

Course Name: Communication, Environment, Science & Health

Institution: Cornell University

Instructor: Bruce Lewenstein, professor

Course level: Undergraduate

Audience: designed as a sophomore course, but also taken by more advanced students who major in biological and physical sciences, science and society and communications

Semester: Spring 2011

Class schedule: Mondays, Wednesdays and Fridays, 10:10 to 11:00 a.m.

Office hours: Wednesdays, 11:15 a.m. to 1:00 p.m. or happily by appointment

Typical Enrolment: 120-130

Course overview

Scientific research...environmental issues...public health...science museum displays. In each of these areas, communication plays a fundamental role. From the media to individual conversations with doctors, from technical journals to textbooks to bestsellers, from lab notes to blogs to Twitter, communication helps define individual scientific problems, social issues and research findings. We will examine the institutional and intellectual contexts, processes, and practical constraints on communication in environment, science, and health (CESH).

Put more formally, this course has the following objectives. As students, you will learn to:

- Identify the role of communication in all aspects of science (including health, medicine, scientific research, environmental issues, etc.)
- Identify theories of science communication
- Identify connections between theories of science communication and theories in fields such as general communication, science & technology studies, sociology, psychology, etc.
- Identify institutional constraints on science communication
- Identify practical constraints on science communication
- Become aware of career opportunities in science communication

To accomplish these goals, we will look at many examples of communication in environment, science, and health. We will read academic analyses of CESH (indeed, learning to read academic articles is an important sub-goal for being able to accomplish the objectives listed above), and most of our class discussions will be devoted to these readings. Bulletin boards and papers will give you a chance to comment on and analyze science communication.

This course is fundamentally one in which you as students will explore these issues; my role, as instructor, is to guide the discussion. Thus you should expect to read, write, and talk (either face-to-face or via online forums) a lot in this course.

Required texts and reading

Readings and class information are available on the class website on Blackboard.

Grades

The assessments in this course are designed to be part of the learning process (for an explanation of why, see <http://nyti.ms/hqYBxp>). Thus there are many types of assessment, designed to give you multiple ways to learn as well as to demonstrate your learning. About two-thirds of your grade will be based on two take-home midterms (each a short paper) and a take-home final exam (a mix of short answers and a short paper). The remaining third will be based on weekly bulletin board comments, on approximately bi-weekly comment papers, and on your formal comments on *other* people's bi-weekly papers.

- Midterm exams: two, for 20% each
- Final exam: 25%
- Weekly discussion board postings: 15%
- Comment papers: seven, for 20% (of which 5% will be reviewing other people's comments)

SCHEDULE OF CLASSES AND ASSIGNMENTS

Assignment deadlines (also known as "assessments")

Some of the specific due dates below may change as the course evolves over the semester; the Blackboard site will have updated information. All assignments are required.

- Midterm exams: 2, for 20% each
 - Midterm 1, made available Monday, 1 March; due Friday, 5 March
 - Midterm 2: made available Monday, 12 April; due Friday, 16 April
- Final exam: 25%
 - Made available Friday, 6 May; due Friday, 13 May, 4:30 pm (the end of the time slot set for a final exam for this course) (Note: this is a *science* communication class; discussion about whether we should even notice that the exam is scheduled for Friday the 13th might be an interesting discussion board topic!)
- Discussion board postings: 15%
 - Weekly (of which, you should initiate at least 3 threads during the semester)
- Comment papers: 20% (of which 5% will be reviewing other people's comments)
 - Friday, 4 Feb, comment on peer review and journals
 - Monday, 21 Feb, comment on nature documentary shown in class on 18 Feb
 - Wednesday, 9 Mar, comment on issues of risk communication
 - Friday, 18 Mar, comment on issues of health communication
 - Friday, 8 Apr, comment on science journalism
 - Friday, 22 Apr, comment on science imagery
 - Friday, 6 May, comment on the overall course

Rules

I don't have many rules. But not following the ones I do have can have serious consequences, up through failing the course.

- You are responsible for information distributed in class and updated on the class online Blackboard site.
- Be alert. Contribute to class.

- Assignments need to be typed, *double-spaced*, using normal type-fonts (Times Roman, 12 point, is always a good choice) and normal margins (1 inch all around is a good standard)
- Assignments should be submitted via Blackboard, and will be graded down for being late.
- **No plagiarizing or other cheating.** You are responsible for knowing the Cornell [Code of Academic Integrity](#). If you're not sure what that is, or what constitutes "plagiarizing" or "cheating," explore the Code of Academic Integrity website, and feel free to ask for guidance. Students (especially those from other countries) should be aware that American academic standards of acknowledgement and use of material prepared by others (especially one's professors) can be much different than those in other national and professional cultures. More information about plagiarism is available at <http://plagiarism.arts.cornell.edu/tutorial/index.cfm>.

Class Schedule

The following schedule is tentative and subject to change.

Readings are on the Internet or on the password-protected class website on Blackboard

Week	Date	Topic and readings
1	24 Jan 26 Jan 28 Jan	<p>Introduction: What does CESH accomplish? Why communicate?</p> <ul style="list-style-type: none"> • Penrose, A., & Katz, S. B. (1998). <i>Writing in the Sciences: Exploring Conventions of Scientific Discourse</i>. New York: St. Martin's [chs. 1 & 2, on Blackboard] • Merton, R. (1973). The Normative Structure of Science. In N. Storer (Ed.), <i>The Sociology of Science: Theoretical and Empirical Investigations</i>. Chicago: University of Chicago Press. [on Blackboard] • Mitroff, I. (1974). Norms and Counter-Norms in a Select Group of the Apollo Moon Scientists: A Case Study of the Ambivalence of Scientists. <i>American Sociological Review</i>, 39(August), 579-595 [link] • Wager, E. 2006. Analysing the purpose of peer review (web debate). <i>Nature</i>. [link] <p>To see what happens in practice, skim the following:</p> <ul style="list-style-type: none"> • Cornell University guide to different types of journals [link] (part of Cornell's general guide to research [link]) • Wikipedia introduction to peer review [link] • Wager, E., & Jefferson, T. (2001). Shortcomings of peer review in biomedical journals. <i>Learned Publishing</i>, 14(4), 257-263.[link]
2	31 Jan 2 Feb	<p>Challenges for communication in the sciences For example: What if we trust scientists to circulate information before it is peer reviewed? What if discussion takes place at Internet speeds, rather than paper speeds? What if we change the whole system of who pays for communicating</p>

	<p>4 Feb</p>	<p>science information?</p> <ul style="list-style-type: none"> • Clarke, M. 2010. Why Hasn't Scientific Publishing Been Disrupted Already? <i>The Scholarly Kitchen</i> (Jan 4, 2010) [link] • Wikipedia on "open access publishing" [link] • Mann, F., von Walter, B., Hess, T., & Wigand, R. T. (2009). Open access publishing in science. <i>Communications of the ACM</i>, 52(3), 135-139. [link] • Ginsparg, P. 2008. The Global-Village Pioneers. <i>Physics World</i> 22-26. [link] [if that link doesn't work, try this one: link -- it will require you to register on the site] • Mandavilli, A. 2011. Peer review: Trial by Twitter. <i>Nature</i> 469: 286-284. [link] <ul style="list-style-type: none"> ○ [An early summary of the response to the arsenic-life case, link] ○ [The lead author responds, link] <p>GUEST SPEAKER: Friday, 4 Feb, Dr. Philip Davis, former science librarian and current research associate, Cornell University, on vanity publishing and the reward system. Dr. Davis has been an active researcher on issues in scholarly publishing. To get a sense of his contributions, see:</p> <ul style="list-style-type: none"> • Davis, P. M., et al. (2008). Open Access publishing increases online readership of scientific articles but does not increase article citations: A randomised trial. <i>BMJ</i>, 337, 343-345. [link] • Scholarly Publishing Roundtable. (2010, 12 January). Report and Recommendations from the Scholarly Publishing Roundtable. [link to report][link to SPR resources, including letters to Congress that led to report recommendations being included in major legislation in late 2010] <p>DUE: Friday, 4 Feb, Comment #1</p>
<p>3</p>	<p>7 Feb 9 Feb 11 Feb</p>	<p>Contexts and models for science communication Let's follow one example: Bee-Eaters [read the material in the following order]</p> <ul style="list-style-type: none"> • Emlen, S. T., & Wrege, P. H. (1988). The Role of Kinship in Helping Decisions Among White-Fronted Bee-Eaters. <i>Behavioral Ecology and Sociobiology</i>, 23, 305-315 [on Blackboard] • Demong, N. J., & Emlen, S. T. (1991, December (Winter)). Family Ties. <i>Living Bird</i>, 26-31. [on Blackboard] • Emlen, K. (1988, January). Birds That Eat Bees. <i>Ranger Rick</i>, 22, 36-40. [on Blackboard] • BBC. (1989). <i>The Bee-Eaters</i> [Nature] [video and television script]. London: British Broadcasting Corporation. [script on Blackboard, video will be shown in class] <p>To help understand the bee-eaters case, see:</p> <ul style="list-style-type: none"> • Mitman G (1999) Disney's true-life adventures <i>Real Nature</i> (pp. 109-131)

		<p>Cambridge: Harvard Univ. Press. [on Blackboard]</p> <p>So what does this all mean for how we understand science communication? Do information flows conform to the traditional model of lab-> journal-> public? Can we use "communication theory" to understand what's happening?</p> <ul style="list-style-type: none"> Lewenstein, B. (1995). From Fax to Facts: Communication in the Cold Fusion Saga. <i>Social Studies of Science</i>, 25(3), 403-436. [link] <p>GUEST SPEAKER: On Friday, 11 February, Prof. Emlen (author of the works we're reading this week) will be in class to talk about the role of science communication in a scientist's life.</p>
4	<p>14 Feb</p> <p>16 Feb</p> <p>18 Feb</p>	<p>Environment: Nature writing</p> <p>Communication about the environment is first about creating attitudes toward the natural world.</p> <ul style="list-style-type: none"> Keegan, B., & McKusick, J. C. (2001). "The Twentieth Century: The Web of Life," in <i>Literature and nature : four centuries of nature writing</i>. Upper Saddle River, N.J.: Prentice Hall. [on Blackboard] <p>And here are some classic examples:</p> <ul style="list-style-type: none"> Selections from the writings of Aldo Leopold, author of <i>Sand County Almanac</i> [link] Carson, R. (1962). <i>Silent Spring</i>. Boston: Houghton Mifflin. [selections, on Blackboard] <p>VIDEO: Friday, 18 Feb, there will be a video shown in class. That video will be the basis of a "comment" assignment, so you MUST be in class that day.</p>
5	<p>21 Feb</p> <p>23 Feb</p> <p>25 Feb</p>	<p>Environment: Political action</p> <p>What role does communication play in public opinion about environmental issues?</p> <ul style="list-style-type: none"> Corbett, J. (2006). <i>Communicating Nature: How We Create And Understand Environmental Messages</i>. Washington, DC: Island Press. [ch. 3, on Blackboard] Cox, R. (2006). <i>Environmental communication and the public sphere</i>. Thousand Oaks: Sage Publications. [chs. 5, 7, 10 on Blackboard] <p>GUEST SPEAKER: Wednesday, 23 Feb: JIA Hepeng, editor, <i>Science Times</i> (Beijing, China)</p> <p>DUE: Monday, 21 February, Comment #2</p>

6	<p>28 Feb</p> <p>2 Mar</p> <p>4 Mar</p>	<p>Environment and Health: Risk communication</p> <p>Enough research has been done on risk to know what the basic recommendations are:</p> <ul style="list-style-type: none"> • Fischhoff, B. (1995). Risk perception and communication unplugged: Twenty years of process. <i>Risk Analysis</i>, 15, 137-145. [link, click on "get PDF" to read article] • <i>CDC Health Risk Communication Primer</i> [link, work your way through the document using links in green box on the upper left] • National Research Council (U.S.). Committee on Risk Perception and Communication. (1989). <i>Improving risk communication</i>. Washington, D.C.: National Academy Press. <Summary, click on "PDF summary" on left to download><The whole shebang> <p>DUE: Friday, 4 March, Midterm Exam #1</p>
7	<p>7 Mar</p> <p>9 Mar</p> <p>11 Mar</p>	<p>Health communication: Doctor-Patient Communication</p> <p>For many people, the most regular interaction they'll have with risk communication involves their personal health. Some key concepts are in:</p> <ul style="list-style-type: none"> • du Pré, A. (2000). <i>Communicating about Health: Current Issues and Perspectives</i>. Mountain View, CA: Mayfield Press. [ch. 1 & ch. 3, on Blackboard] <p>Some of the biggest challenges come at times of stress, such as death or dying:</p> <ul style="list-style-type: none"> • Fein, E. (1997, 5 March). Silent at approach of death, families worsen pain of loss. <i>New York Times</i>, pp. A1, B4. [on Blackboard] • Fein, E. B. (1997, 5 March). Chronicling the end for 20: Hard choices are harder when wishes go unsaid. <i>New York Times</i>, p. B4. [on Blackboard] <p>The Internet has dramatically changed health communication. Some issues are addressed in:</p> <ul style="list-style-type: none"> • Neuhauser, L., & Kreps, G. L. (2003). Rethinking Communication in the E-health Era. <i>J Health Psychol</i>, 8(1), 7-23. [on Blackboard] <p>DUE: Wednesday, 9 March, Comment #3</p>
8	<p>14 Mar</p> <p>16 Mar</p> <p>18 Mar</p>	<p>Health communication: Public Health</p> <p>As in risk communication, the basics of public health communication are pretty well understood:</p> <ul style="list-style-type: none"> • Rimer, B. K., & Glanz, K. (2005). <i>Theory at a Glance: A Guide for Health Promotion Practice</i> (2nd ed.). Washington, DC: National Cancer Institute. [link] [.pdf will download automatically]

		<ul style="list-style-type: none"> Noar, S. M. (2006). A 10-Year Retrospective of Research in Health Mass Media Campaigns: Where Do We Go From Here? <i>Journal of Health Communication: International Perspectives</i>, 11(1), 21 – 42. [link] <p>Relatively recently, researchers have begun to talk about "health literacy":</p> <ul style="list-style-type: none"> Nielsen-Bohlman, L., & Institute of Medicine (U.S.). Committee on Health Literacy. (2004). <i>Health literacy : a prescription to end confusion</i>. Washington, D.C.: National Academies Press. [link] – read the executive summary, which can be downloaded via "PDF summary" link on left] Coleman, C., Kurtz-Rossi, S., McKinney, J., Pleasant, A., Rootman, I., & Shoheit, L. (2008). The Calgary Charter on Health Literacy: Rationale and Core Principles for the Development of Health Literacy Curricula. Retrieved 10 December, 2010, from http://www.centreforliteracy.qc.ca/Healthlitinst/Calgary_Charter.htm [link] <p>GUEST SPEAKERS: Wednesday, 16 March, Jan Talbot and Catherine Thrasher-Carroll of Gannett Health Service's health education unit will talk about health campaigns on campus.</p> <p>DUE: Friday, 18 March, Comment #4</p>
		<p>SPRING BREAK</p>
<p>9</p>	<p>28 Mar 30 Mar 1 Apr</p>	<p>Science literacy What does the public actually know about science? What <i>should</i> it know? How can we distinguish between "science literacy," "public understanding of science," and "public engagement in science"?</p> <ul style="list-style-type: none"> Shen, Benjamin S. P. 1975. Science Literacy and the Public Understanding of Science. In <i>Communication of Scientific Information</i>, edited by S. Day. Basel: Karger. [on Blackboard] National Science Board. (2010). Science and Technology: Public Attitudes and Understanding. In <i>Science & Engineering Indicators--2010</i> (download and read Chapter 7). Washington, D.C.: U.S. Government Printing Office. <ul style="list-style-type: none"> See also the dispute about some of the wording: Bhattacharjee, Y. (2010). NSF Board Draws Flak for Dropping Evolution From Indicators. <i>Science</i>, 328(5975), 150-151. [link] Bucchi, M. (2008). Of deficits, deviations, and dialogues: Theories of public communication of science. In M. Bucchi & B. Trench (Eds.), <i>Handbook of Public Communication of Science and Technology</i> (pp. 57-76). London: Routledge. [on Blackboard] <p>Perhaps we should be focusing on “learning science in informal environments.”</p>

		<ul style="list-style-type: none"> • Bell, P., Lewenstein, B. V., Shouse, A., & Feder, M. (Eds.). (2009). <i>Learning Science in Informal Environments: People, Places, and Pursuits</i>. Washington, DC: National Academies Press. [link – read the executive summary, which you can download from the "PDF summary" link on left, and then skim other chapters that interest you] • Falk, J. H., Storksdieck, M., & Dierking, L. D. (2007). Investigating public science interest and understanding: evidence for the importance of free-choice learning. <i>Public Understanding of Science</i>, 16(4), 455-469. [link] <p>1 April. No class. JUST KIDDING! APRIL FOOLS!</p>
10	<p>4 Apr</p> <p>6 Apr</p> <p>8 Apr</p>	<p>Science journalism</p> <p>Science journalism is...what? Some see it as a profession dedicated to informing the public about the latest news of science. Others see it as a tool for educating the public. Some introductions:</p> <ul style="list-style-type: none"> • Dunwoody, S. (2008). Science journalism. In M. Bucchi & B. Trench (Eds.), <i>Handbook of Public Communication of Science and Technology</i> (pp. 15-26). London: Routledge. [on Blackboard] • Fjoestad, B. (2007). Why journalists report science as they do. In M. W. Bauer & M. Bucchi (Eds.), <i>Journalism, Science, and Society: Science Communication between News and Public Relations</i> (pp. 123-131). London: Routledge. [on Blackboard] • Franklin, J. (2007). The end of science journalism. In M. W. Bauer & M. Bucchi (Eds.), <i>Journalism, Science, and Society: Science Communication between News and Public Relations</i> (pp. 143-156). London: Routledge. [on Blackboard] • Trench, B. (2007). How the Internet changed science journalism. In M. W. Bauer & M. Bucchi (Eds.), <i>Journalism, Science, and Society: Science Communication between News and Public Relations</i> (pp. 133-141). London: Routledge. [on Blackboard] <p>And still others call it "perky cheerleading" for science -- and that's not intended as a compliment:</p> <ul style="list-style-type: none"> • Crewdson, J. (1993, Winter). 'Perky Cheerleaders': By Accepting Research Reports Without Adequate Checking, Science Writers Do a Disservice to the Public. <i>Nieman Reports</i>, 47, 11-17. [on Blackboard] <p>GUEST SPEAKER: On Friday, 4 April, a local science writer, Alison Fromme '99, will talk about her career.</p> <p>DUE: Friday, 8 April, Comment #5</p>
11	11 Apr	<p>Images of science in the media</p> <p>Images of science appear throughout the media -- not just what we get from reading</p>

	<p>13 Apr 15 Apr</p>	<p>the news, but also images in movies, on television, at EPCOT, and so on. Is the key image one of bubbling beakers and wild hair? Or is there some other way of describing the images out there?</p> <ul style="list-style-type: none"> • Kirby, D. (2008). Cinematic Science: The Public Communication of Science and Technology in Popular Film. In M. Bucchi & B. Trench (Eds.), <i>Handbook on the Public Communication of Science and Technology</i> (pp. 41-56). London/New York: Routledge. [on Blackboard] • Kirby, D. A. (2005). The devil in our DNA: A brief history of eugenic themes in science fiction films. In P. Wald & J. Clayton (Eds.), <i>The narratives of genomics</i>. [on Blackboard] <p>You can also see collections of commentaries on movie science at BadAstronomy.com</p> <ul style="list-style-type: none"> • Bad movie physics <p>DUE: Friday, 15 April, Midterm Exam #2</p>
<p>12</p>	<p>18 Apr 20 Apr 22 Apr</p>	<p>Science Museums What is the role of science museums? What interaction is there between research and exhibition? How do "traditional" museums (with collections of <i>stuff</i>) differ from "science centers" (hands-on, interactive science museums)? What's the difference between presenting "packed down" science and exhibiting "cutting edge research"?</p> <ul style="list-style-type: none"> • Schiele, B. (2008). Science museums and science centres. In M. Bucchi & B. Trench (Eds.), <i>Handbook of Public Communication of Science and Technology</i> (pp. 27-39). London: Routledge. [on Blackboard] • Chittenden, D., Farmelo, G., & Lewenstein, B. (Eds.). (2004). <i>Creating Connections: Museums and the Public Understanding of Current Research</i>. Walnut Creek, CA: Altamira Press. [selections on Blackboard] • Lewenstein, B. & Allison-Bunnell, S. (2000). "Creating knowledge in science museums: Serving both public and scientific communities." In <i>Science Centers for This Century</i>. St. Foy, Quebec: Editions Multimondes. [on Blackboard] <p>GUEST SPEAKER: On Friday, 22 April, the <i>Museum of the Earth's</i> Associate Director for Outreach, Rob Ross, will visit class.</p> <p>DUE: Friday, 22 April, Comment #6</p>

13	25 Apr 27 Apr 29 Apr	<p>Citizen Science In the last 15 years, a new approach to public engagement has emerged, in which volunteers and school children fully participate in science. They collect the data that the scientists need to do their work. What are the opportunities and challenges associated with that approach? How does it compare with earlier attempts to create a "popular epidemiology" that depends on citizen contribution to medical knowledge?</p> <ul style="list-style-type: none"> • www.scienceforcitizens.net -- skim this site for examples of "citizen science" • Bonney, R., Cooper, C. B., Dickinson, J., Kelling, S., Phillips, T., Rosenberg, K. V., et al. (2009). Citizen Science: A Developing Tool for Expanding Science Knowledge and Scientific Literacy. <i>Bioscience</i>, 59(11), 977-984. [link] • Brown, P., & Mikkelsen, E. J. (1990). "Taking Control: Popular Epidemiology," ch. 4 in <i>No Safe Place: Toxic Waste, Leukemia, and Community Action</i>. Berkeley: University of California Press. [on Blackboard] • Epstein, S. (1995). The construction of lay expertise: AIDS activism and the forging of credibility in the reform of clinical trials. <i>Science, Technology & Human Values</i>, 20(4), 408-437. [link] <p>GUEST SPEAKER: On Wednesday, 27 April, Rick Bonney from the Cornell Lab of Ornithology will come to talk about citizen science projects.</p>
	2 May 4 Apr 6 May	<p>Wrap-up: What have we learned? So, what have we learned? This week, we'll look at recent scientific publications, recent science news, recent science websites -- in other words, recent science -- and see what role <i>communication</i> plays in science.</p> <p>DUE: Friday, 6 May, Comment #7</p>
FINALS	13 May, 4:30 pm	<p>FINAL PAPER DUE on Friday, 13 May, 4:30 pm (the end of the time slot set for a final exam for this course)</p>