise, and publish technical scientific manuscripts.  

Course Structure:  

The heart of the course will focus on development of writing and editing skills specifically related to the preparation and publication of technical scientific
manuscripts. To this end, each student will distribute each of his or her writing assignments to all participants. Each student and the instructor will then provide both written and (during in class discussions) oral feedback and critique for the author’s consideration. These interactions will provide instructor-supervised, essential audience feedback on the structure, the accessibility, impact, and the style of each student’s writing.

**Student Learning Objectives:**

- Students will understand concepts of grammar, sentence and paragraph structure, and personal style
- Students will comprehend the reasons for the character of scientific communication
- Students will learn how to write and what to include in abstracts, introductions, materials and methods, results, and discussion sections
- Students will understand the importance of structure to communication
- Students will learn how to identify a journal and the importance of style guides.
- Students will gain skill in editing their own manuscript and those of others.
- Students will understand and anticipate the expectations of editors and how to respond to editors and reviewers.

**Grading:**

**Complete list of graded assignments**

Assignment 1- Contribution and discussion of selected scientific manuscripts 5%

Assignment 2- Outline of proposed manuscript 10%
Assignment 3- Introduction of proposed manuscript 10%
Assignment 4- Materials and Methods 10%
Assignment 5- Results 10%
Assignment 6- Discussion 10%
Assignment 7- Abstract 10%
Assignment 8- Revised manuscript 10%
Assignment 9- Editing others work 25%

Final grades will be assigned according to the following standards:

- 90-100% = A
- 80-89% = B
- 70 – 79% = C
- 0-69% = U
Description of Graded Writing Assignments Related to Manuscript Preparation:

Outline

1-2 page outline of the proposed manuscript, including a list of headings or topics for “materials and methods,” “results,” and “discussion” sections of the final manuscript.

Introduction

2-3 pages of “introduction” section focusing on own research project of provided topic.

Material and Methods

4-6 pages of “materials and methods” section focusing on own research or provided topics.

Results

4-6 pages of “results” section focusing on own research or provided topics.

Discussion

3-5 pages of “discussion” section focusing on own research or provided topics.

Abstract

150 words succinctly describing all of the material presented in the three sections above.

Revised manuscript

Complete manuscript revised to incorporate instructor and student-critique of each section.

Participation:

All students will participate in classroom discussion and editing of other students’ writings.

Enrollment: Limited to 12
Class Schedule

Week 1:
Tuesday: Aug 26
Discussion: Introduction and overview
Assignment: Pick out one “good” and one “bad” example scientific manuscript; e-mail to everyone.

Thursday: Aug 28
Discussion: The purpose and the power of scientific communication
Assignment: Read introductions and abstracts to all student examples

Week 2
Tuesday: Sep 2
Discussion: What makes a scientific paper “good” or “bad,” plus discussion of student examples
Assignment: Read all student examples

Thursday: Sep 3
Discussion: Consideration of writing examples
Assignment: Read student examples

Week 3
Tuesday: Sep 9
Discussion: Consideration of writing examples and discussion of techniques of outlining
Assignment: Write introduction, Writing Exercises – Grammar (1-4),

Thursday: Sep 11
Discussion: Writing Exercises -- Punctuation (1-3) Usage (1,2, and 4), and Style (Style) and student examples
Assignment: Write introductions and e-mail to all

Week 4
Tuesday: Sep 16
Discussion: Evaluation and discussion of manuscript introductions
Assignment: begin writing materials and methods

Thursday: Sep 18
Discussion: Evaluation and discussion of manuscript introductions
Assignment: Read and critique all Introductions
Week 5
Tuesday: Sep 23
Discussion: Evaluation and discussion of manuscript Introductions
Assignment: writing Materials and Methods

Thursday: Sep 25
Discussion: Evaluation and discussion of Introductions
Assignment: e-mail Materials and Methods

Week 6
Tuesday: Sep 30
Discussion: Evaluation and discussion of Materials and Methods
Assignment: Continue writing results

Thursday: Oct 2
Discussion: Evaluation and discussion of Materials and Methods
Assignment: Complete writing Results and e-mail

Week 7
Tuesday: Oct 7
Discussion: Evaluation and discussion of Results
Assignment: Begin Writing Discussion

Thursday: Oct 9
Discussion: Evaluation and discussion of Results
Assignment: Begin writing Discussion

Week 8
Tuesday: Oct 14
Discussion: Evaluation and discussion of Results
Assignment: Continue writing Discussion

Thursday: Oct 16
Discussion: Evaluation and discussion of Results
Assignment: e-mail Discussion

Week 9
Tuesday: Oct 21
Discussion: Evaluation and discussion of Discussion
Assignment: begin revision

Thursday: Oct 23
Discussion: Evaluation and discussion of Discussion
Assignment: continuing revising
Week 10
   **Tuesday:**  Oct 28  
   Discussion:  Evaluation and discussion of Discussion  
   Assignment:  continue revision  

   **Thursday:**  Oct 30  
   Discussion:  Evaluation and discussion of Discussion  
   Assignment:  Continue Revision  

Week 11
   **Tuesday:**  Nov 2  
   Discussion:  
   Assignment:  Continue Revision  

   **Thursday:**  Nov 4  
   Discussion:  
   Assignment:  Mail out revision  

Week 12
   **Tuesday:**  Nov 9  
   Discussion:  Evaluation and critique of revised manuscripts  
   Assignment:  begin writing abstract  

   **Thursday:**  Nov 11  
   Discussion:  Evaluation and critique of Revised Manuscripts  
   Assignment:  Continue writing abstract  

Week 13
   **Tuesday:**  Nov 16  
   Discussion:  Evaluation and critique of Revised Manuscripts  
   Assignment:  Continue writing abstract  

   **Thursday:**  Nov 18  
   Discussion:  Evaluation and critique of Revised Manuscripts  
   Assignment:  

Week 14
   **Tuesday:**  Dec 2  
   Discussion:  Evaluation and critique of revised manuscripts  
   Assignment:  

   **Thursday:**  Dec 4  
   Discussion:  Evaluation and critique of revised manuscripts  
   Assignment:  
Assignment: E-mail abstracts

Week 15

Tuesday: Dec 9
Discussion: Evaluation and critique of abstracts
Assignment:

Thursday: Dec 11
Discussion: Evaluation and critique of abstracts