

# Giving a Talk

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Revised 2008

## INTRODUCTION

### **Caveats and disclaimers**

Public speaking may share some features with making love. There's no absolute standard of how to do it well. There are probably some universally accepted ways to do it badly. Different people have distinct opinions on how it should be done. What passes as excellence for one situation may be inappropriate in another context. Some people who do it well won't talk about it and some people who talk about it all the time are failures in practice. People won't tell you if you do it badly, they will just avoid repeating the experience. Thus -- it's risky to presume to tell someone else how to do it.

In view of the above, you should recognize that the following is one person's strongly held (but continuously changing) set of thoughts on the topic, and it's not the final answer. The main message is that it's important to communicate as well as you can and a good rule is to continuously think about ways to improve. Here are some ideas to consider. Ultimately you'll develop your own style. It is worthwhile to give the problem serious thought.

### **Altruism and enlightened self-interest**

In many aspects of human behavior (including public speaking, writing and teaching) success requires work and dedication. Putting effort into teaching is often viewed as altruistic behavior, fine for irremediable "do-gooders" but avoided by fast-track, "cool" scientists. If altruistic goals are not sufficient to motivate you to invest the work, you should consider the fact that successful exposition may be essential to your long-term selfish professional advantage. As outlined below, your reputation as a creative, effective scientist depends on having people understand your work and its importance. In describing this work, you are teaching -- and your life depends on it. Why not get good at it?

### **Treating your public talks as a teaching endeavor**

One way to get your priorities straight when giving a scientific talk is to consider your audience as students and yourself as a teacher. In general, you'll be talking about what you know best. You have all the advantages --- you know why you do it, what the questions are and how the experiments are done and the conclusions that can be drawn. Almost any audience has something to learn from you and they're coming to the talk to learn. (Not to learn how smart, cute or hard-working you are (see below) but how they can get smarter and have some fun doing it.) So, if you aren't teaching, you're a failure.

Set up the topic as you would a course. Why should they be interested, concentrate, pay attention? What's in it for them? Why are the answers important? Why are the questions deep and meaningful?

Make sure that each point is being learned. Watch for audience reactions and adjust your behavior accordingly. Solicit questions. These are points we'll bring out more below.

### **Fringe benefits of teaching**

Effective writing and speaking (teaching) requires the ability to sift data, emphasizing information that is critical to the development of your subject and discarding less central details. By

teaching a broad discipline, you learn to see how detailed facts and relationships fit into the broader scientific landscape. This lets you develop "scientific taste" which is the key to becoming a successful scientist. For your own good (i. e. fame, fortune, grants, promotion, satisfaction) it is best if you can address your work toward central questions and not peripheral trivia. This requires the "taste" that you develop through teaching.

Skill in exposition is central to grant writing. You need to "teach" the grant review panel about the importance of basic questions that are being addressed and communicate efficiently to them how your proposed experiments address those questions. Without these central elements, a grant is painful to read and evokes in the reviewer a desire to extract revenge (which can be painful to you).

Your independent lab will function better if people who work with you have learned (from you) the essential technical and intellectual skills and feel they are continuously learning and growing under your influence. After all, **you** didn't choose **your** thesis advisor because you wanted to help make that person rich and famous, but because you thought you would get an education. By the same token, the lab you run later will function best if you are an effective teacher, concerned with the success of your students and coworkers. The students who will work with you aren't laborers sent to you by God to develop your career. The student/mentor arrangement works best if everyone derives a benefit.

Most scientists work not for fortune or popular public acclaim but to enhance their reputation among the cognoscenti or experts in their field. To build a reputation, you must, of course, produce high quality, insightful science, but you must also convey this information to the scientific readership (and listenership). Your audience is swamped with papers and lectures on lots of topics; you need to get your message across through a blizzard of competing information. The need to communicate effectively is also important if you work in private industry. Your reports and talks to colleagues at your company may determine your ability to influence decisions, get promoted or even maintain employment. Learn to write and speak effectively -- it's a good investment in your future.

### **Convincing everyone you're smart (and how not to do it).**

We need face the sordid fact that an important (and usually unstated reason) that you want to communicate is to convince the audience of your skill, creativity and general insight -- more bluntly, you want to prove how smart you are. (Someone once said that intellectual activity of all kinds is simply one brain's way of ranking itself vis a vis other brains). Assuming this is one of your main (if hidden) reasons for speaking, you should be aware of an insidiously seductive short-cut that leads to a disastrous pitfall.

At first glance, obfuscation looks like a good strategy for making yourself look smart. The reasoning runs as follows -- "If I talk very fast, use lots of jargon and make huge inductive leaps, the audience will get lost, feel dumb and inadequate and assume that I (the speaker) must be the brightest person around." -----Wrong. The many who follow this reasoning in their written work, put out material that is tightly written, finely reasoned, extremely compact (Constipation comes to mind.) The reader endures a joyless, time-consuming task, even when the content is excellent. In lecture form, this approach is dry dry dry and the listener falls asleep hearing a seminar that could have been fascinating. A form of this short cut is to include every single glorious experiment and exactly how it was done until the audience drops from sheer tedium waiting for an idea. Obfuscation (including ponderous impressiveness) is another way of inflicting pain on an audience and no one loves pain; no one loves feeling dumb. They came to learn and you treated them like dirt.

Revert to your teaching mode. When you give a talk or write a paper, you're teaching. The ideas conveyed are your heart and soul, the product of your hands and intellect. If you can teach the intellectual message to your audience, your information becomes part of their general body of knowledge. They will remember with pleasure that they gained some insight from you; they got smarter and improved. If the material is clever they will appreciate your intellect for being able to solve a problem and for being able to convey the message clearly. If you can make your story clear even to non-specialists, you've broadened your audience and spread your message to even more people (putting a higher exponent on the information growth curve). Alternatively, if you baffle them, they'll just think you're a jerk and avoid your next paper or seminar; you've thwarted your own plan to expand your reputation and advertize your brilliance. ---- Take home lesson - TEACH 'EM; DON'T DAZZLE 'EM

### **SCIENTIFIC TALKS – AN OPPORTUNITY WITH A RISK**

The chance to give a live talk is a rare opportunity. In our current global information glut, no one reads enough to cover critically the entire relevant literature. Those who encounter your written work are likely to give it a quick scan and read it carefully only if they find it directly relevant (or exquisite fun). In contrast, a public lecture attracts a less specialized collection of people, most of whom don't know exactly what they're going to get; they make a commitment to invest time in hearing your message without assurance that it will be either relevant or fun. (The implied contract is below.) Once they sign up (and sit down), people at a seminar don't have anything else to do but listen. Verbal communication is an immediate, personal ("mano a mano") form of communication. You can pull out all the stops to convey your message, and they can't escape (very gracefully). This is your chance to strike --- you've got them for an hour, more time than they're likely to spend reading a paper outside their field.

The risk of speaking is that people tend to remember the main impact of what happened at a seminar. This makes public speaking a potentially dangerous way to communicate. If you are effective, you get your message across and may even recruit new friends, admirers or enthusiasts for your kind of science. If you do a bad job, listeners may take away only resentment and the conclusion that you are a jerk. Thus, in accepting the opportunity to speak, you take the risk of hurting yourself. This risk is less with writing because a disgusted reader will just turn the offending page without remembering or generating resentment. (Speaking is like crossing a deep canyon by tight-rope – it's an effective short cut in your journey, but there's no net if you slip.)

#### The contract:

“I, the audience agree to take a risk of pain and suffering implied in going to your seminar on the off chance that I'll learn something and get a chance to practice thinking about something amusing”

“I, the speaker agree to do my level best to teach in a clear and engaging manner the material that I know well and to avoid being the nasty abusive jerk that you have come to expect in this situation.”

## A BASIC PHILOSOPHY FOR SPEAKERS

Whether or not you agree with the suggestions for seminar presentation that follow, the philosophical considerations below are intended to serve as a way of gauging the importance of a good speaking style and as an overall criterion for devices you might like to employ. Remember why you sometimes skip a seminar? Remember how you have felt when leaving a seminar that has been poorly prepared or presented? My dominant feeling is pain and rage at the amount of time wasted in discomfort -- time that could have been better or more enjoyably spent doing **anything** else.

The magnitude of the pain inflicted by an incompetent seminar-giver can be estimated by considering the product of the time spent (usually an hour) and the size of the audience. A painful one-hour lecture to eighty listeners inflicts aggregate pain equal to torturing one human being all day, every day for TWO WORKING WEEKS. That is cruel and unusual punishment. By using this as a measuring stick, you can get a fair idea of why it's important to give a good talk, especially to a large group. Think back to your outrage (as a member of the audience) at having wasted an hour of your precious time at a bad talk; multiply by the size of that audience.

An audience that comes to hear you speak has taken a considerable risk (see philosophy section above). They have given you the power to hurt and maim them without any guarantee of their own safety. They do you a great honor by showing up -- you should treat them with the respect and consideration that is their due. Think of yourself as their guide for a risky trip. The audience is naturally apprehensive that they'll be led astray. You need to reassure them with your confidence and assurance. Be solicitous of their physical and intellectual welfare; convince them of your capabilities. Pay attention to their body language.

### **Creature comforts come first.**

As any capable host, you should start out by being sure that your honored guests are physically at ease. Can your guests hear, see the board? Are there enough chairs? Is the room too hot? Your audience will be able to pay better attention if you spend a moment making a few adjustments to the microphone or the seating arrangements, opening a door, turning on the board lights. Give them a chance to volunteer some suggestions -- "Is the microphone working? Can everyone hear?". Use the same philosophical attitudes regarding the "comfort of guests" to guide you in constructing and presenting your seminar.

### **Encourage participation**

The most entertaining part of attending a seminar is having a chance to think about something new -- to try your own brain out on an unfamiliar puzzle or set of questions. You give your audience a chance at fun if you allow participation. A conversation with give-and-take is more fun than a formal lecture received passively. You can approximate a conversational atmosphere, even with a big audience, by inviting interruptions.

Try starting out by saying "If you have questions or don't understand something, interrupt me during the talk." This is a breathtaking offer to someone like me who has trouble picking up all details in a talk and can often be kept on track by a minor clarification. It's like the matador at a bullfight, turning his back on the bull and walking toward the spectators -- the audience knows you are in supreme control and worthy of their trust. The worst thing that can happen (the bull charges) is that you get some pest who starts trying to show off by dogging your every word. This isn't very

common, but if it happens and threatens to take you overtime, you can always regain control and call a halt. Perhaps you could say, "That's a reasonable point but it gets us off my main topic; we can discuss it later" or even "Gosh, I'm getting behind, let's hold the rest of the questions until the end."

You can stimulate participation during the talk by interjecting invitations between sections. For example, "We've just described the basic experiment. Before we get into the results -- do you understand the basic idea? Any questions before we proceed?"

### **Catering to short attention spans**

Someone once said that the attention span of the average human adult is about 15 minutes. This is unfortunate, since seminars usually last an hour. You can reset their clocks by building interruptions into your talk. That's one advantage of soliciting and getting questions. A question stops the formal flow of the talk. It takes the pressure off. Everyone can take an intellectual breather and the tension between speaker and audience is broken for a bit by a few words of relaxing banter. This helps them reset their attention-span-timers.

## **STRUCTURE OF THE TALK**

### **Outline your talk**

Before you start, put up a brief outline on the board. Go through it quickly, spending just a few moments (one minute maximum). Don't dwell on details they can't understand yet. This outline lets them know that you've got a plan and are likely to be a competent guide. By reducing their apprehensions, you elicit their trust. As you go through the talk refer to your outline. E. g. "We've gotten through the background section and have posed the major question. Now we'll proceed to describe experiments that are designed to approach an answer." This is another device for punctuating your talk, breaking the tension and allowing people to reset the clock of their attention span.

### **Sell the question before trying to sell the answer**

A good principle of teaching is "never provide answers to questions that are not in the mind of the student". Why should a student care about the answer? Facts are only interesting if they answer a question. In seminars you need to teach the question first by presenting the background material that everyone accepts, outline the question inherent in this background and, only then, proceed to describe how your experiments are directed at an answer.

How to establish the background is a difficult problem. You never quite know how much your audience already knows. If you get too simple and spend too much time, they're bored. If you skimp, they can't follow your experiments. Max Delbrück was reputed to have advised seminar speakers "Assume that your audience is completely ignorant -- but infinitely intelligent". In following this advice, one reviews material that is probably familiar to most of the listeners, but one does it at a rapid pace, including only the essential points. An infinitely intelligent novice could, in principle, learn the necessary background; a partially informed audience (more commonly the case) appreciates the review, fills in their knowledge gaps and isn't bored as long as it moves fast.

### **Sell the answer before the experimental data.**

Once you've established the question, it's not a bad idea to tell them where you're taking

them. For example, "I just explained to you the importance of knowing the composition of the moon. Next we're going to consider a series of experiments designed to address this. Through these experiments I'm going to try and convince you that the moon is composed completely and solely of green cheese."

By doing this, you set up a concept against which the listeners can measure all that you have to say. Each experimental result can be evaluated for its contribution toward achieving the stated goal. This makes it much easier to frame objections or accept progress than is the case when the listeners don't know where they're headed. They can start to anticipate what experiment you might do next. They can see where they're going -- always comforting to those on a dangerous journey.

The extreme example of an undirected talk is called a "Who-done-it" in honor of detective stories that lead you through lots of detail (some relevant and some not) and provide an answer only on the final pages. In such a talk, one presents an experiment without telling what it's intended to show. The audience hears a lot of experiments and a lot of results before learning what has been concluded or why the experiment is being done. They must keep all this information in some sort of mental buffer and be able to recall it when conclusion time arrives. Their recall must be perfect if they're going to evaluate your evidence critically. This is tough to do. It demands an audience of absolute saints.

While it may seem more honest not to prejudice the audience with the conclusion, in fact, listening to a talk is too hard for the purist approach. It's better (if you have a sharp conclusion) to tell them the answer up front, just after setting the question.

### **Data versus ideas**

You're most likely to be talking to scientists. This is an audience that loves problems, thinking, ideas, games, hypotheses, models, paradoxes. Make sure these are the dominant features of your talk. A recitation of facts and huge piles of data are only interesting to the extent that they establish or support some engaging notion.

Audiences (at least classy ones) aren't very impressed by hearing you tell them you're a hard-working dude -- they're hard-working too. It is a very common mistake to list the "labors of Hercules" and believe you can make people gasp in awe -- mostly they just yawn at the data and hope you'll soon get to an idea, make a conclusion or eliminate a model. They may wonder why you couldn't figure out an easier way to do the work.

When you have a lot of data, but can't make much of a conclusion, you have a serious problem. The facts can at least be arranged around an idea or a model. You can spend more time establishing the question or the difficulty of the question. Stress the explanations that are eliminated by your data and the ones that are left as possibilities. Keep tying the data to an idea, a model, a hypothesis and don't let the data take over.

### **Questions are more interesting than facts.**

If you have a classy audience, they're eager to "lend you their minds" and try to second guess where everything is going. If they can think, make suggestions, get involved, they'll love you forever. This will be true even if the answers are solid and some more experiments are still needed.

A talk in which the question is interesting and important and the data is extensive, clear, persuasive would seem to be ideal. However in practice they're often pretty dead. The audiences feels abused by the overwhelmed burden of evidence. They're forced kicking and screaming to a conclusion.

The middle road is the one to take. Present the question and the data clearly, but do it by

leading with sub-questions. Make clear what questions remains open. Give them a chance to play.

### **Minimalism in data presentation**

Frequently one does a lot of work that doesn't lead to a conclusion before coming up with the meaty experiment that tells the story. Spare them the first experiments (no matter what it costs you in anguish) and spend adequate time explaining the critical experiment fully. Every experiment you set up takes time to explain. Give the big one the attention it deserves. (If you only talk about critical experiments, they'll think you're a genius whose every experiment is ground-breaking.

Avoid distracting side-routes. Experiments frequently suggest new ideas and pose novel questions. Avoid pursuing these. Stick to the central question you posed at the beginning of your talk. Be brutal in suppressing the clever tangents; make sure that the basic goals of the talk are completely and effectively discussed.

### **Avoid the "Grant Proposal Coda"**

This is the hateful little trailer that follows many seminars. In this section, the speaker tells what will be done next and the cosmic conclusions that will be drawn from these un-done experiments. (Basically they are presenting their next grant application.) Interpreting results not in evidence is like saying "If my grandmother had wheels, she'd be a roller skate." The audience didn't come for science fiction or to hear you tell them directly how smart you are to think up these (undone) experiments, they just want to have fun (Translation: to think and learn.). Save the grant application for NIH.

### **It's not all about you (really)**

There's a strong tendency (once the speaker has control of a podium and an audience) to start a self-centered history of his or her thought processes and how he (or she) did this and then thought that etc etc. This is self-aggrandizement that a classy audience will resent. I even hate the seemingly polite starting phrase ---"I'd like to thank the organizers for inviting me to speak to you." This sounds like courtesy but it's really blowing your own horn. It's really saying, "Dear listeners, I'm great because your august organizers chose me out of the millions of other possible speakers they could have chosen." It seems more reasonable to say, "Hello. I'm honored that you came today and I hope I can keep you from falling asleep" Thank the organizers in person after the talk is over. They'll get their real thanks, if the audience tells them how much they enjoyed your talk.

### **Overlapping loops - the importance of redundancy**

Spoken communication is inefficient because the audience has many attention lapses. They worry about dinner, the car repair, how to solve a problem they have in the lab, a sick dog, their itchy scalp etc. etc. Worst of all, they don't synchronize their lapses. Because of this, if you give a perfectly logical presentation with each step an essential and different link in the chain of evidence, many will lose track of the train of logic when they have an attention lapse.

You can accommodate this problem by having the direction of your talk follow a set of partially overlapping loops. Speak for three jumps, then recap jumps two and three and add four. Next you recap three and four and add five etc. In this way everything gets restated and you keep everyone in the game. This looping train of exposition would look terrible in printed material, but while reading you can back up and reread a section missed during a lapse. Notice how often you do that when reading scientific material. You can't "re-read" what is missed in a talk, but a speaker who builds in some loops can give you a break.

### **Time your talk carefully**

Don't ever go overtime. Remember, in the philosophy section we described the audience as a bunch of apprehensive travelers who took on the risk of a journey (attending your seminar). They contracted to risk an hour of their time (no more) to give you a chance as guide. Regardless of how well you speak, if you go overtime, you violate the contract. They gave you the honor of listening and you forced them to give even more. (They signed up for a float through the Grand Canyon and you dragged them, kicking and screaming, all the way to the coast.) No one was ever angry because a talk was too short.

### **Summarize at the end**

It's nice to sum up at the end. This helps those that just barely stayed with you (and those that slept through the whole thing). The former types at least get a restatement of what they heard so they can confirm and solidify the pictures they had established in their minds. For the sleepers, it's a party-favor so they don't go away completely empty-handed.

## **MECHANICAL DEVICES TO EXPOIT**

### **Use of the lights**

Darkness is for sleeping not for conversing with friends. Many apprehensive speakers hide from their audience by turning out the lights at the first opportunity. If a speaker's first words are "Lights out, first slide", you can be sure that you're about to be subjected to a painful hour. You know the speaker is terrified, insecure (Translation: unprepared, incompetent) and wants to hide in the dark. Low light, a warm room, a humming projector are wonderful inducements to inattention and sleep. My strong preference is to use no projection devices and keep the room as bright as possible. (Occasional loud noises might also help.)

If you must use slides, keep the maximum amount of light on in the room. It is usually sufficient to lower the light in the front of the room in the area of the screen. If lights must be turned off for a microscope slide, be sure to turn them on again as soon as you've passed that slide. Turning lights on and off can actually help keep people's attention. It puts a break in the flow of speech and provides a little shock to avoid hypnosis.

This mention of slides may be old-fashioned, but we'll get to power point in a bit.

### **The advantages (and difficulties) of chalk talks**

To keep people's interest and convey information efficiently, I think it's hard to beat a chalk talk with a well-lit visible black (or white) board.

The main advantages are that the tip of your piece of chalk serves as the focus of attention and minimizes distractions.

- Because of the time required to draw by hand, a diagram made while speaking must have minimal detail. Thus you're presenting only the essentials.
- All eyes and attention are directed to the line you are drawing.
- This avoids "talking head syndrome" in which the audience must stare (hypnotized) into a

- face with a flapping mouth.
- This avoids the mass of detail that is presented all at once on a detailed slide. While you describe one portion of the information on a slide, the audience is looking at the whole thing and is therefore distracted from what you're saying. They lose guidance for one part while trying to understand the rest with no guidance.
  - By drawing while speaking, you show only the diagram that is being discussed. All material visible on the board has already been described and can serve as a reminder and reference to the audience as you go ahead.
  - You can add a diagram to the board, leave it in place, and make a second diagram, moving across the board. When a second slide comes up, the first disappears and can't be referred to for those who had an attention lapse.
  - While speaking, either draw continuously or point out aspects of previously drawn material. This might be a list of key words (no long sentences) or diagrams.
  - In a chalk talk you can change course seamlessly if they aren't getting it. Answer questions on the fly. Make new diagrams you didn't plan on initially. It's better to teach them something (even if it takes you astray) than it is to follow to the bitter end an impenetrable planned talk that went wrong.
  - The biggest advantage of chalk talks is that they set up the ideal teaching arrangement --- you and your audience are on the same side looking at an impersonal third object (the board). In this situation, they're more likely to formulate questions for you and think with you about the problem. In an adversarial arrangement when you're talking AT them, they're more likely to be defensive, fight against your (obvious and beautiful) conclusions or give up and think about something completely unrelated.

### **Problems of chalk talks**

You have to know what you're doing and have the topic under complete control. This is easier when you are describing your own work because no one in the world can possibly understand that as well as you do. After all, you've been thinking about it for years, more or less full time; the audience is hearing it for the first time. If they can out-think you, you've got problems that won't be solved by use of slides.

You need to be able to think on your feet (Translation: walk and chew gum). A question may require redrawing or modifying a figure, or coming up with a new figure. This means you have to listen very carefully to questions, understand the point (hopefully one you have anticipated), and be ready to fill in the missing parts.

Despite the challenges, this is the high road of speaking. It keeps people's attention just to realize that you are out there alone (on the high wire without a net). It makes the talk a more intimate form of communication to have no technical devices between you and the audience. (Comparable to the difference between a live concert and hearing recorded music.)

### **Disadvantages of slides and power points**

Slides take time and effort to prepare and therefore are likely to be used without revision when you give a seminar in a new way or with a new focus of interest. Thus seminars frequently contain slides with incorrect or out-of-date information.

Projectors are often noisy, making it hard for those near the machine to hear you.

Slides require dimming the lights and are sleep-inducing.

It's nice to see the speaker's face, note his expression, see some animated arm motions, pick up on his excitement. It's very hard to tell a joke in the dark because so much information is conveyed by the speaker's "body-language".

A slide contains more information than you can discuss at one moment; the extra stuff is distracting. Most people's slides contain information that will never be discussed and is therefore a distraction with no positive effect. Whatever isn't used is hurting your presentation, because it distracts.

### **If you must use slides**

By now you've considered the arguments for chalk talks; you may have found it all vaguely amusing but you have concluded that it doesn't apply to you. In your particular case, (but no one else's) slides are better. You have rationalized this decision by a complicated (and completely incorrect) train of logic and are ready to plan your slides. If this assessment of the situation is correct, I recommend that you start at the top and read the whole essay again before going on. If I've still failed to convince you and you **ABSOLUTELY WILL MAKE SLIDES**, read on.

### **Keep detail on the screen to a minimum.**

Put on the slide only material you need for your argument. Anything extra is distracting and falls in the category of trying to impress the audience with what a drudge you are for collecting irrelevant data.

Five numbers on a slide constitute a discussible amount of information; fifty numbers are not. If you diagram a process, stages of mechanism, or a series of crosses, then you are morally obligated to lead the audience through every detail of the slide. If you don't, they can't possibly grasp all the details and you are being deliberately confusing. Rather than confuse them, leave the slide at home or design a simple slide with only the relevant material. Either a slide is valuable and therefore deserves a **complete** guided tour, or it's a distracting, useless ostentation. Dazzling the audience with a mass of details is usually done by speakers who intend to impress the audience with how smart they are and how dumb they can make their listeners feel. It never works and is in no way conducive to education. (If they could pool their aggregate annoyance, they would be more likely to kill the speaker than to applaud; thank God members of audiences can't pool their separate displeasures.)

### **Degassing your slides.**

Slides frequently are made at a computer keyboard and there is a strong tendency to use lots of words in small type fonts and put lots of space between many elements of the drawing. This is terrible because usually the small fonts aren't legible. Try to fill the space on the screen. Use **HUGE** type fonts, **BROAD** lines, and a **MINIMAL** number of elements. Basically you're squeezing the "air" out of the space and filling it with bold informative, legible symbols.

Don't use text slides. They're very popular with speakers and they are universally annoying to audiences. If the audience wanted to read your message, they would have gone to the library. It insults an audience when you put up a text slide and then read it to them. You imply that either they need help reading or you don't know what you're talking about without reading it yourself.

## **Power point.**

All the talk of slides seems a little ancient, because power point has conquered the world and taken the place of slides as the most abused means of illustrating a lecture. However there is hope and, in principle, power point can be almost as good as a chalk take, if you deal with it properly.

### **Advantages of power point**

1. It's easy to make new slides (before the talk) or to update old ones so as to eliminate out-moded bits
2. The audience can see what you project better than what you write on the board.  
This is particularly true as new buildings are built with inadequate boards
3. New projectors make it possible to leave the lights ON.
4. The video projector is usually far enough away that it's fans don't drown out the speaker
5. (For those who are determined to fail) – With PowerPoint, you can make endless bulleted lists and actually kill off a whole audience single-handedly.
6. Biggest advantage is that, PowerPoint can help you do many of the things that are provided by a chalk talk (see below)

### **Staging your slides so you approach a chalk talks.**

You can construct slides so they act like a chalk board. If the first view they get is a minimal diagram, which you discuss, as if it were a few hand-drawn lines on the board. Next you put successive slides up, each with one more added feature (You can do this with the “animations” feature if you're willing to personally do battle with Bill Gates). Discuss each added feature in turn, just as you would in a chalk talk. Make each new slides identical to the preceding one with only one new feature. Their attention is directed to the new feature, just as you describe it.

### **Abuse of color and shadings.**

Power point is designed for corporate executives trying to sell you something shoddy. (DON'T FALL INTO THE TRAP !!) It's a way of making nothing sound like something. That's why there's all the artsy colors and shading. It's all intended to confuse the audience and dazzle them with slides of very low information content. Unfortunately (for the speakers), most audiences have figured this out. They know when they're being conned. The color and shading won't help make your data look better and it may even alert the audience that they're in for a rough ride.

### **Abuse of animations.**

Uncle Bill (Gates) and his minions (knowing that their product will mostly be used by snake oil salesmen) have also added lots of features for fading in and out, sliding lines of type onto the screen, adding sound effects when something hits the screen etc. Be careful of this. A little bit may help, but once is probably enough – and may be too much. If you aren't careful, the audience will be concentrating on the side-show and won't be listening to the message.

## PERSONAL BEHAVIOR

Speaking is an interpersonal activity and because you are the center of attention while speaking, many minor aspects of your personal behavior become magnified, obvious and distracting. This goes beyond the well-known bad impression made by picking your nose, scratching body parts and spitting. Even minor tics and mannerisms become striking when you give a talk because the audience sees you do them again and again and again. If they get fascinated by the performance they may stop listening to the message.

Mannerisms James Watson is famous for mannerisms. His contributions to science are enormous, but his contributions to public speaking are largely as a model to avoid. I once watched him being interviewed by Dick Cavet on television. In the course of the conversation, Watson started scratching his left ear **using is right hand** by extending his right arm across behind his head. (Try it, it's possible.) The scene was so grotesque and continued so long that it was hard to concentrate on anything being said. He's also famous for leaning against the blackboard while lecturing and slowly sliding down the board until his elbows are in the chalk tray and his legs are extended far out toward the audience. Apart from the fact that this activity is distracting, it gets your clothes covered with chalk and you look like some kind of plasterer as you finish the talk with white smudges all over the back of your head and clothing. Another of his mannerisms is making a punctuated hissing/sucking noise by drawing little puffs of air inward across closed teeth. This makes you look like a threatened, grinning chimpanzee and has a frightening effect on the audience. I think you get the idea. Pay attention to what you're doing with your body and hands while speaking (or get your friends to watch you speak and point out physical mannerisms.)

More common distracting mannerisms are verbal, such as saying "Uhm" or "Aaah" or "Let's see now" or "You know?" or (heaven forbid) "Like....." or otherwise separating informative sentences with sound bits. Silence is better. Think quietly (or during a practice run of your talk) so your verbal utterances are all directed toward the message you want to deliver. If you need to think, do it without flapping your mouth or making sounds. There's no shame in a moment of silent prayer during a seminar.

### **Don't be cute when nervous**

All speakers are nervous about standing before a group. A frequent response of beginners is to curry favor by being "cute". This means making giggly, silly, sometimes self-deprecatory remarks in the hopes of getting the audience to love you because of your sweet, cuddly self and not because of any message you have to offer. This technique works great for pre-school children and is socially encouraged behavior for women in some primitive societies. However it's frequently tried by science graduate students of both sexes. Examples are giggling at mistakes made or "Silly me, I forgot the critical slide" or "Shucks, I never get that right" or "I don't know the answer to that questions..... Dr. Jones (the research advisor who's in the audience), can you explain that for little old me." **FIGHT THESE MANNERISMS.**

When you speak, be serious; be all business and make it clear that you are in control of the proceedings and you have an important message to convey. Why should the audience care if you don't appear to care? By asking help of someone in the audience, you loose control of the talk and things fall apart rapidly. You are being evaluated as a scientist and a teacher ---- not as a potential adoptee or as a date to the prom. It is essential that the audience take you seriously. Humor has a definite place in speaking, but you should not make yourself the object of the laughter -- this

behavior makes you such an object.

### **The "talking head syndrome" revisited**

When you face an audience and they face you, a sort of tension is set up. (Stare directly into someone's eyes for a while and see if it doesn't get tense.) If you do nothing but stand there and speak directly to the audience and they stare back while listening, this tension gets palpably hypnotic. Above, we called it the "talking head syndrome". Listeners can't stand it very long without looking away, feeling weird or having their attention lapse. You can break this tension in a variety of ways, some of which were mentioned above.

One trick is to move your eyes around the audience. Pick out several people, well-dispersed through the audience and address remarks to them for a while before switching to someone else. (Give yourself a break and pick people who are awake and trying to follow the talk.) You can even walk around a bit, but don't overdo it.

Use of the board is great for breaking this tension. You become one with the audience and join them in considering a diagram that is unfolding below your chalk. You move to the next point on the board. You turn to the audience and back to the board. Pointing to a slide is OK, but the lights are out so they can't see you at all.

Interruptions in the narrative help break the tension. Example: "So you can see the problem we're trying to address. Are there any questions before we go on to the experiments?" This breaks the mesmerizing tendency of flowing words. It's a paragraph mark in verbal flow. The concentration is relaxed for a moment and you're ready to reestablish contact for the next section.

### **When English isn't your native language (this includes all Californians)**

Trying to speak in a second language is difficult for the speaker and can be horrible for the audience. English is a plastic language and native speakers are actually pretty good at understanding imprecise pronunciations IF YOU SPEAK SLOWLY. Slower speech gives the audience a microsecond to sort out the language problems. If you speak rapidly and with some incorrect words or pronunciation, the difficulties can overwhelm the audience and they give up. There's a tendency for some non-native speakers to speak English even faster than normal English speakers. I suspect this happens if their native language has a large number of syllables per second and a lower number of ideas per syllable than English. They speak English so the rhythm sounds right to them and the resulting idea flow rate in English is very, very fast.

While speaking slowly helps the audience understand individual words, slow speech can be incredibly boring if the text has low idea content and lots of filler words. You need to compensate so as to keep the flow rate of ideas up to par. Speech that is low in idea content is OK when a native speaker is speaking rapidly; the redundancy helps the audience keep up. However if you slow your speech down to increase work understanding, don't use the inefficient filler words and empty phrases that are used by native speakers. When speaking slowly, use very information-dense sentences, so the ideas keep flowing at a reasonable rate. (Read Lincoln's Gettesburg Address some time for an example.)

These suggestions are difficult to follow and require a lot of practice. However, based on the experience of foreign students in my lab, I think they are generally correct. They are worth the effort, because being able to communicate clearly in English is important to your success here. Below is an added note of warning ----

Just because you communicate easily with English-speaking members of your English-speaking lab, don't assume that the same sort of speech will work with a group of strangers. Your

closest associates get used to your linguistic imperfections. In a sense, they learn your private dialect of English and can therefore build a personal vocabulary and set of pronunciation allowances to use when listening to you. Just because your English works well with-in your lab doesn't mean it will work well in a talk to strangers. Strangers haven't heard you speak before and don't know how to make these adjustments. For them, you need to speak a generally understandable form of English.