Ten Secrets to Giving a Good Scientific Talk

More people will probably listen to your scientific talk than will read the paper you may write. Thus the scientific talk has become one of the most important communication forums for the scientific community. As proof, we need only look at the rising attendance at and the proliferation of meetings. In many ways your research reputation will be enhanced (or diminished) by your scientific talk. The scientific talk, like the scientific paper, is part of the scientific communication process. The modern scientist must be able to deliver a well organized, well delivered scientific talk

Most scientific presentations use visual aids - and almost all scientific presentations are casual and extemporaneous[1]. This "scientific style" places some additional burdens on the speaker because the speaker must both manipulate visual media, project the aura of being at ease with the material, and still have the presence to answer unanticipated questions. No one would argue with the fact that an unprepared, sloppy talk is a waste of both the speaker's and audience's time. I would go further. A poorly prepared talk makes a statement that the speaker does not care about the audience and perhaps does not care much about his subject.

So what are the secrets of a good talk? Here is my list of do's and don'ts.

1) **Prepare your material carefully and logically**. Tell a story. The story should have four parts:

(a)Introduction (b) Method (c) Results (d) Conclusion/Summary.

The *Introduction* should not just be a statement of the problem - but it should indicate your motivation to solve the problem, and you must also motivate the audience to be interested in your problem. In other words, the speaker must try and convince the audience that the problem is important to them as well as the speaker.

The *Method* includes your approach and the caveats. To me , the Method becomes more interesting to the listener if this section is "story like" rather than "text book like". In other words "I did this and then I did that, but that didn't work so I did something else." This Rather than, "The final result was obtained using this approach." This adds the human element to your research which is always interesting.

The *Results* section is a brief summary of your main results. Try and be as clear as possible in explaining your results - include only the most salient details. Less salient details will emerge as people ask questions. Add statistical significance to emphasize the main results.

The *Conclusion/Summary* section should condense your results and implications. This should be brief - a bullet or outline form is especially helpful. Be sure to connect your results with the overview statements in the *Introduction*. Don't have too many points - three or four is usually the maximum.

These four items are the core of a good talk. Good speakers often broaden the Introduction to set the problem within a very wide context. Good speakers may also add fifth item: *Future Research*.

There is a crusty old saying among good speakers that describes a presentation from the communication viewpoint: **"Tell'em what you are going to tell'em. Tell'em. Then tell'em what you told'em."** The point of this aphorism is people absorb very little information at first exposure - multiple exposures are the best way for ideas to sink in. Thus, it is ok to state some of your results in the introduction, and then to repeat your main points in the results/ conclusion sections.

2) **Practice your talk.** There is no excuse for this lack of preparation. The best way to familiarize yourself with the material and get the talk's timing right is to practice your talk. Many scientists believe that they are such good speakers, or so super-intelligent that practice is beneath them. This is an arrogant attitude. Practice never hurts and even a quick run through will produce a better talk. Even better, practice in front of a small audience.

3) **Don't put in too much material.** Good speakers will have one or two central points and stick to that material. How many talks have you heard where the speaker squanders their time on unessential details and then runs out of time at the end? The point of a talk is to communicate scientific results, not to show people how smart you are (in case they can't figure it out for themselves). *Less is better for a talk.* Here is a good rule of thumb - each viewgraph takes about 1.5-2 minutes to show. Thus a 12-minute AGU talk should only have 6-8 viewgraphs. How many "viewgraph movies" have you seen at the AGU? How effective were those presentations? Furthermore, no one has ever complained if a talk finishes early. Finally, assume most of the audience will know very little about the subject, and will need a clear explanation of what you are doing not just details.

4) **Avoid equations.** Show only very simple equations if you show any at all. Ask yourself - is showing the equation important? Is it central to my talk? The problem is that equations are a dense mathematical notation indicating quantitative relationships. People are used to studying equations, not seeing them flashed on the screen for 2 minutes. I have seen talks where giant equations are put up - and for no other purpose than to

convince the audience that the speaker must be really smart. The fact is, equations are distracting. People stop listening and start studying the equation. If you have to show an equation - simplify it and talk to it very briefly.

5) **Have only a few conclusion points.** People can't remember more than a couple things from a talk especially if they are hearing many talks at large meetings. If a colleague asks you about someone's talk you heard, how do you typically describe it? You say something like "So and so looked at such and such and they found out this and that." You don't say, "I remember all 6 conclusions points." The fact is, people will only remember one or two things from your talk - you might as well <u>tell</u> them what to remember rather than let them figure it out for themselves.

6) **Talk to the audience not to the screen**. One of the most common problems I see is that the speaker will speak to the viewgraph screen. It is hard to hear the speaker in this case and without eye contact the audience loses interest. Frankly, this is difficult to avoid, but the speaker needs to consciously look at the object on the screen, point to it, and then turn back to the audience to discuss the feature. Here is another suggestion, don't start talking right away when you put up a viewgraph. Let people look at the viewgraph for a few moments - they usually can't concentrate on the material and listen to you at the same time. Speak loudly and slowly. . I like to pick out a few people in the audience and pointedly talk to them as though I were explaining something to them.

7) **Avoid making distracting sounds**. Everyone gets nervous speaking in public. But sometimes the nervousness often comes out as annoying sounds or habits that can be really distracting. Try to avoid "Ummm" or "Ahhh" between sentences. If you put your hands in your pockets, take the keys and change out so you won't jingle them during your talk.

8) **Polish your graphics**. Here is a list of hints for better graphics:

1. **Use large letters (no fonts smaller than 16 pts!!)**

   To see how your graphics will appear to the audience, place the viewgraph on the floor - can you read it standing up? Special sore points with me are figure axis and captions - usually unreadable.

2. **Keep the graphic simple.**

   Don't show graphs you won't need. If there are four graphs on the viewgraph and you only talk to one - cut the others out. Don't crowd the viewgraph, don't use different fonts or type styles - it makes your slide look like a ransom note. Make sure the graph is simple and clear. A little professional effort on graphics can really make a talk impressive. If someone in your group has some artistic talent (and you don't) ask for help or opinions.

3. **Use color.**

   Color makes the graphic stand out, and it is not that expensive anymore. However avoid red in the text - red is difficult to see from a distance. Also, check your color viewgraph using the projector. Some color schemes look fine on paper, but project poorly.

4. **Use cartoons**

   I think some of the best talks use little cartoons which explain the science. It is much easier for someone to follow logic if they can see a little diagram of the procedure or thought process that is being described. A Rube-Goldberg sort of cartoon is great for explaining complex ideas.

9) **Use humor if possible.** A joke or two in your presentation spices things up and relaxes the audience. It emphasizes the casual nature of the talk. I am always amazed how even a really lame joke will get a good laugh in a science talk.

10) **Be personable in taking questions.** Questions after your talk can be scary. But questions are very important. If there are no questions after a talk that I give, I am disappointed. It means that I failed to stimulate the audience, or that they understood nothing of what I said. I failed to communicate. Questions tell you what part of your talk the audience did not understand. Questions may also help you focus your research or help you in the write up. So what is the best way to answer questions?

1. **First, repeat the question.**

   This gives you time to think, and the rest of the audience may not have heard the question. Also if you heard the question incorrectly, it presents an opportunity for clarification.

2. **If you don't know the answer then say "I don't know, I will have to look into that.**

   " Don't try to invent an answer on the fly. Be honest and humble. You are only human and you can't have thought of everything.

3. **If the questioner disagrees with you and it looks like there will be an argument then defuse the situation.**

   A good moderator will usually intervene for you, but if not then you will have to handle this yourself. e.g. "We clearly don't agree on this point, let's go on to other questions and you and I can talk about this later."

4. **Never insult the questioner.**

He/she may have friends, and you never need more enemies.

A couple miscellaneous points

Thank you - It is always a good idea to acknowledge people who helped you, and thank the people who invited you to give a talk.

Dress up - People are there to hear your material, but when you dress up you send the message that you care enough about the audience to look nice for them.

Check your viewgraphs before you give the talk. Are they all there? Are they in order? This is especially important with slides. Try to bring them to the meeting in a tray, or at least check them to be sure they are not upside down or backwards when the projectionist gets them. It is especially annoying to watch people fumble to get a viewgraph right side up. Don't do this by looking at the screen. Just look at the viewgraph directly. If it is right side up to you, then it will project correctly on the screen assuming that you are facing the audience. Go over the slides or viewgraphs quickly before the talk. Some people attach little post-it notes to viewgraphs to remind them of points to make. This seems like a good idea to me. However, It is very annoying to watch people peel their viewgraphs from sheets of paper. It suggests that they have never looked at them before. It is faster, more permanent, and you are less likely to have a mixed up shuffle, if you put them into viewgraph holders which clip in to a three ring binder.

If you have an electronic presentation - check out the system well before the talk.

Mark Schoeberl and Brian Toon

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