

**SCHOOL OF JOURNALISM
USC ANNENBERG SCHOOL FOR COMMUNICATION**

**JOUR 433 Writing About Science
Spring 2008
4 units**

Schedule/Syllabus

Day/Time: Wednesday, 2-5:20 p.m.
Classroom: ASC 230
Professor: K.C. Cole

Course Description

The universe belongs to everyone, yet many students shy away from science courses because they're afraid of getting buried in problem sets. In this course, we will approach science through writing and journalism—learning how to interpret the universe on its own terms, how to write about science clearly and accurately, and how to become smarter readers (and listeners) of science as it's portrayed in the media. Many of the greatest scientists are and have been “popularizers”—including Albert Einstein—and many artists and scholars incorporate ideas from science into their work. But communicating complex ideas can be tricky, and requires an enormous amount of translation. The writer has to provide context, learn to use but not abuse metaphor, distill without diluting, and answer the all-important question: “So what?” All this in an engaging literary style that invites the uninitiated to explore unfamiliar realms. Students can expect to read a great deal from the rich literature of science, and also to write a great deal in a wide variety of forms. However, no background in science (or journalism) is required.

Course Goals and Objectives

Students will be expected to become comfortable with major fields of science through a series of readings designed to convey both the substance and style of various disciplines. They will acquire the skills necessary to write about science not merely as journalism, but also literature, philosophy, advocacy, art. They will learn how to seek out essential truths in complex situations, and convey the mystery and magic of science as well as its rigor and unreasonable effectiveness.

Course Requirements

Students will read three books on three different areas of science chosen from a list of suggested readings (others with permission of instructor); students will summarize the overall gist of the scientific content of the book in a 2-3 page reflective essay as well as in a 10-minute presentation to the class.

Students will read a wide range of hand-outs, including articles, essays and excerpts from books.

Students will produce six pieces of writing in a variety of styles and forms, ranging from 800 word essays to feature stories. All stories will be revised *at least* once.

Attendance is mandatory.

All work must be turned in on time, and students must be well prepared for all class discussions.

Plagiarism/Academic Integrity Policy

Plagiarism is defined as taking ideas or writings from another and passing them off as one's own; in journalism, this includes appropriating another writer's reporting without clear attribution. The following is the School of Journalism's policy on academic integrity as published in the university catalogue: Since its founding, the USC School of Journalism has maintained a commitment to the highest standard of ethical conduct and academic excellence. Any student found guilty of plagiarism, fabrication, cheating on examinations, or purchasing papers or other assignments will receive a failing grade in the course and be dismissed as a major from the School of Journalism. There are no exceptions to this policy."

Statement for Students With Disabilities/Academic Accommodations

Any student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered to me as early in the semester as possible. DSP is located in STU 301 and is open 8:30 a.m. – 5:00 p.m., Monday through Friday. The phone number for DSP is 213-740-0776.

Instructor

K.C. Cole has been a science writer and columnist for the Los Angeles Times since 1994. She is the author of seven nonfiction books, most recently *Mind Over Matter: Conversations with the Cosmos* (Harcourt 2003). Her articles, which have been featured in *The Best American Science Writing 2004 and 2005* and *The Best American Science and Nature Writing 2002*, include contributions to *The New Yorker*, *The Smithsonian*, *The New York Times*, *Newsweek*, *Discover*, *Newsday*, *Esquire*, *Ms.*, and *The Washington Post*. Cole has developed and taught courses in science and culture at Wesleyan University, Yale and UCLA. She has also been a regular commentator on science issues for KPCC-FM.

Textbook

The Best American Science Writing 2005, Alan Lightman, editor.

Internships

The value of professional internships as part of the overall educational experience of our students has long been recognized by the School of Journalism. Accordingly, while internships are not required for successful completion of this course, any student enrolled in this course who undertakes and completes an approved, non-paid internship during this semester shall earn academic extra credit herein of an amount equal to one percent of the total available semester points for this course.

Reading List: Students will read three books of their choice from this list.

All of these books provide delightful introductions to particular fields of science; all are engaging and capture both a feel for the discipline and a sense of the concepts and kinds of thinking involved. Several are quite old and/or out of print, but easily available through alibris.com, abebooks.com, or other used book dealers.

Mathematics:

Mathematics: The Science of Patterns, by Keith Devlin
A Tour of the Calculus: David Berlinski
A Beautiful Math, by Tom Siegfried

Chemistry:

The Same and Not the Same, by Roald Hoffmann
Uncle Tungsten, by Oliver Sacks
The Periodic Table, by Primo Levi

Geology:

Assembling California, by John McPhee
Basin and Range, by John McPhee
In Suspect Terrain, by John McPhee

Astronomy:

Blind Watchers of the Sky, by Rocky Kolb
The Planets, by Dava Sobel

Physics:

The Elegant Universe, by Brian Greene
Black Holes and Time Warps: Einstein's Outrageous Legacy, by Kip Thorne
Dreams of a Final Theory, Stephen Weinberg

Genes and Cells

The Lives of a Cell, by Lewis Thomas

Microcosmos, by Lynn Margulis

Genome, by Matt Ridley

Evolution

Wonderful Life, by Stephen Jay Gould

Ever Since Darwin, by Stephen Jay Gould

Life

The Beauty of the Beastly, by Natalie Angier

The Creation, by E. O. Wilson

Cosmology

Our Cosmic Habitat, by Sir Martin Rees

The Inflationary Universe, by Alan Guth

The Prophet and the Astronomer, Marcelo Gleiser

History and Process

The Sleepwalkers, by Arthur Koestler

A Feeling for the Organism, by Evelyn Fox Keller

Morality

Science and the Moral Life, by Max Otto

Statistics

How to Lie with Statistics, by Darrell Huff

News and Numbers, by Victor Cohn

Neuroscience:

In Search of Memory, by Eric Kandel:

The Man Who Mistook His Wife for a Hat: Oliver Sacks

Descartes Error, by Antonio Damasio

Resources

The USC campus offers a cornucopia of fascinating research projects, so whether you're interested in bugs, brains or robots, you'll find fantastically cool stuff to write about. For starters, check out: www.usc.edu/research/centers/

Grading

Participation and preparation:	10%
Presentation of books and understanding of fields covered:	15 %
Four 800 word essays at 10 % each:	40 %
Profile (1500-1800 words):	15 %
Feature story (final project, 1800-2000 words):	20 %

SYLLABUS

Week One (January 16): Introductions and Expectations

Introductions and expectations.

Lecture on the problem of perception and evidence in science. How we know what we know. Video demonstrations on the difficulty of noticing what's right in front of your nose.

Discussion of periodicals (and other media) that you will need to follow during the course.

Reading for next week: "Even Bees Must Rest Their Heads," by Diane Ackerman.

Lives of a Cell, Lewis Thomas. Pages 3-5; 11-19; 96-99; 103-110; 141-148.

The Secret House by David Bodanis, Chapter 1, Morning.

Also: Pick a book from the list of recommended titles or equivalent (to be approved by instructor), and start reading. You have four weeks to finish the book. Make sure you have a good command of substance and style.

Also: Begin to familiarize yourself with a wide range of science writing including news, profiles, features, commentary from a wide range of publications including newspapers, science specialty magazines, general interest magazines; newsweeklies. *The Best American Science Writing* collection is a good place to start.

Writing for next week: (Assignment #1) Noticing. Find a scientific setting of any kind on campus—a laboratory, a department, a meeting; hang around for a few hours and practice noticing; describe what you see in the form of an 800 word short "feature" piece; what do you learn about the particular science just by observing? Among other things, notice posters, announcements, noise-level, cartoons on office walls or corridors, snatches of conversation, notations on chalkboards and obviously equipment. Sit in on a colloquium or seminar if you can (don't worry about whether you understand it or not). It's OK to talk to people you run into. See what story ideas bubble up. Be prepared to talk about them. Have fun.

Week Two (January 23): Noticing

Artists and scientists, the late physicist Frank Oppenheimer liked to say, are the official “noticers” of society—those who notice things other people either have never learned to see, or have learned to ignore. Since human perception by definition requires filtering most of the information around us, learning how to notice can be a challenge. We’ll discuss the kinds of things you noticed during your scientific sightseeing excursion, and compare them with the noticings of Ackerman, Bodanis, Thomas.

Reading for next week: *Warped Passages*, by Lisa Randall, Chapter 1.

The Physics of Star Trek, by Lawrence Krauss. Atoms or Bits.

Continue reading book.

Hand-outs.

Writing for next week: (Assignment #2) Explanation. Pick one idea, object or phenomenon that you “noticed” during last week’s assignment that you didn’t understand. Write an 800 word essay explaining it so that it is understandable to your classmates, your basketball coach and your creative writing teacher.

Week Three (January 30): Explaining

How do you learn a difficult subject that is unfamiliar to you well enough to explain it to someone else? As we shall discover, learning is often the easy part; explaining is difficult because it involves much deeper levels of understanding. What problems did you encounter in trying to get the information and context necessary to write your explanation?

Reading for next week: *Physics and Philosophy*: Sir James Jeans. Pages 1 – 22.

“Natural/Unnatural,” by Roald Hoffmann.

“Weird Science,” by K.C. Cole.

Continue reading book.

Writing for next week: Rewrite of Assignment #1, Noticing.

Week Four (February 6): Overcoming Common Sense

Science writing often involves understanding and communicating ideas so unfamiliar they defy common sense. (If you think about it, even “obvious” notions—i.e. the fact that the world is a sphere or that a human being is made mostly of microbes—don’t really make sense either.)

Therefore, much of learning science (and learning to write about it) involves unlearning what we think we know.

We’ll look at a case study from a *New Yorker* story involving ghostly neutrinos. By this time, you will be far enough along in your reading to have come up with examples of “absurd” ideas from science that are nonetheless true, so bring them to class. Explaining such concepts in simple and compelling terms without losing a sense of their essential mystery is a real challenge.

Reading for next week: *Infinite in all Directions*, by Freeman Dyson: Chapter 2.

Microcosmos, Lynn Margulis: Introduction and Chapter 1.

Finish first book.

Writing for next week: Informal 2-3 page reflection on your first book focusing on the question: What IS cosmology (mathematics, microbiology, genetics, physics, etc.). Be prepared to present what you learned to the class. What kind of central questions does the discipline pose?

Also: Rewrite of Assignment #2, Explanation.

Week Five (February 13): Context

It’s impossible to accurately depict or explain scientific phenomena in the absence of context: where does your subject fit into the broader field? Knowing context gives your writing authority, and allows you to wander afield without losing your sense of direction. In class, we’ll discuss the measure of context you were able to gain from your first book.

Reading for next week: *The Creation*, by E.O. Wilson.

Writing for next week: (Assignment #3) Commentary. Choose a subject in science you feel passionately about because of its inherent beauty, its importance to humankind, or simply because you find it interesting. Write an essay or commentary that conveys not only a sense of the object or phenomena itself, but also of your connection to it. This may also be done as a radio commentary.

Week Six (February 20): Passion

Science is a counterpoint of tight constraints and wild imaginings, certain knowledge and cosmic-scale befuddlement, precision and ambiguity, and reporting on it needs to convey a sense of the process as well as the inevitable excitement (and sometimes terror) that comes with exploring uncharted territory. One (but not the only) way to do this is to write profiles of scientists that reveal the connections between their work and their lives.

Reading for next week: “Scientist at Work: Jacqueline Barton,” by Natalie Angier.

“Does the Universe Exist When We’re Not Looking?” By Tim Folger.

Also: Pick a second book on a subject area different from that of your first book, and start reading.

Writing for next week: (Assignment #4) Profile. Come up with an idea for a profile of a scientist whose work is sufficiently accessible and interesting that you will be able to combine aspects of previous assignments: that is, in the process of writing about the scientist you choose, you will have to do a lot of noticing, explain difficult concepts, and convey the passion behind the scientist’s work. Write a proposal for a 1500-1800 word story and a research plan good enough to convince your editor to give you the assignment.

Week Seven (February 27): People and Process

We’ll discuss your story ideas in depth, and explore the ways profiles can illuminate both the science and the person behind it, as well as giving the reader familiar reference points.

Reading for next week: Continue second book.

The Planets, by Dava Sobel. Excerpts.

“The Metaphor, Unchained,” by Roald Hoffmann.

Writing for next week: Rewrite of Assignment #3, Commentary.

Week Eight (March 5): Metaphor

Since many of the objects scientists study (be they molecules, cells or black holes) are not even visible in the ordinary sense, the science writer also has to learn how to be a translator, interpreting the unfamiliar in familiar terms—and it's easy for essential truths to get lost in translation. Bring in metaphors that you've noticed in your readings thus far. Which work? Which don't? What kind of metaphors do scientists use in describing their own work? What kind of metaphors have you struggled with in your writings for the class thus far?

Reading for next week: "Dozens of Words for Snow, None for Pollution," by Marla Cone.

Continue reading book.

Writing for next week: Work on Profile. You should be finished reporting by now, and well along with writing.

Week Nine (March 12): Being There

Writing about science (as well as understanding it) requires getting out there, whether "there" is the laboratory, the Arctic, or the scientific meeting. For this week's class, we will take a field trip to Mount Wilson Observatory, where Edwin Hubble discovered both that the universe is expanding (confirming the Big Bang) and also that the Milky Way is merely one ordinary galaxy among billions of others. Because of the good "seeing" at Mount Wilson, it continues to do work at the forefront of astronomy.

Reading for next week: Continue with second book.

Writing for next week: Profile due (Assignment #4). Bring in a copy for a classmate.

SPRING BREAK

Week Ten (March 26): Editorial Combat

How to be a useful editor, for yourself, and for others. For most of the semester, you've been on the receiving end of ruthless editing. This is your chance to use what you've learned to help someone else restructure a difficult story, make explanations clearer, add excitement and depth, turn a good story into a great one.

Editing for next week: Thoughtful and thorough edit of a classmate's profile with concrete suggestions for improvement. This will count as part of your participation grade.

Reading for next week: Finish second book. Prepare a 2-3 page reflective commentary. Be prepared to present what you learned to the class.

"Dining With Robots," by Ellen Ullman.

Writing for next week: (Assignment #5) Feature story. Prepare a proposal and research plan for a 1800-2000 word feature story that involves some kind of discovery. We will discuss in class.

Week Eleven (April 2): Structure and Function in Writing About Science

The structure of a molecule determines what it can do and how it does it, and the same is true of a story. We'll spend the class discussing the difficulties that came up in structuring your profile, and anticipate the challenges you will face in writing your feature story.

Profiles returned. We'll go over my edits in some depth, as well as those of your classmates.

Reading for next week: "Greetings from the Island of Stability," by Oliver Sacks.

Oxygen, by Roald Hoffmann and Carl Djerassi.

Poetry of the Universe, by Robert Osserman, Prelude and Chapter 1.

Through a Universe Darkly, by Marcia Bartusiak. Prologue.

Choose a third book from the list and start reading.

Writing for next week: Rewrite of Assignment #4, Profile.

Work on feature story.

Week Twelve (April 9): Discovery

Ultimately, all science is about discovery. Scientists are sightseers in the tradition of Marco Polo, wandering the natural universe in search of wonders, answers, and—most important—questions. But what does it mean to discover something, and how are discoveries made? Who gets credit for discoveries?

Reading for next week: *The Silent Spring*, by Rachel Carson: Forward, Chapters 1 and 2.

Mr. Tompkins, by George Gamow: Preface, Introduction, Chapters 1 and 2.

“Pas de Deux,” by Alan Lightman.

“Dream Come True,” by Hans Christian von Baeyer.

Writing for next week: Feature story due (Assignment #5). Bring a copy for a classmate.

Week Thirteen (April 16): Imaginings

Professional scientists as well as professional writers frequently turn to fiction to convey scientific ideas deemed beyond the reach of straightforward prose. In fact, it’s not uncommon for scientists to make discoveries by imagining “what if” scenarios.

Reading for next week: *Flatland*, by Edwin A. Abbott.

Writing for next week: (Assignment #6) Imagining. Write an 800 word scientifically instructive fantasy, dialogue, essay or story that combines fact and fancy in a way that leads to deeper insights and greater clarity than could be achieved through expository prose.

Editing for next week: Thoughtful and thorough edit of classmate’s feature story.

Week Fourteen (April 23): Trouble Shooting

Feature story returned and discussed in detail. We’ll use the class to discuss what worked, what didn’t, and compare edits. We’ll also go over 2nd and 3rd rewrites on other stories.

Reading for next week: Finish final book. Prepare 2-3 page reflective essay and present to class.

Writing for next week: Rewrite of Assignment #5, Feature.

Student conferences.

Week Fifteen (April 30): Wrap-Up, Outstanding Business, Career Planning.

Presentations on third book.

Optional, but encouraged – rewrites of previous assignments.

Week Sixteen: Exam Week

Final revisions on all stories due.