DON’T BE SUCH A SCIENTIST

Talking Substance in an Age of Style

by

Randy Olson
show Watch Mr. Wizard played to millions of kids and inspired more than 50,000 Mr. Wizard Science Clubs. But things have changed. We live in a new media environment, with different rules. And those rules make the conveying of substance harder than ever. But not impossible, if you’re willing to learn the basic constraints of the system.

So What Makes Someone Likeable?
If likeability came down to a formula, scientists would figure it out and be the most popular people in the world. Of course, it’s far too subjective for that. But we do know likeability is inextricably tied to elements arising from those lower organs—humor, emotion, passion.

And you can’t overlook the overall role of fun. Edward Castronova makes this point in his recent book Exodus to the Virtual World. In a speech, he said, “Fun is a societal element that governments have yet to fully appreciate.” If you can create an atmosphere of fun, there are no limits on popularity.

In the end, it is these human qualities that can reach beyond “the choir” of those who are interested in science no matter what. They can be incredibly powerful in mass communication. And, even as the new media environment has, in many ways, made communicating substance harder, it has also opened up new opportunities.

In the old days, scientists were forced to keep their heads low, their noses to the grindstone, doing their humble research and quietly awaiting the day when a journalist would knock on the door of their laboratory and ask them to explain their scientific work to the world. But that day is now over. New technology has brought about many changes in communications, and in the world of science this could prove to be one of the most profound developments.

With the advent of such innovations as blogs, video technology, and YouTube, a new day has arrived for scientists. No longer do they have to sit quietly awaiting that visitor from the media world. They can themselves “be the voice of science.” And this is the subject of the final chapter.

Be the Voice of Science!

In 2003 I filmed the Ocean Symphony public service announcement, for which Jack Black agreed to be the conductor. I sent him an e-mail with pages of detailed notes on exactly what sorts of dance moves and wacky antics I needed from him and the specific topics in ocean conservation the PSA would address. At various places I asked him if he could tell a joke about this or that—you know, the standard one-liners about dinoflagellate blooms and anoxic events. In response to my several pages, he wrote back a single sentence: “I can’t tell any jokes but I can conduct like a mofo.”

Once upon a time, communicating science to the general public was incredibly easy. In the 1850s Louis Agassiz, founder of the Museum of Comparative Zoology at Harvard University, gave public lectures on the Cambridge Common that were hugely popular. Hundreds of people would crowd around in the hot summer swelter to hear him speak for three to four hours—not telling religious stories (the heart), not performing stand-up comedy (the gut), and definitely not telling dirty stories (the lower organs). No, they would listen for hours as he talked about . . . fish taxonomy.

What was wrong with those people? I think they had empty heads. There was no television, no Internet, no iPhones, not even electricity. Their brains were in desperate need of stimulation. Think of it—just hearing words and
information—it was like letting their brains sit in vibrating massage chairs for three hours. It must have felt sooo good.

Things have changed a bit since then.

What do you think would happen today if Karel Liem, a fish anatomist and brilliant lecturer at the same Museum of Comparative Zoology, started giving three-hour outdoor lectures on hot summer days about fish taxonomy?

The audience has changed. But it’s not clear that the world of science understands this. Which is kind of surprising, since there is an entire field of science dedicated to the study of change called “evolution.” But that knowledge seems to get focused more on the study of fossils than on the study of how the general public has evolved.

There exists today a new media environment. The large science organizations have been slow to adapt to it, but at the grassroots and individual levels things are different—change is indeed under way. You can see it in the proliferation of new modes of communication—from blogging to video-making to styles of graphic presentations. Individuals in the world of science are not waiting for the large organizations to show them the way; they are in the process of themselves becoming “the voice of science.”

What exactly is the voice of science? At its very best, it was and still is Carl Sagan. In case you don’t know, he was an astronomer, astrochemist, and unparalleled popularizer of science. He got his start in media fame with his best-selling book *The Dragons of Eden* in 1977 and was propelled to superstardom with the 1980 television series *Cosmos: A Personal Voyage*. Given the scale of achievement of his popular books and television series, he is the most successful scientist in recent decades in communicating pure science to the general public. So let’s take a look at him now in relation to the previous four chapter titles.

First off, he was certainly cerebral (chapter 1)—a truly great thinker. However, he was not so caught up in his thought processes that he was unable to act. In fact, as William Poundstone mentions in his biography of

![Figure 5-1. Carl Sagan, proof of how not being “such a scientist” can help you connect with the general public. Photo by Michael J. Okoniewski.](image)

Sagan, he acted so vigorously in his efforts to communicate and popularize science that his friends often wondered when he slept.

Carl Sagan also was not constrained by being overly literal (chapter 2). How else would he have ended up on Johnny Carson’s *Tonight Show* couch so many nights? Many scientists would have considered the show a bunch of silly banter, but Sagan fully understood the enormous power of television to influence American society.

How about storytelling (chapter 3)? Sagan’s 1985 novel, *Contact*, was a best seller and was made into a major motion picture. The man appreciated the power of telling a good story, and, while not religious himself, he had a
tremendous grasp of the role of religion and mythology in the human psyche. It was a theme he explored in many of his books, beginning with his first best seller, *The Dragons of Eden*.

Likeability (chapter 4)? Sagan was dorky, nerdy, and even goofy at times, but he had the “it” factor that made him very well liked. In the late 1990s a friend of mine, filmmaker Mark Shelley of Sea Studios, got to see Carl Sagan’s lasting influence when he began searching for an on-camera host for his National Geographic Society documentary series *The Shape of Life*. His production team searched far and wide for a host; they auditioned a number of scientists, showed the test footage to focus groups, and listened to the feedback.

The viewers didn’t like any of the candidates. It drove the producers crazy. They finally asked the focus group members, “Well, who do you want for a host?” The answer was very simple: “Another Carl Sagan.”

Over the course of several decades Carl Sagan embodied the very best traits of a scientist and was widely loved as a result. Overall, he was the living proof of everything I have to offer with this book.

However, there is a sad footnote to Carl Sagan’s career, and it’s something that every scientist interested in engaging in broad communication needs to know.

The Rejection of Carl Sagan by the National Academy of Sciences

A number of fine biographies of Carl Sagan recount the unfortunate details of his treatment by the National Academy of Sciences.

In a nutshell, Stanley Miller (of Miller and Urey fame, the team who were among the first to describe mechanisms for the possible abiotic origin of life on Earth) headed up a group that nominated Sagan for admission into the National Academy of Sciences. The Academy is sort of the equivalent of the Hall of Fame for football and baseball players at the end of their careers.

Sagan made the cut in the initial voting, ending up in the top 60 of the 120 nominees that year. This was enough to secure his entry into the Academy, provided no one objected to his induction. Of the previous 1,000 nominees who had made the cut, only one had been objected to by any member. Sagan ended up being the second. Which meant there had to be a special vote for him.

Before the vote, there was an open debate in which many members lashed out, denigrating him for supposedly being a lightweight scientist despite having published more than 100 peer-reviewed papers and numerous books and having made major accomplishments in astronomy. Texas A&M University chemist F. Albert Cotton referred to Sagan’s involvement in the popularization of science as “symptomatic of an inadequacy in doing science.”

In the end, Sagan needed a two-thirds majority for admission but failed to get it. How in the world did this happen?

Sagan’s first wife, Lynn Margulis, who had an unhappy divorce from him (I once heard her lovingly refer to him as an “ass” in the question-and-answer session of a talk she gave at Harvard), was part of the team fighting for his acceptance. She set aside all personal animosity and vigorously defended his distinguished career.

According to biographer Poundstone, Sagan never spoke with any bitterness publicly about the defeat, but in a letter, Margulis told Carl that Cotton’s speech resonated with every small mind, ugly body, and verbal maladapt present, and that means half of the membership. They are jealous of your communication skills, charm, good looks, outspoken attitude, especially on nuclear winter.... In summary, you deserved election to the National Academy years ago and still do; it is the worst of human frailties that keeps you out: jealousy.
In short, the Academy never forgave Sagan for being so popular. That one event stands as a monument to the risks of broad communication. And while today more scientists than ever are involved in communicating science, and the National Science Foundation even requires recipients of its grants to set aside a substantial part of the funds for "outreach," the dilemma still exists. In fact, I'm even willing to put a number on it.

**The One-Third Rule of Science Cannibalism**

I'm gonna go ahead here and propose the hypothesis that, all else equal, in any random group of scientists, about one-third of them will simply dislike anyone who stands above the pack and tries to communicate directly to the general public. If you are a scientist, I invite you to put this hypothesis to the test.

I base this number first on the fact that a third of the Academy voted against Sagan. But I further support it with a few personal experiences.

At the Scripps Institution of Oceanography, for the past four summers we have taught a week of communications during the twelve-week intensive orientation course for new ocean science graduate students. Each year at the end of the course the students fill out evaluations. And each year the same simple pattern seems to emerge: about a third of the students talk about our communications week as a "life-altering" experience. They so thoroughly enjoy themselves and find it so eye-opening that they feel certain a major part of their future scientific work will involve communications projects.

A second third calls the week very worthwhile. But the final third, oh, yeah. You guessed it. They lash out against the communications week, call it a total waste of their time, insult me as some sort of "poser," see no relevance of the material to their career in science, and basically hint at the possibility of a refund of their tuition.

The third set of "data" is what emerged in the reviews for my movie *Sizzle: A Global Warming Comedy* (see appendix 1). About a third of the scientist blogger reviews raved about the movie, a third called it adequate, and a very vocal final third seemed to be channeling the voices of the National Academy that voted down Sagan.

**Uncritical Science: Like an Ocean with No Sharks**

You could also see the one-third rule when, in late 2007, a novel idea emerged to organize a debate among the U.S. presidential candidates focusing on scientific issues. Termed "Science Debate 2008," the idea began with Matthew Chapman, the great-great-grandson of Charles Darwin, who decided he was fed up with the amount of attention paid to religion in the presidential debates in contrast with the virtual absence of science discussion. He managed to create a groundswell of support for the idea, eventually recruiting all the major science organizations and a gaggle of Nobel laureates to back it. But along the way, had you read the science blogs, you would have found rather consistently about a third of the voices negating the entire idea, saying it wouldn't work for a variety of reasons, despite the endorsement by most of the top leaders of the science world. Most of the skeptics seemed to have some basic aversion to getting involved in politics and engaging with the general public. Or they were just contrarians by nature.

So the negative, negating, cynical voice of the science world is still there, and it will probably be there for the rest of time. Which is fine. You wouldn't want it to go away. If it ever did, there would be reason to worry. It would be like an ocean with no sharks. As much as you don't want to get attacked by a shark, you also don't want them to go extinct. With some things in life you just need to find a way to coexist.

Personally, I sensed this problem long ago. I knew from the start of my media involvement that I didn't want to end up as an academic attempting to do both serious research and silly filmmaking. It's just too big of a divide. I might have been able to make it work, but it would have been an unfair imposition to make on my colleagues and students—to ask them to accept me as both authority figure and clown.
In fact, while I was still a professor at the University of New Hampshire, I was so keenly aware of it that for my first short film, Lobstahs, I used the fake name Charlie Agassiz for the credits. There was no trace of my real name. Of course, I eventually dealt with the dilemma by resigning from my professorship. But that was because I sensed I would be going much further into the media realm than would a normal academic scientist.

As for the central divide between the purists and those who would deign to reach a hand out to broader audiences, you can see pretty much the same dynamic in other professions. Take, for example, the life of John Steinbeck. His literature was enormously popular with the average reader, but he was forever dogged by the critics. When he was finally awarded the Nobel Prize in Literature, there was such an outcry from the literary world that at his press conference a reporter actually asked him whether he thought he deserved it (and, sadly, he humbly replied that he wasn’t actually certain he did). Had there been a National Academy of Sciences for him to be elected to, he probably would have suffered the same fate as Carl Sagan.

Yet when all is said and done, in the world of science, criticism is an essential part of the process. There’s no denying it. And it leads us back, one last time, to my beloved acting teacher.

The Delicate Art of Negation
The woman was mean. Make no mistake. I could tell you some truly horrible stories about her—like the night she got into a fight with a student who had criticized her teaching style. She accused the student of acting out with her the same mother-daughter problems the student must have experienced growing up.

The spat quickly escalated until the student burst into tears and ran out of the classroom, followed by the instructor. We all sat listening to the screaming match that ensued in the hallway, which culminated with the student shrieking, “Fuck you, don’t you talk about my mother, she died five years ago,” and the teacher screaming back, “Good, well, why don’t you go visit her grave and take a shit on it!”

Honest to goodness. Doesn’t that make you want to go take an acting class? Hollywood can be such a sweet and nurturing place.

But every third night we had a different instructor at the school. He was a very nice man—handsome, friendly, never confrontational, always supportive, allowed everyone to talk, always listened. And for the first month everyone craved the night with him, desperate to get away from the old bag.

But guess what eventually happened? Everyone got tired of the nice guy. After a while, all his sweetness and positivity was okay; it just wasn’t very interesting, exciting, or challenging. There was an electricity to going into class with the mean woman. Everyone sat on the edge of their seats, wanting to do their best work. She was tough, she was critical, she was brutal, but when she finally said something was good, it really meant something.

She was terrible to me, and she doesn’t like me to this day, but I’m forced to concede she was an excellent instructor. The bottom line is, let’s face it, really good teaching sooner or later involves a certain amount of pain. Whether it’s the pain of tedious work or the pain of stinging criticism, seeking a totally pain-free education is kind of wishful thinking.

It’s important for young scientists in particular to take note of these dynamics. It is essential for them to become better communicators by learning from, rather than being crushed by, criticism. And also, unfortunately, to expect some lack of interest in communication from the science world. Especially since there is one very important large-scale pattern that I have observed over the course of my twenty years of exploring science communication.

Find the Good Communicators!
As the years floated by, I hit countless brick walls in seeking support for innovative ways to communicate science. (A program officer at the National
Science Foundation said, "Scientists are pretty much just going to communicate the way they always have—the good ones will always be good; the bad ones will always be bad.") But I also found a number of very firm and committed backers. Eventually I hit a point where an unmistakable pattern emerged.

Here's the pattern: Good communicators believe in the power of communication. Poor communicators don't.

More often than not, when you encounter scientists, administrators, foundation officers, or even politicians who feel that spending good money on such stupid things as television commercials or movies is a waste of limited resources, you will find that they themselves have relatively poor communication skills.

I think there is a positive feedback loop—or, in less sciencey terms, a snowball effect—that develops throughout people's lives. Those with poor "people skills" have had a lifetime of disappointment with using communication (i.e., persuasion) to get their way. They try to speak to their next-door neighbors about keeping their incessantly barking dogs inside at night but find they can't persuade them through discussion. So eventually they give up on that approach and instead go straight to the police and get action through a more objective means—force of law.

The more this happens, the more they conclude that talk is a waste of time—"Let's do something" becomes their attitude. If they end up being in charge of a conservation group, they'd rather bring in the lawyers and propose legislation to stop the new housing development next to a park than launch a mass media campaign to convince the local residents to defend their natural resources. When somebody stands up at a meeting and suggests spending money on better communication, they respond by claiming they already have and it didn't work.

Conversely, there are others who naturally have strong "people skills." They find it very easy to speak to their next-door neighbors, have them over for a beer, laugh about the barking dogs, and then make a friendly deal to give them their extra lawn chairs in return for keeping the pets in at night. The law is never needed. Everything is settled through the more subjective means of communication.

Years later, they have a natural appreciation for the importance of communication. They've used it effectively throughout their lives. When you say, "We need to put more effort and resources into communication," they respond positively because it has worked for them so well in the past.

This has certainly been my experience. All of the scientists who have supported my efforts have, not by coincidence, been themselves excellent communicators. So my simple advice is to seek support from these people—those who know how to talk and listen. They already understand the power of good communication. And they can help you with the most important aspect of your communication effort—to discover and nurture your "voice."

Which brings us to a very important term in communication—"voice." It means much more than the sounds emerging from the vocal cords. Whether it's the "voice of authority" in warning signs at the airport or the voice of compassion behind humanitarian efforts, this subjective element is central to effective communication.

The Scientist's Voice

Yes, that was me back at the beginning of chapter 1 with the letter to the editor of Premiere magazine scolding Marky Mark Wahlberg for misidentifying whales. By now, I know my voice all too well, and I know that despite nearly two decades of running around Hollywood, hanging out with actors, making movies, and trying to pretend I'm a Hollywood player... I still have the voice of a scientist. And that's fine.

Whether it's genetic or developmental, who knows, but surely it's there for life by the time you've completed a doctorate in science. I'm stuck with it.

Here's a little example of my public voice. At our orientation day lecture at the USC School of Cinematic Arts, all fifty members of our class were seated in a theater and had to introduce ourselves with a few sentences.
When it came to me, I said, "I was a marine biologist. I earned my Ph.D., spent a number of years in Australia working on the Great Barrier Reef, and—" To which a professor interjected, "Did you fix it?"

I didn't even understand his little quip until later. In the world of science, one of the first things you ask a colleague is "What are you working on?" or "What are you looking at?"—as in "I'm looking at speciation in sympatric populations of hoppy toads." If you're a scientist, this is just commonplace dialogue. But to that professor of filmmaking it sounded as if I were some sort of repairman out in nature working on the reef.

The bottom line: There is a science dialect that you pick up without even realizing it. You think you're talking "normal," but the civilians hear otherwise. This is one of the hardest things to get a lot of scientists to realize—they feel like, "What do you mean? We talk just the same as everyone else." And they're certain of this (with a probability of error of less than zero point zero five).

It certainly has taken me a lot of years to fully realize the differences. There are benefits to having the voice of a scientist (some people are actually impressed!), and there are costs. And in my case the cost is even financial.

The Life That Didn't Happen
In 1990—that's nineteen ninety, mind you—getting close to two decades ago—I wrote a novel titled Ice Blue, which was a tale of suspense in Antarctica drawn from my experiences there in the mid-1980s. It was a wild and woolly story involving shipwrecked oil tankers, diving beneath the Antarctic ice, and frantic helicopter chases over the frozen wilderness.

Though I was still a professor at UNH, I had a celebrity friend who had a literary agent at William Morris, one of the big three agencies in Hollywood, to whom she gave the book. He was an avid scuba diver, he read it, he loved it, and he called me up asking to represent it. A month later, I was meeting with him in Hollywood and he was asking me whether we should go for a $200,000 or a $300,000 advance and which A-list actors should play the lead roles in the movie version. I did my best not to be snowed by the Hollywood hype.

In an alternate universe, that book got bought by a leading publishing house, spent a year on the New York Times best-seller list, and became a huge blockbuster movie that made me a gazillionaire and put me in the same club with Michael Crichton.

Unfortunately, in the universe in which we live, the book was turned down by a dozen publishers. My agent got rejection letters from the same editors whose names I saw in best-selling books by Tom Clancy, Scott Turow, and John Grisham. The book was being read by the best sources, but there was something wrong with it.

Today I can look back and tell you fairly precisely what the problem was. The narrative voice was the voice of a scientist. It was very honest, humble, accurate, and precise. All of which meant it wasn't the best fiction storytelling. The entire novel was woven out of real tales that I'd heard when I was in Antarctica doing research. In the climax scene, the heroine swims beneath the ice in freezing water that is nevertheless about fifty degrees warmer than the air temperature. Her soaking wet attacker tries to chase her but finally freezes to death when he climbs out of the water and into the frigid air. My agent loved that scene and never got over it—he still talked about it years later, asking me repeatedly if it was true that the air would be so much colder than the water, which of course it is.

But for the editors the story just wasn't big enough, grand enough, and sensational enough. I'm guessing they felt it needed nuclear weapons, abominable snowmen, or space aliens (as my writer friends suggested years later).

The book never got bought, but the scientist voice stayed with me. To use a line that occurs in both Dodos and Sizzle, I was, in the end, "handicapped by a blind obsession with the truth."

This is the burden that scientists and science communicators face. It is the eternal struggle between storytelling and reality, which I hope I've made clear in this book. It is not an insurmountable challenge, and when a good
story can be told using completely accurate facts from the real world, that is often the most powerful story of all.

Many of the greatest movies ever, from Lawrence of Arabia to Titanic, are woven primarily out of the truth. Liberties are taken to make the stories work to their maximum strength, but in general both films reflect an effort to stick to the truth.

So I am in no way encouraging anyone to distort science, only encouraging scientists to help the rest of the world understand the crucial insights of their work by going the extra mile. Scientists actually know what I'm talking about here. They write research papers. They know what it's like to take a rough first draft and turn it into a well-polished finished product. The only question is how far you are willing to push. And this comes down to the importance you place on communication.

Let the Revolution Begin: Dada and Attention

Now it's time to look to the world of art and propose a parallel pattern for the world of science, separated by roughly a century. In many fields of science, there is a progression from an old-fashioned descriptive phase to an exciting new experimental phase.

In my field of marine invertebrate embryology, for at least a century scientists sat at their microscopes and humbly described everything they could see when they looked at animal embryos in various stages of development. But then a lot of scientists seemed to tire of simply describing what they saw and began wanting to know how things work. This led them to begin experimenting. They began turning their efforts toward subjecting embryos to different physical conditions or removing individual cells and watching what happened. Instead of just describing patterns, they began to delve deeper into understanding the processes that create the patterns.

The "descriptivists" (if we can coin such a term) are generally seen as traditional, conservative, unimaginative, content with the status quo, and even repressive toward those who challenge their established ways. The experi-

mentals are regarded as more bold, brave, confrontational, innovative, and determined to break free of the bonds of tradition. The descriptivists are also seen as more disciplined, while the experimentalists seem more reckless.

In the world of art, a major transition of this sort began with a single, explosive event in 1917 staged by the playful French artist Marcel Duchamp. In an era when art was considered to be grandiose paintings by the great masters, Duchamp and two friends purchased an iron urinal, turned it on its side, called it Fountain, and submitted it to an art show in Zurich, Switzerland. The judges, being traditionalists, deemed it "not art" and rejected it. An uproar ensued among the newly formed Dada cultural movement (which produced what is sometimes called "anti-art" in a fashion similar to antiplot, discussed in chapter 3). Duchamp protested by resigning from the board of the Society of Independent Artists, and the art world was never the same.

Figure 5-2. Fountain, the piece of art with which Marcel Duchamp shocked and offended the conservative art world in 1917. Could the science communication world use a similar shake-up?
A full appreciation of this event requires an understanding of the social tensions in Europe on the eve of World War I and the widespread frustration with the staid and serious tone of the art world in general. The urinal was a statement of rebellion, which was met with hostility by many established artists yet laid the groundwork for much of today’s modern art movement. To this day *Fountain* is pointed to as a landmark creation—so much so that it was the centerpiece of an entire museum show in 1989.

The discussion of “what is art” continues, and the bewilderment of so many when looking at what Duchamp referred to as “readymades” (objects that become art simply by being labeled as such) has not abated. In 2007 a wonderful documentary, *My Kid Could Paint That*, took yet another look at this issue by asking whether the abstract paintings of a child could really be considered art. But there is a different way to view the work of such artist provocateurs.

Richard Lanham, in his discussions of what he calls our “attention economy,” offers up a new and interesting perspective on Duchamp’s defiant gesture. If you view Dadaists and their descendants, such as Andy Warhol and Christo, not so much as artists but rather as “attention economists,” you see they were brilliant. They knew how to work within an economy in which attention is increasingly the most important currency, and they knew how to score big.

All of which lays the groundwork for what we now see in the communication of science. Today there exists a very traditional style of communicating science. It is quiet, reverential, rich in information, supremely accurate, short on humor, devoid of emotion, and increasingly ineffective, as I noted in the discussion of the first of Laurie David’s two global warming movies.

In the world of documentary filmmaking in general, the equivalent of *Fountain* could well have been Michael Moore’s 1989 groundbreaking film *Roger and Me*. In the film, Moore dispensed with the age-old ethic of filmmaker as outside observer or “documentarian” and instead jumped in front of the camera as an active participant. Documentary purists were as angered by his work as the art purists had been by *Fountain*. But it also became the most commercially successful documentary in history at the time.

In the same way that Duchamp caused the art world to ponder “What exactly is art?” Moore prompted the documentary filmmaking world to consider “What exactly is a documentary?”

And now, in the postmodern era, the presentation of science through the traditionally rigid channels of science documentaries seems to invite experimentation. And that, in essence, is what Laurie David and Al Gore did—*An Inconvenient Truth* was experimental and also drew on Gore’s celebrity to grab attention.

The bottom line: experimentation is essential to advancement, and to experiment successfully you must be able to draw on your voice.

**Your Voice**

Everyone has an expressive, creative, personal voice to some degree, and it comes with a stamp that is as indelible as fingerprints. We saw this in film school. In our first class, we had to make five short Super 8 films. Each week, five of the fifteen students would show their latest “masterpiece.” In the fourth week the instructor took one week’s films, chopped off their opening credits so no one would know who the filmmaker was, and then after each film asked everyone to guess who made it.

It was so easy. Everyone was able to guess: “Oh, that was a Javier film,” “Oh, that was a Zellie film,” “Oh, that was an Ann film.” Everyone’s style had become so obvious that even if the guy who had made three Tarantino-like guns-and-violence films were to switch to a romantic comedy, you’d still sense his style. Something would just come through. That something is called “voice.”

If you are a scientist (or pretty much anyone) and you want to get involved in mass communication, this is your official starting point. You need to listen to your “voice” and figure out what it is.

I know what mine is. You can see it in my twenty years of filmmaking
and even before that. It’s characterized by bright colors, upbeat music, silly and even campy humor, “high key” lighting (meaning brightly lit scenes, as opposed to dark and moody), simple but well-structured stories, sincerity, irreverence bordering on offensiveness, and a tendency toward provocativeness.

Spending three intense years in film school had no effect whatsoever on my voice. I made my barnacle music video in 1991 and Sizzle in 2007. They were sixteen years apart, with film school in the middle, but for better or for worse they have the exact same voice—same combination of silly and serious, science and nonsense, bright color, lively music, and plenty of humor.

And I can name for you some elements my voice doesn’t have—nonmelodic music, complex and inverted story lines, amazing visual gymnastics, large doses of mystique, eyeball-wrenching rapid-cut sequences, tons of beautiful people, on and on. That’s just not part of my voice.

So when it comes to communicating with the general public, what is the voice of science today?

First off, as with any discipline, the strongest voice is that of a single individual. When the United States goes to war, it starts not with a press release from the Pentagon but with a single individual, the president, standing before Congress and lending his single human voice to the mission.

There is nothing more powerful than the first-person narrative—the voice that can speak to a crowd and say, “This is what I know; this is what I have experienced; this is how I feel.”

In 1999, four authors published The Cluetrain Manifesto: The End of Business as Usual, which was an essay directed at the business community that underscored the importance of the human voice by demanding respect for the channels of communication opened up by the newly created Internet. They offered up the following warning regarding the markets available via the Internet:

These markets are conversations. Their members communicate in language that is natural, open, honest, direct, funny, and often shocking. Whether ex-
dumped into the marketplace with an air of Darwinian models of natural selection. The most miserable and embittering five years of my life were from 1983 to 1988 as I desperately sent off job applications in search of a tenure-track professorship. During those years, senior professors told me “Good people get jobs,” meaning “There’s nothing you can do; the job market is going to tell you if you’re a good person.”

It’s still a tough process today for young scientists finding employment, but at least several decades’ worth of editorials in Science and Nature have awakened some level of compassion. Today there is an entire “Naturejobs” Web site to assist struggling young scientists, and most science organizations invest a lot of effort in helping fledgling scientists find their way, with, it is hoped, a little less heartache than my generation experienced.

The world of science is slowly, gradually becoming more humanized. And that allows room for individual scientists to increasingly speak out in their own distinct voices.

Which brings us back to the individuals from the science world who feel drawn to engage with the general public. Yes, I’m speaking to you—the scientist, the science communicator, and even just the science aficionado. I want to finish by offering up a few words of encouragement, as well as reality, when it comes to communicating science to the general public. Let me start by ground-truthing this book.

Is This Book “the Be-All and End-All” for Communicating Science?
So what were you expecting—that the book would be the definitive manual for communicating science to the public? Here’s a final Hollywood anecdote.

In the first summer of film school, I got a job working as an assistant on the Hollywood movie Three Wishes, starring Patrick Swayze and directed by Martha Coolidge. It was great (if you rent the DVD you can see my name in the end credits, buried among the production assistants and listed as Dr. Randy Olson). I was thirty-eight years old, a tenured professor (technically I still hadn’t resigned), and there I was getting coffee and lunch for all the producers, many of whom were younger than me. It was wonderfully humbling!

For a couple of weeks I managed to get assigned to work with the casting director, videotaping auditions. As a number of major actors came in to “read” for parts, I sometimes got to chat with them in the waiting room. I had just begun my Meisner acting course, which, despite my beatings, I was very excited about, so I would ask them if they had ever taken such a course and, more important, what they thought was the best and most essential acting class to take.

What I heard from every single actor was the same thing. There is no one class or method that is the definitive education for acting. Instead, you need to take a variety of courses—scene study, cold reading, improvisation, Meisner, and so on—and take what is of relevance and value to you from each one, in hopes that together they will eventually make you into a well-rounded actor.

I give the same answer for science communication in relation to this book. As I mentioned in chapter 1, a number of excellent workshops and guidebooks are now being offered that address how to mold scientific information into understandable messages. That knowledge is essential to communicating science effectively, and I haven’t even begun to delve into it here.

This book alone is not designed to train you as a mass communicator. It’s more of a lesson in how to rethink your style of communication so that you can reach a larger audience.

So Then, What Does the Title Mean?
Now that we’ve almost completed our journey, let me step back and address the title of this book, which does not say “Don’t be a scientist.” It merely says don’t be such a scientist.

I had an incredible amount of fun in all facets of my career as a scientist (except for writing grant proposals—ugh). I loved doing research, loved
going to scientific meetings and giving talks, loved reading (good) scientific papers, loved writing research papers that got accepted (not quite as fond of the ones that got rejected), and more than anything else loved the application of reason and logic to the natural world through the scientific method. I spent a year on Lizard Island, Australia, living and breathing science every single day. It was the very best year of my life.

Some day I will make it back to Lizard Island to resume my research on the strange little white and brown blobs that I studied for my doctoral dissertation. My heart will forever reside in the Lizard Island lagoon. I loved my career in science and departed only because I equally enjoy the telling of stories through film. There is nothing negative about a career in science intended by the title or anything in this book.

No, the fact is, the title of the book is *Don't Be Such a Scientist*, and I will now, reluctantly, reveal where the title comes from. I spent eleven years, the better part and certainly the best years of my science career, with a woman whom I married and eventually divorced. She was not a scientist by any stretch. In high school she was an accomplished singer, dancer, and actress who could easily have pursued a career in those professions but instead chose to study environmental policy, eventually earning her master’s degree.

Throughout the years we were together she was my biggest fan and supporter, going to scientific meetings with me and spending months in the field with me at marine biological laboratories and countless nights listening to scientists do what they like to do most—talk about their research. She was one of the all-time greatest fans of science and an incredibly good sport. And yet . . .

There were times when being around the science life was just too much for her. The spouse of any scientist knows what I’m talking about, in the same way that the spouse of any lawyer, accountant, politician, engineer, real estate agent, or most any profession knows (just take, for example, my wonderful mother—my father could easily have written a book about her titled *Don’t Be Such a Real Estate Broker*). All of these professions can require a great deal of focus, intensity, and concentration, which leads to occasional phases of myopia. And because science is so information intensive, I would suggest that it might even lead to a little bit more of it than other professions.

And so, despite how much fun and fascinating the science life was, there were times when I would show some of the worst traits I’ve talked about in this book—the tendency to be so cerebral (preferring to read a book rather than go dancing), so literal minded (unwilling to suspend disbelief and roll with a silly story that pushed the limits of credibility), and such a poor storyteller (going on and on about a scientific study because I believed the data itself to be so fascinating), and, in the end . . . at times being unlikeable (including moments of extreme cynicism). All of which did, on more than one occasion, lead her to cry out, sometimes humorously, but also sometimes with tears in her eyes, “Please . . . don’t be such a scientist!”

This is what the “Don’t be *such* a scientist” admonishment is about. Not to be any less of a scientist than your mind tells you to be, but simply to develop an awareness of where the excess focus will take you. You want a healthy, productive life as a scientist? You’ve got to find ways to develop an awareness of the myopic drive and the need to split your attention. In essence, you need to . . .

**Be Bilingual**

This is my specific recommendation. Know that there are two audiences for you as a scientist. I have talked about them both. Let me summarize here some of the basic dynamics in a form that scientists can relate to—a table.

As a scientist or science communicator, you need to become “bilingual”—to be conversant in your area of specialty in both languages.

There are, of course, plenty of exceptions. Many researchers are shielded from the general public and don’t have to bother with the broad language, and many science communicators never have to come into contact with scientists, so they need to worry only about broad communication. Still,
Table 5-1. How the Broad versus Academic Audiences Respond to Various Aspects of Communication

<table>
<thead>
<tr>
<th></th>
<th>Broad</th>
<th>Academic</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Main information channel</strong></td>
<td>Visual</td>
<td>Audio and visual</td>
</tr>
<tr>
<td><strong>Structure</strong></td>
<td>Need a story</td>
<td>Information is fine</td>
</tr>
<tr>
<td><strong>Mode of response</strong></td>
<td>Visceral</td>
<td>Cerebral</td>
</tr>
<tr>
<td><strong>Need humor?</strong></td>
<td>Pretty much</td>
<td>Not necessarily</td>
</tr>
<tr>
<td><strong>Like sincerity?</strong></td>
<td>Always</td>
<td>Suspicious of it</td>
</tr>
<tr>
<td><strong>Sex appeal?</strong></td>
<td>The ultimate</td>
<td>Potential disaster</td>
</tr>
<tr>
<td><strong>Prearoused?</strong></td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Effective elements</strong></td>
<td>Humor, sincerity, sex</td>
<td>Information</td>
</tr>
<tr>
<td><strong>Effective organs</strong></td>
<td>Heart, gut, gonads</td>
<td>Head</td>
</tr>
<tr>
<td><strong>Preferred voice</strong></td>
<td>Human</td>
<td>Robotic</td>
</tr>
</tbody>
</table>

working toward bilingualism is a potential bonus for anyone associated with the world of science.

So how does this work? It means speaking the right language to the right audience. One of my best scientist friends complained to me recently about her graduate students giving talks at scientific meetings in which they show funny cartoons all through their presentations, to the point where the serious scientists find it annoying and even discrediting. It is. I’ve seen it with other scientists. As bad as it is for a scientist to speak with molasses-thick jargon to the general public, it’s equally bad to speak with a broad, elementary voice to fellow scientists.

**Truly Be the Voice of Science**

If you want to make a major contribution to science communication, you need to know from the outset that it will be a long and personal journey. It won’t be easy. It won’t be safe. And it’s doubtful you’ll be able to control the timeline.

No one told Carl Sagan to write science fiction novels, get involved with Hollywood filmmaking, or go on Johnny Carson’s *Tonight Show*. He simply had an inner voice driving him to reach out and share his passion for science. He was the voice of science, by his own doing.

In working on this book, I managed to contact his last wife, Ann Druyan. She said that while the National Academy incident was definitely a setback for Carl, in his final years he was more satisfied than ever before and thoroughly relished the joys of sharing science with enormous audiences around the world. He died a very happy and content man.

On a much smaller scale, I can offer up the same overall report. No one in the science world ever recommended my initial involvement in filmmaking: it all came from inside. I enjoyed connecting with broad audiences through film, and I began to experiment.

I didn’t have any clear timeline. A month after I got to Hollywood, in 1994, I was at an entertainment industry cocktail party, standing in the buffet line and talking to a haggard old man who was a veteran agent. I was telling him about all my grand ambitions for filmmaking. While plucking hors d’oeuvres onto his plate, and without even looking up, he said, “So how long ya gonna give it?”

I didn’t even know what to say. I’d bought a one-way ticket to Los Angeles. It never even crossed my mind to do anything other than this for the rest of time.

Fifteen years later, I am still making science-related films and can say that, on the whole, it is thoroughly rewarding. One of the most heartwarming experiences has been the response I received to *Flock of Dodos*.

Although none of the major science organizations showed any willingness to support what I had done, at the grassroots level an incredible number of old friends and new friends suddenly emerged. They contacted me about screening the movie at their universities, and what ensued over the next two years was a string of more than fifty major events with excellent panel discussions. None of it involved large science organizations.

All of which showed me that there is a new interest in the broad communication of science and that the greatest support for this movement resides in individuals.

Naomi Oreskes, star of my movie *Sizzle*, talks about how a hundred years
ago scientists were by tradition very good at speaking to the lay public, as well as personally and passionately committed to do so. But that changed in the United States after World War II. The government began establishing enormous science agencies and programs and creating a new breed of research scientist who no longer needed to appeal to the public for support. A new standard emerged in which these scientists felt entitled to the right to conduct research without having to explain it to average folk. The heads of science organizations acceded to these desires of scientists, and the idea of communicating science to the public was shifted from second nature to a secondary priority.

Today, however, a change is in the air. Just as the Internet has revolutionized the individualistic drive of the population in general, it is also fostering a grassroots strength in the world of science communication. And with today’s new individual science communicators comes a bit of rebelliousness. They are exploring new ground, pushing back the boundaries, and overturning traditions. They are tossing out the old and bringing in the new. But as they go their way, building these bridges to the broader lay audience, it’s my hope that at least a few of them will follow a very simple rule of thumb. Perhaps occasionally, when they’re not quite managing to connect with the public, one science communicator will whisper to another, “Maybe try to not be such a scientist.”

Appendix 1
The Sizzle Frazzle

In the summer of 2008 I premiered my feature film Sizzle: A Global Warming Comedy at Outfest: The Los Angeles Gay and Lesbian Film Festival. The response the movie drew from many scientists (including the scientific journal Nature) is worth examining, as it illustrates much of what I’ve presented in this book.

To evaluate the response, I draw a comparison with three other science documentaries of recent years. The “data” for this enormously subjective analysis comes from assessing the presence in these movies of three elements that correspond to the top three-quarters of my “four organs theory,” introduced in chapter 1.

The first element is information, which, as I’ve discussed, is based mostly in the head. Second, we have emotion, from the heart; and finally, humor, which figuratively speaking resides in the gut.

It would be silly to try to get too quantitative about this (can you actually measure units of humor?), so this whole examination is simply at the broad-brush level. But, that said, let’s take a look at these movies.

First is the very serious and straitlaced PBS Nova two-hour production “Judgment Day,” about the 2005 trial in Dover, Pennsylvania, over the