



Eureka! The people, politics and luck behind some of the best-known scientific discoveries

Writing 20: Academic Writing
Duke University, Spring 2006



Section 60- TTh 8:30-9:45 AM, Science Bldg 04
Section 65- TTh 10:05-11:20 AM, Carr 242
Section 13- TTh 2:50-4:05 PM, White lecture hall 106

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Course Structure and Objectives

“In science the credit goes to the man who convinces the world, not to the man to whom the idea first occurred.” –*Sir William Osler (1849-1919) Canadian physician.*

In this section of Writing 20 we will explore and develop strategies for academic writing while examining the nature and politics of scientific discovery. What scientists do you think of when you think of DNA? X-rays? The theory of evolution? You may recognize the names of James Watson and Francis Crick in association with the discovery of the structure of DNA, but not of Rosalind Franklin, who provided the key evidence. Darwin’s name has become a household word, whereas Alfred Russell Wallace (who independently devised the same theory of evolution) is lost in historical footnotes. While credit for scientific discoveries typically goes to one or two people, scientific research programs build on years of previous work performed by countless different scientists. Success is never guaranteed at the outset of any experiment, either; even the most carefully designed experiments are unpredictable and rarely go in the direction we expect. If science is both a collaborative and competitive enterprise, how exactly is credit attributed? And what is the relative importance of chance vs. careful logic and reason in the scientific process?

We will begin the semester with a consideration of the scientific method. In this first unit, “On Method,” we will use the steps of the scientific method as it is typically presented—observation, question, hypothesis, prediction, and experiment—to investigate phenomena we observe in class. We will then refine our understanding through a reading of several scientists’ personal accounts of the process of scientific research. You will write a

Course Structure and Objectives Cont.

number of brief responses to these accounts which we will then discuss in class. By inviting you to actively draw distinctions between the way science is portrayed and the way it is frequently experienced, these preliminary writing exercises will serve as an introduction to the critical analysis and rigorous argumentation skills characteristic of academic writing.

In Unit 2, “What is discovery?” we will explore the problems associated with assigning priority and attributing credit in science through a close reading of the fictional play *Oxygen*. Building on many of the writing techniques you learned in the first several weeks of the semester, you will also begin your first major writing project, in which you will compose a critical essay based on the play.

In Unit 3, “Competition vs. Collaboration in Science,” we will turn our attention to the simultaneously collaborative and competitive nature of science, using as a case study the 1953 discovery of the structure of DNA. Your second major writing project, due at the end of Unit 3, will require you to advance an argument based on a comparison of two or more related texts from this period.

Finally, in Unit 4, “The Race to the Finish,” you will have an opportunity to research one of four different examples of scientific discovery:

- the independent derivation of two nearly identical theories of evolution
- Rosalind Franklin, unsung heroine of DNA
- unlocking the origins of cancer
- the race to complete the human genome

Writing 20: Writing as a Process

“There is a certain irony in our teaching scientists and engineers to use instruments and techniques, many of which they will never use in their working lives, and yet not teaching them to write. This is the one thing that they must do every day—as students, and as administrators, executives, scientists and engineers.” (Barrass 1977)

Scientists and engineers must write too. You use writing every day as a tool to help you think, remember, express yourself and organize your thoughts. Whether you are writing grant proposals to fund your research, communicating research results in scholarly journals, or simply corresponding with friends over email, the ability to communicate effectively in writing is a skill you will need throughout your life, both within the university and beyond.

Writing 20 is the only course at Duke taken by all undergraduates. While the many sections of Writing 20 focus on different themes and vary in the disciplines from which they draw, all sections of Writing 20 are united by a shared commitment to a common set

Writing 20: Writing as a Process Cont.

of course goals and practices. In particular, students in all sections of Writing 20 learn how to:

1. *Engage with the work of others.* In pursuing a line of inquiry or research, scholars need to identify and engage with what others have written about a text or issue. This academic move asks that writers read closely and attend to context, and that they make fair, generous, and assertive use of the work of others.
2. *Articulate a position.* The point of engaging with the work of others is to move beyond what has been said before. Scholars respond to gaps, inconsistencies, or complexities in the literature of their field and anticipate possible counterarguments in order to provide new evidence or interpretations that advance clear and interesting positions.
3. *Situate their writing within specific contexts.* In order to best contribute to their fields of inquiry, scholarly writers need to develop an awareness of the expectations and concerns of their intended readers. These expectations include not only appropriate and effective support for an argument, but also conventions of acknowledgement, citation, document design, and presentation of evidence.

Each section of Writing 20 is designed with an emphasis on writing as a process, not a product. As such you will be asked to rethink and rewrite your written work repeatedly. You will need some time to find your argument, and should be prepared to modify or expand upon your ideas. To provide you with feedback on your writing as well as opportunities for revision, each major assignment will be broken down into a series of steps or warm-up exercises that build or draw upon each other over the course of the semester. This will include one or two pre-draft exercises (a short critical summary, tentative thesis topic, outline, etc.) as well as at least 2 drafts. Some form of writing will be submitted each week, and this will form the basis of class discussion. As you will soon discover, many of the central components of academic writing (the importance of making texts public, the process of peer-review and revision, proper citation and attribution of credit) are key features of scientific discovery as well.

What kind of writing will I be doing in this course?

Although this is described as a writing course, it is also a course about *ideas*. I want you to think of writing as a tool for thinking. With that in mind, I am not as interested in helping you with grammar and sentence-structure or citation conventions (although we will touch on these as needed) as I am in helping you develop strategies for formulating, supporting, and articulating your ideas within our academic community. With this in mind, the writing assignments I've developed for this course are designed to help you develop these skills. While much of the reading and writing you do in this course will revolve around the nature and politics of science, we won't be talking about science writing per se but rather about academic writing in general. The goal is to help you define your position in relation to what other people have said, and to make use of other

What kind of writing will I be doing in this course? (cont.)

people's writing and ideas in order to advance your own. By the end of the semester, I hope that you'll not only be a better writer, but that you'll also be better able to think critically and to think of writing—and science—not as a collection of facts and techniques but as a way of thinking about and understanding the world around you.

Writing Assignments and Evaluation

The main types of writing you can expect to do in this course will include the following:

Writing Exercises (X's): These are relatively informal pieces of writing that will take a number of different forms. For some writing exercises you will be asked to respond briefly in writing to something we are reading as a class. These exercises are designed to help you with the initial period of planning and exploration that marks the beginning of any large writing project and will be used to help jump start class discussion. Other writing exercises will require you to practice particular writing skills or techniques that you will need for subsequent and more ambitious projects.

Writing Exercises are to be posted to Blackboard by 5pm the day before class. Please bring a hard copy of your work with you to class the following day. I may also ask you to read each other's postings before coming to class. Writing exercises will receive grades of $\sqrt{+}$, $\sqrt{}$, $\sqrt{-}$, or \emptyset (missing/late). Because these exercises will form the basis of much of our discussion in class, late writing exercises will not be accepted.

Peer Reviews (PRs): Just as all scientific journal articles go through a rigorous process of peer review before being published, so too will the writing you do in this course. At various points during the semester we will break the class into sets of small groups, or workshops, to discuss each other's work-in-progress. For each workshop, you will be asked to read and respond to each other's writing and to practice giving constructive criticism and feedback to your peers. Before each workshop you will prepare a ½ page response to each writer to be distributed in class the day of the workshop. These "peer reviews" are an extremely important part of both your and your classmates' learning in this course and should be prepared with care. Because your attendance and participation are key to the success of a workshop, peer reviews for workshops from which you are absent will not be accepted. Peer reviews will receive grades of $\sqrt{+}$, $\sqrt{}$, $\sqrt{-}$, or \emptyset (missing/late).

Major Projects (MPs): Over the course of the semester you will be asked to complete three major writing projects of increasing complexity: 1) an argument about or critique of a single text (Unit 2, 4-6 pages); 2) an argument requiring comparison of two or more texts (Unit 3, 7-8 pages); and 3) an argument requiring independent research (Unit 4, 10-12 pages). At the end of the semester, you will also be asked to give a formal presentation based on your 3rd major project.

Drafts (D): You will take each major writing project through several drafts and revisions. Drawing on ideas generated in class discussion and in your writing exercises, you will

Writing Assignments and Evaluation Cont.

write a first draft (to be posted to File Exchange) which will be read and critiqued by your peers. Second drafts, usually due one week after first drafts, will be submitted directly to me (via my Dropbox) for comments. Third and final drafts will be submitted for a grade.

Workshop Reflections (WRs): After each workshop I will ask you to submit a brief note (~1 page) in which you rely on both your own assessment as well as the feedback you received from your classmates to reflect on the strengths and weaknesses of your writing and to offer a plan for revision for your next draft. Workshop reflections will receive grades of $\checkmark+$, \checkmark , $\checkmark-$, or \emptyset (missing/late).

Participating in a Seminar

Because each section of Writing 20 is structured as a small seminar capped at only twelve students, Writing 20 represents a unique opportunity for you to be part of a student-centered classroom. As your instructor you should think of me not as a lecturer but rather as a moderator of a larger conversation we are having as a class, and as such your input and active participation are key. I will prepare you ahead of time for your role in any given class session, but it is your job to do the legwork before coming to class. You will be asked to reflect on the issues raised by the readings and develop well-reasoned responses to them. You can expect to do a fair amount of writing both in and out of class and to read and respond to one another's work as you explore tensions and issues that matter to you. As you will soon discover, academic writing—like scientific research—is an intensely social and collaborative effort.

Attendance Policy

While I expect you to come to every class period and to come prepared to participate, I understand that everyone occasionally gets sick, has a family emergency, or simply needs a mental health break. With this in mind, you may be absent two times over the course of the semester (excused or unexcused) without adverse effects on your grade. It is your responsibility to find out what happened in class on that day and to pick up any handouts you may have missed. Any work due in class on that day should be submitted to me by email *before* the start of the missed class period. Each time you arrive late (5 minutes or more) will count as $\frac{1}{2}$ of an absence. Students who are routinely late or absent will have their end-of-semester grade lowered by one third of a letter grade (an A to an A-, an A- to a B+, etc.)

Grading

The work that you do in this course will be weighted as follows:

Major Project 1:	20%
Draft 1: 2.5%	
Draft 2: 2.5%	
Draft 3: 15%	
Major Project 2:	20%
Draft 1: 2.5%	
Draft 2: 2.5%	
Draft 3: 15%	
Major Project 3:	20%
Draft 1: 2.5%	
Draft 2: 2.5%	
Draft 3: 15%	
Peer Reviews & Workshop Reflections:	20%
Writing Exercises:	10%
<u>Participation and Attendance:</u>	<u>10%</u>
	100%

Naming and Posting Documents to Blackboard

I will ask you to submit most of your work for this course to its Blackboard website. In most cases, I will ask you post your writing to my Digital Dropbox, although I may at times ask you instead to post what you've written to File Exchange or the Discussion Board. Posting documents to Blackboard is a fairly simple point-and-click process that we will go over in class. But don't worry if you run into any problems the first few times you try to post your work. Simply email me to say that you will bring your writing with you to the next class. We will figure out what went wrong and how to fix it. My guess is that, like me, you will soon find sending texts online more efficient than trading hard copies of papers in person.

When you post your writing to Blackboard, please name your document according to this formula: **w20.section.assignment.lastnamefirstinitial.doc**. For example, if I were to post the first writing exercise for this course, I would name my document: **w20.13.x1.smithr.doc**. Observing this formula will make it less likely that I end up with 12 documents on my hard drive that are all named "Writing One."

Proofreading

While the emphasis in Writing 20 is first and foremost on ideas and arguments rather than mechanics and grammar and per se, presentation *does* matter. Students at Duke are expected to be able to write reasonably correct prose. This means that you are responsible for making sure that all your writing is presented as carefully and thoughtfully as you can. I am willing to help you with any questions you may have about points of style,

Proofreading Cont.

usage, or grammar. But I should not be the first reader of your work and I will not accept any text that strikes me as hurriedly or carelessly prepared. So make sure to edit and proofread all the work you do for this course (and others) with care. Use a spell-checker, but don't rely on it. Get a good college dictionary and handbook—and learn how to use them.

Document Formatting

Please use Microsoft Word for all work you do in this course.

Put your name, assignment, and date on the first page of every text you write for this course. Use a header to number and identify the pages of your text. Format your text in a common, readable font (like this one) with conventional margins and headings—unless you have a good reason not to. If you choose to vary your font, format, or document design, do so for particular reasons and effects—and be ready, if asked, to talk about what those are.

Citing Sources and Avoiding Plagiarism

No good idea develops in a vacuum. Just as a major focus of this course is the proper attribution of credit in science, a major concern in your writing should be the proper acknowledgement of other's ideas and influences on your work. Academic and intellectual integrity are central to the fruitful exchange of ideas that lies at the heart of the university. To intentionally or unintentionally appropriate the ideas, language, or work of another and pass them off as one's own is to plagiarize. Students who engage in plagiarism risk failure in the course and suspension from the university. For a look at the Duke Community Standard and further definitions of cheating and plagiarism, see: <http://www.integrity.duke.edu/ugrad/student.html>

The Duke library system offers an excellent discussion of plagiarism and proper citation practices at the following links: <http://library.duke.edu/research/citing/> and <http://library.duke.edu/research/plagiarism/>

The Writing Studio

No matter how strong a writer you are, everyone benefits from additional feedback on their work. The Writing Studio offers specially trained tutors who can assist you with any stage of the writing process—from brainstorming and researching to drafting, revising, and polishing a final draft. In addition to individual appointments with students, the Writing Studio also offers workshops and writing groups. The main offices of the Writing Studio are located on the second floor of the Academic Advising Center on East Campus, with satellite locations at Perkins and at Lilly Libraries. To make an appointment or to peruse the Writing Studio's extensive list of resources for writers go to: <http://uwp.aas.duke.edu/wstudio/>

Course Texts

The case studies discussed in this course will be illustrated by a range of types of texts, from screenplays and biographies to critical essays and scientific papers, thus challenging us to interpret and respond to readings of varying intents, degrees of objectivity, and levels of experimental detail. Rather than group them alphabetically, the readings below are grouped in the order in which we will likely read them over the course of the semester:

Unit 1 (weeks 1-3): On Method

*Harris, Joseph. Working with Texts: Four Moves for Academic Writers. New York, W. W. Norton & Company. In press.

Hatton, J. and P. Plouffe (1997). Science and its ways of knowing. Upper Saddle River, NJ. Prentice-Hall, Inc.

Unit 2 (weeks 4-6): What is discovery?

Booth, Wayne, Gregory Colomb and Joseph Williams (2003). The Craft of Research. Chicago, University of Chicago Press.

Djerassi, C. and R. Hoffmann (2001). Oxygen: a play in two acts. Weinheim, Germany, Wiley-VCH.

*Harris, Joseph. Working with Texts: Four Moves for Academic Writers. New York, W. W. Norton & Company. In press.

Hatton, J. and P. Plouffe (1997). Science and its ways of knowing. Upper Saddle River, NJ. Prentice-Hall, Inc.

Unit 3 (weeks 7-11): Competition vs. Collaboration in Science

*Harris, Joseph. Working with Texts: Four Moves for Academic Writers. New York, W. W. Norton & Company. In press.

Hatton, J. and P. Plouffe (1997). Science and its ways of knowing. Upper Saddle River, NJ. Prentice-Hall, Inc.

Stent, G., Ed. (1980). The double helix: a personal account of the discovery of the structure of DNA. Norton Critical Edition. New York, W. W. Norton & Company.

BBC film: "The race for the double helix"

Course Texts

Unit 4 (weeks 12-16): The Race to the Finish

Sayre, A. (1975). Rosalind Franklin & DNA. New York, New York, W. W. Norton and Company Inc.

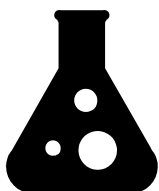
Sulston, J. and G. Ferry (2002). The common thread: a story of science, politics, ethics and the human genome. London. Bantam Press.

Weinberg, Robert (1998). Racing to the beginning of the road: the search for the origin of cancer. New York. W. H. Freeman.

**Browne, Janet (2002). "Part One: Author." Charles Darwin: the power of place. New York, Alfred A. Knopf.

*These readings can be found online via Blackboard

**These readings can be found on e-reserves



Acknowledgments: I owe special thanks to my colleagues in the Duke University Writing Program for their excellent advice and thoughtful feedback in designing and teaching this course. Thank you.

