

MCDB 6440 – Fall 2019

Writing Skills for Scientists: A Special Topics Course

(required for 2nd-year MCDB Graduate Students)

Meeting time: Thursdays 2:00 – 3:45

Meeting place: Gold Biosciences, Room A1B20

Instructors: Paul Muhlrاد Gold A1B43A, 303-492-0187 paul.muhlrاد@colorado.edu
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Website: <https://canvas.colorado.edu/courses/54150>

Office hours: Muhlrاد: Tuesdays 10-11 and by appointment
Rowland: Mondays 2-3 and by appointment

Course Overview, Approach, and Philosophy

You can't be a good scientist if you don't communicate well.

Your ideas, no matter how insightful, mean nothing if you can't effectively convey them to colleagues, reviewers, policy makers, and fellow citizens. Developing good writing skills will also help you become a better scientist because clear writing tends to crystallize clear thinking.

Have you ever read a journal article or a grant proposal that you would call “a real page turner”? Probably not recently, but that ought not be the case. In MCDB 6440: Writing Skills for Scientists, we want to dispel the notion that scientific writing must be dry, stiff, and convoluted—inaccessible to all but a few experts, and tedious to read even for those experts. Good scientific writers tell captivating stories that don't merely inform, but excite and inspire. We scientists must engage readers so that they'll invest their precious time to consider our ideas. Those readers, after all, might be potential collaborators, journal editors, grant reviewers, or job search committee members.

This semester you will work with your classmates and instructors to hone your writing and editing skills and learn some new tools for creating clear and engaging scientific prose, that readers will want to keep reading. We'll approach scientific writing from the perspective of storytelling. Many scientists might bristle at this word, but they shouldn't. By “storytelling,” we don't mean writing fiction or spreading hype. Rather, we mean presenting our discoveries and ideas in a way that will capture and hold our readers' attention and interest. All good stories follow a logical path, present challenges that must be overcome, and end with a changed world. Good stories move people, and we must remember that the scientists who read our writing are real people. They have emotions, self-interests, biases, and limited attention spans. We can communicate most effectively by harnessing these human traits to keep our readers reading.

You'll put your newly acquired writing and editing techniques into practice by developing the (one-page) Specific Aims and (6-page) Research Strategy sections of an NIH F31/F30-style grant proposal

to fund your graduate research. The payoff can be real. In fact, students from prior classes have submitted NIH, NSF, and other fellowship proposals that received funding!

What this Course is Not

Scientific communications is much too big a topic to cover comprehensively in this course. Our main goal is therefore to teach you writing skills that you can't readily learn on your own without a great deal of time and effort. You should dedicate yourself to learning on your own the many aspects of written scientific communication that we can't cover in class. For instance, all successful scientists must become skilled at:

- Using basic document preparation software such as Microsoft Word, Google Docs, or Apple Pages and data manipulation software such as Microsoft Excel. One of the best and cheapest (free!) ways to learn the ins and outs of these programs is to take advantage of your CU Boulder membership to LinkedIn Learning (formerly lynda.com) computer video training courses (<https://www.cu.edu/employee-services/career-advancement-learning/lyndacom-upgrading-linkedin-learning>)
- Managing references and building bibliographies. You should find a reference/bibliography management system that works well for you. Many commercial packages (e.g., Endnote; endnote.com) and free packages (e.g., Mendeley; www.mendeley.com) are available, each with different features and quirks. Talk to your colleagues—everyone has their own opinions of which is “best.”
- Designing and producing figures and slides. Again, many different tools are available, free and otherwise. Adobe Illustrator is powerful, but costly, and has a steep learning curve. Learn on LinkedIn Learning. Pay close attention at seminars and MMB talks to keep track of effective and ineffective slide designs.
- Navigating the mechanics of assembling a grant proposal. We'll touch on this, but the procedures vary by granting agency, and change constantly. As a launch point, go to: <https://www.colorado.edu/mcdb/resources/science-communications>
- Basic grammar. We will alert you in class and in your writing when you stray from good grammar, but we won't spend much time teaching (or reteaching) you grammar rules. For that, we suggest some useful resources below.
- Finding grant opportunities. There are many. Here's a good place to start your search: <https://www.colorado.edu/mcdb/resources/science-communications/funding-opportunities>
- Scientific evaluation. We could easily devote the entire class to discussing the scientific merits of your proposal, but our focus is on writing effectively. We will not have time to provide in-depth critiques of the quality of science. However, the feedback on your significance and aims should provide you with an idea of the quality of science you are proposing.

Course Structure

- ◇ **Lectures and general discussion:** Most class sessions will begin with brief background information or review from the instructors to stimulate effective writing and discussion. The bulk of each class session will be discussion centered around peer-review and instructor-review of written assignments. In some class sessions we will do in-class writing/editing exercises, often done in small groups. We'll mix up the groups so that you'll get different perspectives.

Please bring your laptop or tablet to every class for composing and editing in-class assignments.

- ◇ **Reading and writing assignments:** Your out-of-class work will include reading, writing, and editing assignments. In addition to small individual exercises, over the course of the semester you will write the Significance, Specific Aims, and part of the Approach sections of an NIH F31/F30 Predoctoral Fellowship application. ***Written assignments are to be deposited by the posted due date and time, which unless otherwise noted, will be by 5:00 P.M. on the Sunday following the class when the assignment is given.*** Please include your last name in the file name of the assignment. This year we have about double the number of enrolled students that we have ever had in previous years. Therefore, it will be impossible for us to comment on every written assignment for every class. Instead, Paul and Teisha will each offer in-depth comments on one student's assignment, and will present our evaluations to the entire class in the following class session. In addition, each student will peer-review one other student's assignment, and we will discuss a selection of these peer reviews in class. We will rotate randomly through students to assure that everyone receives instructor- and peer-review of their work. You will see that each of the instructors has a different writing and review style and will likely provide differing feedback...we may even disagree.

Reading Material

In addition to the required textbook, assigned reading will include materials posted on the class web page.

Required text:

Writing Science, by Joshua Schimel; ISBN-13: 978-0199760244

(will be provided to all 2nd-year MCDB graduate students)

Additional suggested (but not required) supplemental reading:**On the Psychology of Persuasion and Compelling Communication**

Made to Stick: Why Some Ideas Survive and Others Die, by Chip Heath & Dan Heath*†

Influence: The Psychology of Persuasion, by Robert B. Cialdini*†

Thinking Fast and Slow, by Daniel Kahneman†

The Sense of Style: The Thinking Person's Guide to Writing in the 21st Century, by Steven Pinker*†

Wired for Story, by Lisa Cron*

On the Writing Craft

It was the best of sentences, it was the worst of sentences: A Writer's Guide to Crafting Killer Sentences, by June Casagrande

Writing Tools: 55 Essential Strategies for Every Writer, by Roy Peter Clark

The Scientist's Guide to Writing: How to Write More Easily and Effectively throughout Your Scientific Career, by Stephen B. Heard

Garner's Modern American Usage, by Bryan A. Garner†

Dryer's English, by Benjamin Dreyer

Draft No. 4: On the Writing Process, by John McPhee

On the NIH

How the NIH Can Help You Get Funded: An Insider's Guide to Grant Strategy, by Michelle L. Kienholz and Jeremy M. Berg*†

*available from Paul's office lending library – Gold Biosciences A1B43B

†available at Norlin Library

Web resources:

MCDB Science Communications:

<https://www.colorado.edu/mcdb/resources/science-communications>

NIH Ruth L. Kirschstein Predoctoral Individual National Research Service Award:

<https://researchtraining.nih.gov/programs/fellowships/F31>

Fellowship Instructions for NIH and othr PHS Agencies (SF424 Application Packages--BRACE YOURSELF!):

<https://grants.nih.gov/grants/how-to-apply-application-guide/forms-e/fellowship-forms-e.pdf>

Grading

This course requires your full participation, both in class and with reading and written homework assignments. If you must miss a class session, we need to know, and require that you notify us as soon as possible. We expect that you will attend all classes, be on time, turn in assignments on time, and participate in discussions. 70% of your grade will depend on class participation, 30% of your grade will be from written assignments. In keeping with one of the main precepts of the class—that writing is mostly rewriting—we will evaluate your written assignments in the context of their process and progress over time and the effort you show, so you shouldn't dwell on getting your early (or even later) drafts perfect.

“...shitty first drafts. All good writers write them. This is how they end up with good second drafts and terrific third drafts.”

*-Anne Lamott, *bird by bird: Some Instructions on Writing and Life**

A Forewarning (and preemptive apology)

“Success is moving from failure to failure with no loss of enthusiasm.”

-Some smart person (dubiously attributed to Winston Churchill)

Throughout this course, your writing will be judged and critiqued by your instructors and classmates. To know how effectively you write, you need to hear from your readers. While we will always strive to be tactful and constructive in our criticisms (and will try to offer praise appropriately), we realize that it can be painful to receive criticism of any kind, especially for something that you have poured your heart and soul into. Usually our criticisms will be suggestions, not demands. Our criticisms will never be personal. And for those times when our sense of tact lapses momentarily (as it inevitably will), we apologize. Let us know if you've felt hurt, and we'll try to make it better.

We hope and expect that all students will be tactful and respectful in your own critiques of your peers, but we also don't want you to err in the opposite direction: When you read something you don't like, or that doesn't make sense, or is wrong, be honest and speak up. Attempt to use factual, descriptive and non-judgmental language when discussing others' writing and your own writing. You won't do your classmates any favors if you cannot critically assess the content.

You should also realize that we expect ALL your writing submissions to be in a state of progress. Your goal should not be to turn in a perfect publishable piece of writing. The purpose of the class is to explore and hone ways to improve your writing, editing, and revising skills. So, embrace your “flaws” as learning opportunities.

CU Boulder Syllabus Statement on Campus Policies

(Further information is available at: <https://www.colorado.edu/academicaffairs/policies-customs-guidelines/required-syllabus-statements>)

Accommodation for Disabilities

If you qualify for accommodations because of a disability, please submit your accommodation letter from Disability Services to your faculty member in a timely manner so that your needs can be addressed. Disability Services determines accommodations based on documented disabilities in the academic environment. Information on requesting accommodations is located on the [Disability Services website](#). Contact Disability Services at 303-492-8671 or dsinfo@colorado.edu for further assistance. If you have a temporary medical condition or injury, see [Temporary Medical Conditions](#) under the Students tab on the Disability Services website.

Classroom Behavior

Students and faculty each have responsibility for maintaining an appropriate learning environment. Those who fail to adhere to such behavioral standards may be subject to discipline. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with race, color, national origin, sex, pregnancy, age, disability, creed, religion, sexual orientation, gender identity, gender expression, veteran status, political affiliation or political philosophy. Class rosters are provided to the instructor with the student's legal name. I will gladly honor your request to address you by an alternate name or gender pronoun. Please advise me of this preference early in the semester so that I may make appropriate changes to my records. For more information, see the policies on [classroom behavior](#) and the [Student Code of Conduct](#).

Honor Code

All students enrolled in a University of Colorado Boulder course are responsible for knowing and adhering to the Honor Code. Violations of the policy may include: plagiarism, cheating, fabrication, lying, bribery, threat, unauthorized access to academic materials, clicker fraud, submitting the same or similar work in more than one course without permission from all course instructors involved, and aiding academic dishonesty. All incidents of academic misconduct will be reported to the Honor Code (honor@colorado.edu); 303-492-5550). Students who are found responsible for violating the academic integrity policy will be subject to nonacademic sanctions from the Honor Code as well as academic sanctions from the faculty member. Additional information regarding the Honor Code academic integrity policy can be found at the [Honor Code Office website](#).

Sexual Misconduct, Discrimination, Harassment and/or Related Retaliation

The University of Colorado Boulder (CU Boulder) is committed to fostering a positive and welcoming learning, working, and living environment. CU Boulder will not tolerate acts of sexual misconduct intimate partner abuse (including dating or domestic violence), stalking, protected-class discrimination or harassment by members of our community. Individuals who believe they have been subject to misconduct or retaliatory actions for reporting a concern should contact the Office of Institutional Equity and Compliance (OIEC) at 303-492-2127 or cureport@colorado.edu. Information

about the OIEC, university policies, anonymous reporting, and the campus resources can be found on the OIEC website.

Please know that faculty and instructors have a responsibility to inform OIEC when made aware of incidents of sexual misconduct, discrimination, harassment and/or related retaliation, to ensure that individuals impacted receive information about options for reporting and support resources.

Religious Holidays

Campus policy regarding religious observances requires that faculty make every effort to deal reasonably and fairly with all students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. In this class, please contact Paul or Teisha to arrange in advance for any religious obligations that may conflict with class sessions or assignments.

See the campus policy regarding religious observances for full details.