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Science and the Media: Ethics Issues

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This module addresses the complex interface of research and the media; this interface necessarily involves issues of public policy, however, for the purposes of this module we will focus on media issues and touch on public policy in the Thinking Outside the Box section. For simplicity, when we refer to “media” we are speaking of journalists covering the science beat. In the Introduction we talk about the special collaboration between the media and the researcher and the challenges both face in communicating science to the public at large. We note the ethical component inherent in all communication and include quotations from various experts as to the difficulty of reporting research clearly; the role of rhetoric in discussing science is touched upon. In the Central Essay portion, Dr. JoAnn Burkholder talks about her experiences when dealing with the media and conducting her research in the glare of the public eye. Using specific situations in her work with *Pfiesteria* as an example, she gives advice to follow when talking with the media. In the Applied Philosophy section we talk about professional responsibility as “right balance” compare the role of the researcher with that of the journalist and talk about the values of objectivity, accuracy and honest disclosure. We ask about the responsibility to report ambiguous results. In the Major Theme section we focus on the challenge of communicating the uncertainty in science, and present a valuable resource for assistance, the NC State News Service. In the Thinking Outside the Box section we touch on public policy issues by presenting an article about the Precautionary Principle, a practice of communicating less than significant findings as having a role in public policy in environmental research. We close with some Additional Resources for further study.

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"In my view, honest communication with journalists and others in the general public is a scientist's professional responsibility. Whether in the laboratory or communicating with journalists and the general public, the scientist who act with integrity in even the smallest of daily decisions will have the best training to confront the challenges of the most difficult, often-highly publicized ethical choices."

JoAnn Burkholder, "Uncertain Ground: The Boundary Between Science and the Media," Central Essay for this module. page 15.

1) Introduction:The Media and The Researcher: a Special Collaboration

In 1998, The New York Times ran a story about cancer research. Gina Kolata, a respected science reporter, publicized comments that James Watson had related to her regarding promising work from Dr. Judah Folkman's lab. The Times ran sentences such as, "Judah is going to cure cancer in 2 years," and "Dr. Watson said that Dr. Folkman would be remembered along with scientists like Darwin as someone who permanently altered civilization."

Although much of the article was more cautious in tone—the headline read "A Cautious Awe Greets Drugs That Eradicate Tumors in Mice"—the perception was that a cure for cancer was imminent. Even though Watson, Kolata and other scientists and journalists went on to clarify the original new story, the words "media frenzy" and "media circus" became part of the picture, with arguments over book deals and discussions over the correct role of science writers when reporting on current research in the public interest. Even though both Watson and Kolata backtracked and tried to clarify their original statements, the Times did not retract this and subsequent stories; indeed, the choice of words were in some cases, not Kolata's but her editors. Yet, the original story was written by Kolata, from observations and interviews with researchers attending a conference on gene therapy. (Eliot Marshall, "[The Power of the Front Page of the New York Times](#)," *Science*, 05/15/98, Vol. 280, Issue 5366, p. 996-997)

Many researchers can point to similar large-scale misquotations, misunderstandings and misrepresentation of their work when they face trying to explain themselves to the media, even when the journalist is well meaning. For many scientists the chance of error is too high for them to want to foray into the line of battle. Some say that their place is in the lab or the field and that speaking to the media, or to the public, is not part of the job of a scientist: "Let me do science," they say. But other researchers feel that communicating to the public is part of the job. They cite the responsibility to report work financed with taxpayers' dollars, as well as the professional obligation to give the public information necessary for their health and welfare.

Many NC State researchers have experience with the media and two scientists have contributed one of their many stories to this module. Dr. JoAnn Burkholder, a professor of marine botany here at NC State found herself at the center of controversy due to her research with *Pfiesteria*. Dr. Robert

"John Maddox, recently retired editor of *Nature*, argues that, 'it seems important that people at large should be helped to a deeper understanding of what the scientific process is like. It's not a matter of education in the simple sense—knowing the structure of DNA for example—but of understanding the necessarily tentative character of scientific conclusions, or theories, which all began life as hypothesis.'"

John Turney, "[Public Understanding of Science](#)," *Lancet*, 04/20/96, Vol. 347, Is 9008, p. 1088.

Bruck, a professor of plant pathology has been involved in many public and government forums about the effects of acid precipitation on forests. Both these scientists have had to make difficult decisions about what to communicate and how to do it, balancing their professional obligations to their disciplines and colleagues as well as their sense of duty to the public.

Given the reality that the public often does not understand the details of the scientific method, the stepwise nature of discovery or lacks the training to analyze research data, who has the responsibility to educate? Is it the scientists themselves, or the journalists? Is it the responsibility of the researcher to educate the media so that they can write understandable stories? Or should the scientist, in the tradition of Carl Sagan, be a teacher? Where you feel the line should be drawn may say more about your personality than a philosophic stand. John Maddox, previously an editor of Nature notes that explaining research to the public can be problematic.

Tim Lucas, one of the Public Information Officers (PIO) of the NC State News Service, notes that many academics follow the older, more traditional approach to speaking with the media and interacting with the public: that is not their job. They feel that their place is out of the public eye. Lucas worked extensively with Dr. Burkholder, acting as her liaison and "point man" with the press. He sees her as following a different paradigm of the scientist in society, one that places the tasks for educating and interacting with the public as part of the professional responsibility that goes along with expert knowledge.

"There is no way to "plan ahead" and stay comfortably hidden in the laboratory away from the public eye; no "safe-zone" to protect a scientist from stumbling upon data that completely change his/her life; no way to know when difficult ethical choices will arise. A scientist, as any person, is in training throughout his/her life to confront such decisions. (Swazey, et. al. 1993) The response will depend on the strength of the moral code that each person develops and shapes on a daily basis. In weighing the choices, one might ask, what are the risks of taking responsibility for a given action? And, what are the risks for ignoring that responsibility? In my view, the greatest risks to be avoided are to settle for complacency rather than meeting challenges; and to be seduced by the easier course of dishonesty over honesty, the seemingly "safer" path of lack of principles over integrity."

JoAnn Burkholder, ["The Uncertain Ground of the Science/Media Border](#), p. 13.

"I know many scientists who really dislike operating in the public arena. But I believe that scientists should be held accountable to the public. Not just because the public often pays for the work. But because science can so impact people's everyday lives....I know scientists now who are censoring what they write in their internal lab records, out of fear that they will become public. And I think we should be concerned when researchers become too self-conscious about their work. In a free press society, the balancing of public interest and privacy is always a difficult one."

Deborah Blum, ["Science and Media,"](#) Ethics, Values, and the Promise of Science, Forum Proceedings, Sigma XI, February 25-6, 1993, pp. 225-227.

Ethical Components of Communication

Although it seems obvious that good communication skills are invaluable, how does this relate to ethics? Dr. Victoria Gallagher of the NC State Department of Communication Studies teaches students that whenever you have people talking, there are embedded ethical issues. How much truth to tell, how much slant to give something, how deep are the hidden motives—these are all relevant questions. A style that is highly emotional is very different than one that is detached and each style carries a different subtext.

The editors at the New York Times—their job is to sell papers and so they slanted their writer's story about the latest in cancer research. Emotions sell papers. But Kolata had a stake in the story as well—a science reporter covering her beat, her job was to be a liaison between her sources, her editors and the public. She knew that the personal aspects of the science, who said what to whom, would sell her story to her editors. Both the editors and Kolata had a job to do, just as did Folkman and Watson.

If you, as a researcher at NC State University, are being interviewed on a matter of public health, how to balance the principle of disclosure with the necessity of caution in extrapolating from a research study is an ethical decision. What about not telling the whole story, in order to emphasize a positive aspect? Should the researcher wait until the results are proven beyond a doubt? If the results are ambiguous, as is often the case, what kind of responsibility does the researcher have to the public?

Just as different researchers will see the degree of their obligation to educate the public differently, so will science writers. Some will feel that their job is to simply translate, to the best of their ability and others will feel part of a team. Deborah Blum, whom we quoted on the previous page is an experienced science writer. She affirms the importance of communicating with the public since research, whatever the discipline will have a profound effect on daily life.

"As communication helps associate the name of your institution with excellence, it helps translate recognition into results and revenue. It helps recruit top faculty and students. It helps bring in money for government and private operating budgets and grants. Congress and the National Institutes of Health, for example, are beginning to write requirements for public information outreach into the grant proposal process.

Joann Ellison Rogers & William C. Adams, [Media Guide for Academics](#), (Los Angeles: Foundation for American Communications, 1994) p. 14. Chapters on electronic reserve: 1; ["Why Spread the Word? Nine Good Reasons to Talk to Journalists,"](#) Chapter 2, ["Why Journalists Act the Way They Do"](#), and Chapter 4, ["Support Your PIO"](#)

Burkholder believes in the importance of educating the media, using them as a liaison with the public and encourages researchers to learn how best to talk to journalists.

The Role of Rhetoric in Communicating Science

Choosing the appropriate words to explain scientific results is challenging. Language can educate but it can also misguide with innuendo and emotional overtones. Given the complexity of science, metaphor and analogy are often useful methods for educating the public. In the hands of a good writer this is a powerful tool, but it can be misleading since a careless metaphor can skew meaning.

For instance, here are two different titles. Both are about JoAnn Burkholder's research with *Pfiesteria*, a one-celled algae that was implicated in fish kills here in North Carolina and off the coast in Maryland. This paper in a scientific journal used cautious language: "Implications of Harmful Microalgae and Heterotrophic Dinoflagellates in Management of Sustainable Marine Fisheries," ([Ecological Applications, 1998, 8:S37-S62](#)). Science writer Rodney Barker wrote a mass-market book about Burkholder's research; it was called [And the Waters Turned to Blood](#) with the line on the front cover stating, with an update on "The Cell from Hell."

Yes, *Pfiesteria* did seem to be able to kill fish in great numbers, but the actual situation was complex and involved a cascade of different factors. The text of Barker's book is full of specific details, included numerous interviews with Burkholder, spelling out the time consuming process of research. Yet the mass-market title seems to suggest a massive catastrophe out of control--in other words, a big news event. "I can't stand that title" Burkholder has said and yet the public drawn by the catchy title is now literate about a complicated situation. Newspapers have picked up the "cell from hell" phrase, giving a sensationalist feel to the meticulous research Burkholder's lab is engaged in. Burkholder was not consulted about the title--that was the job for the publishing company. After all, they wanted to sell books.

Dr. Robert Bruck has faced a similar situation. In [Air Pollution's Toll on Forests and Crops](#), a book edited by J. J. MacKenzie and M. T. El-Ashry, (New Haven: Yale University Press, 1989) Bruck titles his chapter: "[Forest Decline Syndromes in the Southeastern United States](#)." His first sentence is cautious in tone: "The evidence of forest declines in the eastern United States has accumulated principally over the past ten years" (p. 113). Bruck writes in time honored scientific style, using unemotional words and the passive tense. In contrast, a mass media book written by science writer Charles E. Little about acid precipitation, is titled, [The Dying of the Trees: The Pandemic in America's Forests](#) (New York: Viking Press, 1995) Little wrote a chapter based on Bruck's work and just as Barker utilized interview material from Burkholder in reporting scientific details, Little's text is based on conversations with Bruck. We have placed this chapter on electronic reserve via the NC State University library course reserve system; click on the hyperlinked chapter title, "[On Top of Mount Mitchell](#)" to access this.

Like Barker, Little is writing for a different audience, not the readers of peer-reviewed journals but the average citizen, interested in “who, what, where, when and why.” There is a great deal of emotional difference between the words “toll” and “syndromes” vs “dying” and “pandemic.” The Sierra Club went further than Viking Press, with a book called, An Appalachian Tragedy: Air Pollution and Tree Death in the Eastern Forests of North America. H. Ayers, et al., Eds. (San Francisco: Sierra Club Books, 1998)

Is it ethical to use emotionally laden words when reporting scientific results? This is what a large part of the argument was about in Kolata’s story with the New York Times. Although the text of the article was cautious the rhetorical headlines slanted the message. Going back to Gallagher’s comment on how communication has ethics embedded in, what are the ethics in using a catchy title, even if misleading, to draw the reader in? If the goal is to educate the public, how do you, the scientist balance using emotional words or metaphors to pull the audience in vs misleading the public as to your real message? If the journalists use rhetoric that you feel is misleading in telling your story, is that your responsibility or not?

“Inasmuch as science is intrinsically a social activity and not a solitary pleasure, another primary aspect of ethics of science is the communication to the world at large and to other scientists in particular, of what one observes and what one concludes. ...In fulfilling the requirement of our age for the public understanding of science the scientist must shirk no duty.”

Bentley Glass, “The Ethical Basis of Science,” in The Ethical Dimensions of the Biological Sciences, Ruth E. Bulger, Elizabeth Heitman and Stanley J. Reiser, Editors. (Boston: Cambridge University Press, 1993) p. 46 and p.50

Gallagher notes that rhetoric does not just refer to “emotional language,” but to that aspect of language called “strategic communication.” What communication, is not, on some level, strategic? This is an ongoing discussion in the field of rhetoric studies, but for our purposes, we will look at rhetoric more simply and think about how emotional language works or doesn’t work as strategy in communicating about research. In the Applied Philosophy and the Major Theme sections of this module we will look at the role of rhetoric, especially the device of metaphor, in presenting new research, often ambiguous and incomplete, to the media and the public.

Commentary on Central Essay

As Tim Lucas noted, Dr. Burkholder follows a paradigm of professional responsibility that includes direct contact with both the public and the media. She spends time with journalists, believing that education in the largest sense of the word is part of an unwritten contract between the professional, (the expert, the person with specialized knowledge and skills) and the public at large.

In Module IV, [Professional Responsibility and Codes of Conduct](#), Dr. Joe Herkert discusses his view of the meaning of professional responsibility, saying, "A key concept in engineering ethics is the notion of 'professional responsibility,' which many ethicists characterize as a type of moral responsibility arising from special knowledge possessed by an individual."

Herkert talks of both micro and macro ethics, noting how both arenas for action are critical for the professional. Micro ethics, for example, would refer to how data is collected—with objectivity and honesty—and macro ethics would refer to such things as behavior with colleagues and communications to the public. Burkholder follows this model, going out of her way to take extra time to educate journalists and feeling it part of her professional responsibility to attend public forums that result from her research.

In Section 3 of her essay, "Ingredients for Effective Communication When Scientists Talk to the Press," Burkholder gives us a list of practices to follow, illustrating each with concrete descriptions from her own experience with *Pfiesteria* research and the resulting entanglements with both media and public policy. For example, she discusses the dilemma of talking to a journalist and then not seeing the story until it is in print, too late to correct any skews or misinformation.

"As we reached the end of the interviews, I offered to be of further help...Several weeks later, the journalist called and asked if I might have time to read certain sentences from her draft article...She only had about an hour that afternoon, so I dropped what I was doing, rescheduled a meeting....called her within 20 minutes as we had arranged. ... I was able to help her soften certain statements..and was able to correct several major errors. I thanked her for the opportunity and, in turn, she expressed that she was more confident about the quality of her final product."

(Burkholder, p. 7)

Burkholder is balancing a variety of needs here, the need for her to be true to her own research, the need to be fair to her colleagues in rescheduling a meeting, the need to be fair to the journalist (respecting the journalist's constraints in meeting many deadlines,) and the need to educate the public fairly. Given the time demands on everyone, she believes it to be part of her job to re-arrange when necessary, in order to be fair to all.

3) Applied Ethics: Professional Responsibility as Right Balance

Often, when a scientist is speaking to the press, the ethical concern is not about something as simple as telling the truth, but about more ambiguous matters. The conflict may be about dilemmas of commitment, deciding between the “good and the good.” For example, the scientist might feel an obligation to not report work until it is completely finished and all data proved beyond a doubt and the research verified by several other labs. At the same time, she might feel that preliminary findings are something that a concerned public should know about. In a land grant university, where taxes support much research, should a progress report be given to the public?

When faced with talking to a journalist about her work, the scientist may feel obliged to hold back some details, feeling that she owes her lab-workers the privacy to do their work; yes, the public has the right to know, but she has the right to privacy as well. She may also have an obligation to her granting agency to give them first rights of publication.

One of the recurring themes in these modules is that of “right balance.” This sense of balance is always a useful clue pointing in the direction of right action. Yes, the public has a right to know when new advances are made that can affect their lives as well as a right to know the results of tax supported research. And yet the researcher has the right to honor her commitment to presenting verifiable data that is backed up by sound scientific method. When asked for an interview, or to comment on reports of a “breaking scientific story” choosing what to say and how to say it necessarily involves an ethical choice. In presenting the research results simply, so that the public will understand, is the scientific truth compromised? If a line of research seems to imply a health risk to a specific population but the results are not all in, what should the scientist report?

Gallagher notes the importance of another type of balance, rhetorical balance. Thinking back to her comment about rhetoric being a form of strategy, she suggests that effective communication about research involves judicious use both the subjective and the objective. For example, when talking about your work, you need to both involve the audience personally and yet refer to the need for objective proof and adherence to the scientific method. One way to do this is to make the research story personal in some way at the same time you cite the relevant data, being sure the slow, incremental way that research advances knowledge is acknowledged.

“It’s perfectly acceptable, in fact, to say, as a scientist, interpretations from the data can only be extended this far - this is what we know within reasonable certainty. I’m more than a scientist; of course; I’m also a voter and a concerned citizen, and as a concerned citizen, I feel it important to make the following point as well...”

(Burkholder, p. 9)

Professional Responsibilities of Researchers and Journalists Compared

Interestingly enough, there are some general principles that apply to both researchers and journalists. Both believe in the value of complete, honest disclosure: telling the truth is basic to the task, whether in reporting data or telling the public about a new discovery. And the public trusts both reporters and researchers to tell them the truth. Another similarity between those that report on science and those that work in science is the emphasis placed on objectivity. We will focus on the challenge of communicating new results, which means that the information will be “work in progress.”

What complicates the picture, though, is that the job descriptions are different. Furthermore, objectivity is achieved through a different process. And, to add to the difficulty, new research often has ambiguous results. Thus, the scientist prepares to speak to a journalist about her work and they meet at the appointed time, full of good will. But the journalist needs to present something accessible to the public (and the editor) and it needs to be written up quickly (yesterday) and it needs to compete on pages full of dramatic events. The scientist knows that her recent progress is very exciting, but not really dramatic – there are no good or bad guys – and what is exciting is often an incremental increase in knowledge in one area that at the moment might not have practical significance. They have set aside 15 minutes to share and discuss information. Both feel a deep sense of obligation to the greater society; the journalist feels himself a liaison between the public and the scientist and the researcher feels herself to be laboring with the interests of society in mind.

Qualitative Values in Ethics: Objectivity, Accuracy and Honest Disclosure

David Resnik emphasizes how both the media and scientists value objectivity, accuracy and honest disclosure. But there are differences in how they present objective work. For the scientist, objectivity, says Resnik, is part of following the scientific method. For journalists, objectivity means presenting differing opinions on the same issue. Therefore, a journalist will search out conflicting reports on the same data, interviewing two or three different researchers who disagree. For the media, this is presenting all sides of the story. But for the public, it can be confusing. If science is about the facts, why don't scientists agree?

“Confirmation in science is seldom definite and never instantaneous. Scientific theories and hypotheses are confirmed or disconfirmed based on a careful weighing of the evidence, which usually comes in bits and pieces. New evidence may support or undermine a theory or hypothesis, but no single piece of data ever absolutely proves or disproves a theory or hypothesis. (Popper, 1963; Ziman, 1984). “Proof” in science does not mean “certainty” or “absolute truth” but only “proof relative to a given body of evidence.” This does not imply, of course, that scientific theories and hypotheses have no support at all, since we have very good reasons for believing that the earth is not flat, that dinosaurs existed, and that DNA carries genetic information.”

David Resnik, [“Ethical Problems and Dilemmas in the Interaction Between Science and the Media,”](#) in [Ethical Issues in Physics: Workshop II Proceedings](#), July 19-20, 1996, Marshall Thomsen and Bonnie Wylo, eds. (Ypsilanti: Eastern Michigan University, 1996) p. 92-93. Click here: [Part 2](#)

Resnik also comments on the difficulty of verbalizing complex information in simple terms, particularly when the public is not familiar with the scientific method. Advances in knowledge proceed slowly, sometimes sideways and often what is true yesterday becomes obsolete with further study. For those who believe that science will tell us "what is true," this wobbling gait can seem frustrating and it is the task, somehow, of the researcher to explain the wobble intelligently. Part of the challenge for the public is to understand that although they are accustomed to seeing science as "the truth, the facts, what is real," they also need to understand that research, the incremental process of adding to our knowledge of what is true, may include areas of ambiguity. Again, we see the relevance of "right balance."

The Journalist's Responsibility

In order to help the public make sense of science, is it the journalist's job to educate the public, or should the researcher do this, using the writer or interviewer as a blackboard to transmit the story. How is the journalist to know what's the most important and decide what the public has the right to know vs the need to know vs what is interesting? There is a tradition in journalism--that of reporting objectively, without bias. One way to achieve this balance is to seek differing views and this is standard procedure in the media; speak with one scientist and then look to find another expert who sees it differently. This is called balanced reporting and we mentioned it when talking about the value of reporting differing opinions as part of the construct of a puzzle.

There are gifted science writers who choose to cover the "science beat" and there are those who believe science news needs to be reported by such a specialist. Does this make sense--to only have journalists who are experts in science do the reporting? Is it practical?

"The importance of the media in society also means that the media are ever closer to the centers of economic and political power. Professional communicators have never felt greater pressure to maintain their personal moral integrity within the great media enterprises of the Murdoch's, the Thompsons and now the Internet interests. It is perhaps important that the right to communicate is now a far more public moral claim than it has been in the past. The defense of truth, freedom, social responsibility and advocacy in the name of democracy cannot be restricted to a few media professionals. The quest for the exercise of the right to communicate which began some two thousand five hundred years ago in the *agora* of Athens has to become a much more deeply felt need by every citizen in the society."

Robert A. White, "[Seven Characteristics of the 'Ethical' Public Communicator: Protecting the Quality of Democratic Communication,](#)" in *Media Ethics: Opening Social Dialogue*, Bart Pattyn, Editor, (Belgium: Peters, 2000) p. 303. Click here for [Part 2](#).

This chapter is available electronically. Although the essay (and book) is intended for journalists, the comments on professional responsibility have broader implications and are useful for discussions of professional integrity.

So it seems that the scientist needs to be able to educate the media. One way to look at this is, again, as a collaborative venture between the media and the researcher. Wilkie notes that he received 56 press releases as well as a contract book "listing university academics willing to talk to the press about their area of expertise." One way to work toward this collaboration is via the university news service that has experience both with academics and the media. In the next section we will focus on the NC State News Service to see what advice they give and services they offer.

The Responsibility to Report Ambiguous Results

The task of reporting objectively, so central to both journalists and scientists, is even more difficult when the results are uncertain or ambiguous which is often the case in research. Actually, when you think about it, why research what is known? Of course, it is important to verify results, but even that is an attempt to make the uncertain more certain.

Whether you think of the media as either a blank slate to transmit the scientific story, or a partner in informing the public it makes sense that the researcher has a unique opportunity to educate the society at large whenever asked to do an interview or contribute to a story. The journalist's work is about answers, results, deadlines, the good pull quote—and all at top speed so as to move on to the next story in their assigned list. The scientist's work takes decades, is ongoing, about endless refinement and retesting and is never finished. So there is the challenge of different agendas. If the work itself is ambiguous this makes the task for both even more challenging.

"Science is a way to teach how something gets to be known, what is not known, to what extent things are known (for nothing is known absolutely), how to handle doubt and uncertainty, what the rules of evidence are, how to think about things so that judgments can be made, how to distinguish truth from fraud and from show."

Richard Feynman as quoted by Brian Moss, in "The Emperor's Clothes of Knowledge and the Seamless Cloth of Wisdom," in Can Science Save the World, Tom Wakeford and Martin Walters, editors, (New York, John Wiley & Sons, 1995) p. 298.

4) Major Theme I: Communicating the Uncertainty in Science

In this section we present two different readings on the topic of communicating new science to the media. Two useful books on this topic are Communicating Uncertainty: Media Coverage of New and Controversial Science. Then we present some thoughts from Dorothy Nelkin from her book, Selling Science: How the Press Covers Science and Technology.

Given that explaining science is not always simple, how best to go about it? In "Effective Explanation of Uncertain and Complex Science," chapter 12 of Communicating Uncertainty, author Katherine E. Rowan describes the method of framing reports as puzzles so as to avoid the sound bite mentality. In doing this, the researcher and the journalist educate the public as to the culture of science, helping people to see the step-by-step reality of research. This method also helps avoid the breakthrough cliché while allowing for reporting of achievements. When a climatologist, for example, says he's "very excited" about today's discovery, if it is described as a step in the right direction, he will hopefully not be misquoted as saying the questions have all been resolved. It is a bit like when the coach is asked how he feels about a home run and answers, "That was sure a great hit, but the ball game's not over, till it's over."

Another useful aspect of describing ongoing science within the construct of the puzzle, is that it emphasizes the collaborative nature of research, as opposed to making it seem that the adversarial position is the norm. This helps the public understand the honest disagreement when working on new research, the necessary uncertainty of trying a piece this way and that, waiting for these results to clarify those, having to rebuild sections endlessly, as integral to the process and not an example of scientists "not knowing what they're doing." Thus, the public gets an education into the scientific method and the necessary ambiguities when only a small part of the picture is clear.

In her chapter, Rowan also talks about the value of drawing pictures or diagrams for the journalist as part of an interview or conversation; this will give the writer something specific to put into the story and give the researcher a greater role as the teacher, rather than relying on another's interpretation. Rowan explains that one of the challenges lies in understanding what she calls "lay theories," such as believing that a slow moving train will cause less of an accident than a fast moving one and using this type of event as an occasion to educate the public. When describing the science behind the reality she notes the importance of language;

most people have a lay sense of the word “force” and if you are explaining Newtonian mechanics, you and the journalist need to describe quite clearly the scientific definition of “force.”

“Suggestions for Journalists

Identify familiar terms being used in specialized ways and distinguish their essential from associated meanings.

Use diagrams, analogies, or previews, and frame conflicting findings as puzzles to help audiences mentally model complicated subject matter.

- Explain counterintuitive scientific notions by identifying lay theories that make them see implausible, acknowledging the understandability of lay views, demonstrating the lay views’
- limitations and illustrating the greater adequacy of the orthodox scientific theories.”

Katherine E. Rowan, [“Effective Explanation of Uncertain and Complex Science.”](#) *Communicating Uncertainty: Media Coverage of New and Controversial Science*, (New York: IFA Press, 1999) p. 219

Gallagher reminds us again, of the need for rhetorical balance when explaining new, controversial or ambiguous results to either the media or the public directly. On one hand, there is the work itself and on the other, the need to instruct. This dual role is a challenge, no doubt about it. One needs to balance two hats at the same time, that of researcher and that of educator. Agreeing with Rowan, that metaphor is often a key device in doing this, she notes the need to be sure that metaphors are chosen carefully. The metaphor of a puzzle is a good example: if we think of the image of a crossword, instead of pieces of a finished picture, it is possible to see how there might be incomplete and yet correct entries. By using the image of a crossword, the story becomes personal and accessible to the general public, and yet true to the nature of the scientific method.

“But as application or practice, rhetoric becomes in varying degrees either unethical or ethical. In Rowland and Womack’s interpretation of Aristotle, ethical rhetoric as practice represents a mean or balance between the extremes of pure logic and of irrational appeals to our animal instincts, to non-reflective emotional states, or to harmful passions. Their interpretation would seem to point toward an Aristotelian ethic for rhetoric summarized as follows: The sound, relevant, integrated use of both reason and emotion in the service of practical wisdom and the general public good.”

Richard L. Johannesen, [Ethics in Human Communication](#) (Prospect Heights: Waveland Press, 1996) p. 47. Chapter 1, [“Ethical Responsibility in Human Communication,”](#) is on electronic reserve.

Major Theme II: Talking to the Media

The NC State News Service

The News Service at NC State has two major tasks: 1) to let the media know about work being done on campus by academicians by writing and distributing news releases and 2) to assist faculty when they are being interviewed or otherwise interacting with the media. Members of The News Service staff are all experienced journalists. The website, http://www.ncsu.edu/univ_relations/news_services/homepage/services.htm is a good place to begin to browse; you can access their Brochure in pdf format at: http://www2.ncsu.edu/ncsu/univ_relations/news_services/homepage/guide.pdf

Recalling Vickie Gallagher's comment, that ethics is embedded in our daily communication, it makes sense to look at interview guidelines with an ear to the ethical components. Honesty, fairness, open disclosure, objectivity—these are all values that need to be emphasized when talking to the media.

As a public university, certain facts are a matter of public record; for example, speaking engagements, announcement of projects, etc. but for a report about work in progress the News Service must get release approval from the scientist. Because of intellectual property issues, copyright and patent possibilities, premature disclosure is avoided but the public does have a right to know what is happening since this is a land grant university, supported in large part by tax dollars.

Here are two sample hyperlinks to give you an idea of News Services stories about current research at NC State:

News tip sheet
http://www2.ncsu.edu/ncsu/univ_relations/news_services/tipsheet.html

Research highlights
http://www2.ncsu.edu/ncsu/univ_relations/scicoal.htm

The News Service also publishes an "experts list" which is a specific list of campus authorities who have agreed to speak with the news media. Access this at:
http://www2.ncsu.edu/ncsu/univ_relations/experts/

"As a publicly funded university, certain things are a matter of public record and along with that it is up to the individual scientist to answer the question, 'What do you disclose?' Generally, Mom was right: tell the truth. But to answer the question, 'what should a land grant university do?' is a bit more complex. My first duty, as an employee of the News Service is to safeguard NC State's reputation and safeguarding its researchers is part of that job. Safeguarding a researcher IS safeguarding the university. At the same time, I need to be fair to other interested parties—for example, current students, alumni, taxpayers, the legislature We follow the traditional model of a land grant university as one that delivers resources to the state, and its citizens. Increasingly, this is becoming a global community. In particular, as the web is replacing traditional media we can begin to educate the public much better but at the same time, because of electronic media capabilities, our role as a conduit is more complicated than it used to be."

Tim Lucas, director, NC State News Service

e-mail -- tim_lucas@ncsu.edu

One of their publications, "What to Do When a Reporter Calls..." gives helpful hints for dealing with the media and we quote directly from this Guide (pages 15-16 of this module) or you can it electronically at:

http://www2.ncsu.edu/ncsu/univ_relations/news_services/homepage/guide.htm

Ethics Checklist

- Honest disclosure
- Objectivity
- Fairness
- The public's right to know
- The university's rights as an employer
- Duties to the discipline/research, e.g. to avoid premature disclosure

Preparing for the Interview

1. Outline your main points:

Make a list of three to five main points you would like to make during the interview. These points should each be as brief as possible -- you should be able to say each of them in 20 seconds or less. Reporters are looking for quotable quotes, punchy lines that can be lifted for a "quote box" in print, or a "sound bite" of airtime. Make sure you get across your main points even if you have to repeat them several times.

2. Background:

Because it is impossible to convey all the information you would like to convey in 20-second bites, handouts and background sheets are very helpful. Reporters appreciate having ample background material, and if your topic is complex, it is crucial to have handouts for reporters. This can be in the form of a prepared press release, a brochure, historical background, a fact sheet or statistics. Reporters love facts and figures that will lend credibility to their stories, but don't exaggerate figures or use superlatives to make something sound more impressive than it really is.

3. Anticipate hard questions:

- Ethics Checklist: Still....be honest, be fair, be objective

Make a list of questions you'd rather NOT answer, and then think about how you might best answer them. Also think about how you might transition from answering the tough questions into making one of your key points. News Services staff members can help you anticipate and prepare for tough questions.

The Interview: Some Dos and Don'ts

1. You are the boss.

Take the initiative, don't wait for the reporter to ask the questions. Remember your three to five key points, and begin making them right off the bat, even if it means going beyond the question you've been asked.

2. This is NOT a conversation!

This is an interview and an exchange of information. You should not feel obligated to keep a conversation going, and resist the urge to go beyond the scope of your subject. Beware of the reporter who remains silent and waits for you to ramble or divulge more information than you intend. Also, don't let an interviewer put words in your mouth. Your answer will appear in print or on the air, the reporter's question probably won't. Be quick to correct misstatements made by the interviewer -- diplomatically, but firmly.

3. Don't go off the record.

- Ethics Checklist: be honest and yet faithful to other commitments

Even though a reporter may agree that your comments won't be attributed to you personally, that information may eventually end up in print if it is confirmed by other sources. If you don't want to read it in the paper, don't say it.

4. Be brief and to the point.

Remember your three to five main points and make an effort to convey those points in 20 seconds or so. If there is one key message, say it in different ways, more than once. For television, about 45 seconds of response time is the maximum you will be given to make your point.

5. Tell the truth.

Sometimes the truth hurts, but lies hurt worse and for a longer time. Your credibility and that of your institution could be at stake.

6. If you don't know, don't speculate.

Simply refer the person to the appropriate office or to News Services if you are unsure. Sometimes reporters will not distinguish between a personal opinion and the university's position, so it will be up to you to set the record straight.

7. If you are the spokesman for an official committee, campus organization or group, identify yourself as speaking for that group.

- Ethics Checklist: What do you owe to whom?

Faculty and staff are free to give their personal opinions to reporters, but if you don't know the university's position on a particular issue, find out or refer the reporter to the appropriate source -- don't speculate.

8. Be friendly, after all it's an interview, not an interrogation.

Try to establish rapport with the reporter and be positive and courteous at all times. Never argue with a reporter, and avoid defensive answers. A combative answer or hostile body language makes great TV, but could be embarrassing to you professionally and to the university.

9. It's all right to make a mistake.

If you have made a mistake on camera or in an interview, or if you find that you've strayed seriously from the question asked, simply stop and correct the mistake, or ask if you can give another response. Most TV reporters will prefer your new, briefer quote.

10. In TV or radio interviews, be aware that the electronics may be rolling at all times. Assume that if you're in the studio, everything you say is being recorded.

11. Anecdotes and humor have their place. Use them, when appropriate, to liven up a story, to add a human angle.

If you want to search the News Service archives you can do so by accessing:

http://www.ncsu.edu/univ_relations/news_services/homepage/archives.htm

Another useful document is the Public Information Guidelines that you can access at:

http://www.ncsu.edu/univ_relations/news_services/homepage/archives.htm

We quote the first paragraph of the Guidelines here:

"North Carolina State University, as a public university supported with tax dollars, has a responsibility to be open and responsive to information requests from the public and the news media. NC State is committed to a policy of openness, honesty and cooperation with members of the public and the news media. Faculty and staff are encouraged to give interviews when asked and to provide information on matters within the realm of their responsibility in a timely and courteous manner."

6) Study Question: The Precautionary Principle and the Interface of Science, Media and Public Policy

In a provocative article in Science and Engineering Ethics, Lene Buhl-Mortensen and Stellan Welin propose that to report only the certainties in science would be unethical since there is a need for early action in many situations. Further, they make the point that scientists have two sets of responsibilities: 1) to increase knowledge and 2) to benefit society. The authors point out that for environmental scientists, there is an obligation to protect natural resources as well and this can put them into a special role as public policy advisors.

In this article, they describe how the precautionary principle—a special circumstance in environmental management that accepts less than significant statistic results as acceptable for decision making—is the ethical thing to do when faced with the reality of ambiguous results. They are not saying that rigorous, objective data is not the goal, rather that professional responsibility demands a slightly different threshold for action. They feel that to wait until the data is statistically significant may not be as ethical as to act early, although with the full and open understanding that all the results are not yet in and the matter has not been definitively proven.

Following the principle of honest disclosure, the researcher would need to be clear that not all the facts are scientifically proven, and that the preliminary report is in the interest of an early warning, to reduce possible risks. Do you think that using the precautionary principle might be reasonable idea in some situations? Would it help or hinder the public's understanding of the ambiguity inherent in research? What might the dangers of early disclosure or premature reporting be?

“Environmental scientists in many respects have a double set of obligations. On one hand as a scientist, the prime responsibility is to strive for increased knowledge in an unbiased and reliable manner. This is well reflected in the traditional ways of pursuing and communicating results in science. On the other hand, scientists also have obligations toward the environment and towards society. One could indeed argue that all scientists share this double responsibility but in the case of environmental scientists, who often are deliverers of premises for environmental management, their results are often directly relevant to environmental policy, and this gives an extra dimension to their ethical responsibilities. As natural scientists, they often work in a complex natural environment with little possibility of designing clear-cut experimental situations. In such a complex surrounding direct cause and effects are often difficult to establish in a conclusive way.”

[Lene Buhl-Mortensen and Stellan Welin, "The Ethics of Doing Policy Relevant Science: The Precautionary Principle and the Significance of Non-significant Results," Science and Engineering Ethics, Volume 4, Issue 4, 1998, p. 402.](#)

7) Additional Resources

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Books

Barker, Rodney, [And the Waters Turned to Blood.](#)New York, Simon & Schuster, 1998. The best-selling, mass market story of Dr. JoAnn Burkholder's research with Pfiesteria.

Blum, D and M. Knudson, Editors.[A Field Guide for Science Writers](#) .New York, Oxford University Press, 1997. A classic text, useful to all who want to communicate science clearly.

Chang, Laura, Editor. [The New York Times Scientists At Work.](#) New York: McGraw Hill, 2000. A good coffee table book that presents biographies/interviews with 50 outstanding scientists from diverse fields, including JoAnn Burkholder and Judah Folkman.

Crawford, Susan Y., Julie M. Hurd and Ann C. Weller, [From Print to Electronic: The Transformation of Scientific Communication,](#) Medford, Information Today, Inc., 1996. An assessment of the massive changes in communicating science today. Chapters include, "Scientific Communication and the Growth of Big Science," and "The Changing Scientific and Technical Communications System."

Friedman, Sharon M., Dunwoody, Sharon and Carol L. Rogers, [Communicating Uncertainty: Media Coverage of New and Controversial Science,](#).Mahweh: Lawrence Erlbaum Associates Publishers, 1999. This is one of the classic works on this topic. Sharon Dunwoody, on faculty at the University of Wisconsin, Madison, is an expert in the topic of communicating with the public, particularly in the area of risk. Three chapters are on electronic [reserve "Scientists, Journalists and the Meaning of Uncertainty,](#) by Sharon Dunwoody, ["Effective Explanation of Uncertain and Complex Science,"](#) by Katherine E. Rowan, and ["Interpreting Uncertainty: A Panel Discussion,"](#) by Philip M. Boffey, Joann Ellison Rodgers and Stephen H. Schneider.

Gelbspan, Ross, [The Heat Is On.](#)Reading: Perseus Books ,1997. A classic text in the ongoing argument about global warming. The author, an investigative journalist, details the political and scientific entanglements and gives extensive background. This book is a good example of good science writing for the mass audience.

Hyland, Ken, Hedging in Scientific Research Articles. Philadelphia: John Benjamins Publishing Company, 1998. For those interested in reading further about rhetoric in science writing, this is an interesting book. The author talks about "hedging" as a technique to deal with talking about uncertainty.

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Nelkin, Dorothy, Selling Science: How the Press covers Science and Technology. New York: W.H. Freeman, 1987. A widely read book by an expert in the area of rhetoric, and communicating science. We have placed chapter 1, "[Science and Technology in the Media](#)" and Chapter 2, "[The Scientific Mystique](#)," on electronic reserve.

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Rogers, J.E. & W.C. Adams. Media Guide for Academics. Los Angeles: Foundation for American Communications, 1994. Pithy. Handbook style. We have placed Chapter 1: "[Why Spread the Word? Nine Good Reasons to Talk to Journalists](#)," on electronic reserve, as well as Chapter 2, "[Why Journalists Act the Way They Do](#)."

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Smith, Virginia Carter and Patricia LaSalle Alberger, Eds. Communicating University Research, Washington, D.C., Council for the Advancement & Support of Research, 1985. Although this book was published in 1985, the essays included are still timely

and useful. We have placed two of them on electronic reserve: ["Translating the Curious Language of Research,"](#) by Dr. Jon Franklin, (pages 61-69) and ["The Problem of Informing the Public About Basic Research,"](#) by Dr. Victor F. Weisskopf, (pages 34-40)

Wakeford, Tom and Martin Walters, Editors, *Science for the Earth: Can Science Make the World a Better Place?* New York: John Wiley, 1995. This is an interesting collection of essays, most of them activist in orientation. This is a good book to look at to see science writing for the educated mass market, about issues in environmental science that concern the public. We have placed one of the essays, ["Gallopig Gertie and the Precautionary Principle: How is Environmental Impact Assessed,"](#) Part 2, [click here](#). by Richard Lindsay on electronic reserve.

Wilkinson, Todd, *Science Under Siege: The Politician's War on Nature and Truth*. Boulder: Johnson Books, 1998. A solidly researched book on the complex topic of politics and natural resource use and the role of the scientist in society. The author has won awards for his writing. Two excerpts are available as electronic reserves: [Forward](#), by David Brower and Prologue: ["Remembering the Spirit of Rachel Carson,"](#) by Todd Wilkinson.

Websites

The Society of Professional Journalists- the website has an excellent Code of Ethics. <http://spj.org/ethics.asp>

North Carolina State Center for Applied Aquatic Ecology
Website <http://www.pfiesteria.org/>