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SCIENTIFIC PRESENTATIONS

“Nothing clarifies ideas in one’s mind so much as explaining them to other people.”

VERNON BOOTH

Presentations at professional meetings and elsewhere are extremely important to scientific communication and to your individual reputation. Scientists build on the discoveries of others through communication, and your own speaking ability may mean the difference in your getting a job or a promotion. Often, many applicants for a position will have equally impressive academic knowledge and technical skills; the ones who get the jobs are those who also present themselves well. Take advantage of graduate school as a time to perfect your speaking skills. You will probably be required to make one or more presentations while you are in graduate school. You may even have a course in your department in which you and other graduate students regularly deliver presentations. Also, attend seminars and special lectures in other departments and observe good and bad techniques in delivery as well as the content of the speech, and use every opportunity available to take presentations to professional meetings. Valuable experience can be gained by attending presentations either as a speaker or a listener.

If you have occasion to attend regional or national meetings sponsored by societies allied with your discipline, go and present posters or slide talks. In doing so, you are establishing your reputation with colleagues, and you may encounter

prospective employers for whom you will later make another presentation at a job interview. Whether it is a departmental seminar, participation in a national meeting, an informal or formal speech, or a job interview, you must perform well when you are “on stage” to become recognized as competent and articulate, two qualities almost essential to your success as a scientist.

DEPARTMENTAL SEMINARS

A specific time, perhaps weekly or semimonthly, may be set up in your department for seminar presentations. Graduate students and other speakers will be scheduled to present information on their research, on the scientific literature, or on other subjects of interest to the department. During your presentation, keep in mind that you are talking to the people who know you best, but they are also the people who will or will not recommend you for career positions. Whether it is evident or not, professors evaluate your research and your communication skills any time you make a presentation in a class or for a departmental seminar session. Attendance at these departmental seminars is usually considered one of your professional or academic responsibilities, and participation offers you several advantages.

Seminars Provide Information on Current Research

For both the speaker and the audience, seminars present a unique educational opportunity. Every discipline includes a broad range of subject matter. You cannot expect to become proficient in all areas, but you can obtain some knowledge of and respect for the work being done in specialized areas other than your own. Conversely, when you present your own research to those in related but different areas, you provide them with another view of their discipline. Whether you are listening or speaking, seminars furnish a rather painless way to broaden your education.

Seminar Presentations Provide New Perspectives for Your Own Work

When you prepare and deliver a presentation, your perception of your own study increases. As Vernon Booth (1993) suggests, “Nothing clarifies ideas in one’s mind so much as explaining them to other people.” The learning that takes place in making your own presentation or observing others will improve your research. From others who discuss their research proposals, methods, and results, you will acquire ideas that apply to your own work. Seminars present a means for uncovering errors, picking up new perspectives, and strengthening

your own research. Constructive, professional criticism is always beneficial for both the beginning scientist and the experienced professional.

Seminar Presentations Increase Your Ability to Evaluate Research

As a graduate student, you soon learn that neither the scientist nor the science is infallible. Much time, effort, and objective criticism are required to judge whether a scientific paper or presentation reflects good research, whether it is presented well, and whether it contains significant new ideas. The ability to listen to and critically evaluate a presentation is useful in acquiring new ideas and in deciding what information is valuable for your own research or communications.

Presentations Improve Your Ability to Communicate

Education and scientific progress are so closely allied with personal communication that everyone involved needs to develop an ability to communicate well. Few can become effective speakers without conscious effort. During graduate school, you will not make enough presentations to provide the desired training, but put forth your best efforts when you give a presentation and critically observe the efforts of your colleagues. The experience you gain will be well worth the effort at a professional meeting or a job interview as well as for career-long communication efforts.

THE PROFESSIONAL MEETING

Communication at scientific meetings transpires through both the spoken word and body language used formally and informally. The best information from meetings often comes from casual conversations. More formally, the speaker is a valuable part of the poster or slide presentation. When you are talking about science and research, you need to maintain your professional attitude whether you are in a formal or an informal situation.

The importance of chance encounters and casual conversations should not be underestimated, and some preparation can be made for these exchanges. Prepare for more than just an oral or poster presentation. Good impromptu communication requires that you know your own material and the literature on the subject. Know how your research was planned, designed, and carried out; how data were collected and analyzed; and how your results compare with those of others who have done similar research. Prepare for informal discussions by going over your material before you get to the meeting, and perhaps take notes with you. Try to predict what questions might be asked about your work. To get

the most from a professional meeting, plan ahead for the activities you may be involved with.

Getting the most from a professional meeting:

- Study the program that is usually published well before the meeting, and plan your own schedule.**
- Plan to give a slide or poster presentation. Enter a contest if one is held.**
- Carefully select other presentations to attend, including those by authors whose publications you have read.**
- Unobtrusively critique the good and bad points in posters and slide presentations to apply to your own research and communication.**
- Observe the leaders of your society and how they conduct the meeting.**
- Take advantage of placement or career services.**
- Meet as many new people as you can. Join informal discussions about your research and that of others.**
- Schedule time to relax and enjoy highlights of the town with your friends and new acquaintances.**

Presentations at Professional Meetings

Relative to your career, the highlight of the professional meeting is your oral presentation or a poster. Both of these formats are prominent at meetings, and both require your communication skills. You will often be required to make the decision on whether to present a poster or a slide talk. Try to get experience with both formats. Consider characteristics and requirements for both and choose on the basis of which best fits your material and your ability. The comparisons and contrasts in Table 13-1 may be helpful.

As you are preparing your presentation, read Jay Lehr's editorial (reproduced in Appendix 13), and keep your audience's welfare in mind. You must coordinate the subject and your visual aids with the audience as you present your work whether to a full audience or a single poster observer. Remember that most of the people in your audience will know less than you do about your subject. Prepare your talk or poster for these people. Try to develop the clearest and most effective way to explain the subject to them. If you aim your presentation at the few people in the audience who know more than you about the subject, you may succeed in convincing them that you understand your material, but likely those few will not be impressed if you obscure the real significance of your subject from most of your audience.

TABLE 13-1
Comparison of Characteristics and Requirements
for Slide and Poster Presentations

Poster presentations	Slide presentations
The Situation	
Relatively informal; contact one to one or one to few	More formal; contact one to many
Both speaker and audience standing	Speaker standing and audience seated
No moderator; direct contact, no buffer between the speaker and audience	Moderator helps to introduce, buffer the audience, and keep time
Time limit flexible	Time limit formalized
Audience free; only truly interested remain	Audience more captured; most not likely to leave
Chiefly question/answer or conversational discussion	Chiefly declamation from speaker with a short question session
Handouts helpful; easy to exchange names and addresses	Handouts possible; less likely to exchange names and addresses
Preparation	
Materials: poster, tacks or loop/hook tape	Materials: slides or disc and notes
Know your subject—be able to justify objectives, refer to literature, and support your methods and results	Know your subject—be able to justify objectives, refer to literature, support methods and results
Prepare answers to likely questions	Prepare formal speech and slides
Get ready early. Construct poster, review and revise	Get ready early. Practice, review, and revise

Even with your own research peers, limit the use of statistical and technical jargon, but indicate what statistical analyses have been applied to your data. In most scientific research, statistical techniques are used only to provide a test of significance or to obtain an empirical mathematical expression of relationships. Emphasize the fundamental scientific concepts, not the statistical techniques. If you must use jargon terms peculiar to your subject, define them clearly for your audience.

Try to orient your talk or poster around **one central idea**. Accept that everyone in your audience will forget most of what you say. But if you do your job well, most of the audience will remember you and your point of emphasis for

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at least a few days, and those working in your area will remember far longer. If you fail to distinguish between big points and little ones, your audience will not make that distinction for you. An audience will simply walk away from a confusing poster and a confused author. The audience may sit in their seats as a matter of courtesy, but their minds will have turned to more interesting subjects. Also keep in mind that they are there because they are interested in what you have to say. Present your objectives and results vividly. Restrict the scope of your subject so that you can give a thorough explanation of the essential points.

For clear communication, you must be conscious of symbolic communication and communication without words (see Chapter 14). Your attitude, facial expressions, tone, and all the symbolic displays in your slides or poster may carry stronger messages than anything you say. Visual aids, properly prepared and used, can enhance presentations. At their best, however, visual aids are merely aids. At their worst, they can completely destroy the effectiveness of your presentation. They do not substitute for adequate preparation and effective verbal exposition by the speaker. For the poster they should support and illustrate the written material and your comments or responses to questions from viewers. For slide presentations, consider yourself and your speech content, not your slides, the central focus of the presentation.

SPEAKING AT THE JOB INTERVIEW

You are even more the central focus when you make a speech at a job interview. Taking a slide presentation to a job interview may appear more frightening than making other presentations, but it need not be. If you have taken every advantage of experience in departmental seminars and at professional meetings, you should have built the confidence that can make you a good speaker. Take that confidence with you to the interview.

For the speech at the job interview, two points deserve special attention and are unique for this situation: the **audience** and the **purpose** of the speech. For your departmental seminar, your audience is made up mostly of people you know, and many of them know what kind of research you have been doing. You are usually given enough time to fully explain your points. At the professional meeting, your audience is a group of people especially interested in your topic; they probably already know much about it. Your time is short, but they don't need a great many details to understand a point you want to make. Most of them are more interested in your research than in you. The same is not true with the job interview.

The **audience** at the job interview is often made up of administrators, managers, and scientists with diverse backgrounds who are interested primarily in finding out more about you, especially your communication skills. There may

be few with any expertise in your specific area of research. You must present your material so that it is clearly understood by individuals who are probably highly intelligent but uninformed about your subject. Because the audience is different from those in your department and at a professional meeting, don't expect to make the same presentation to them that you used for the other occasions. You need to revise a presentation every time you present it to a new audience, especially when a job is at stake.

Because the audience's chief interest is you, you must align the **purpose** of your talk with this specific semantic environment. They probably have several qualified applicants. They want to know whether to hire **you**, whether you will work well with them, and whether your expertise fits the position they need to fill. They want to know if they would enjoy a professional association with you. Your purpose then is to provide positive answers to such questions. To do so, simply follow the principles for all good presentations, but alter your own approach to accommodate the different purpose.

Give your audience the opportunity to discover more about you than is evident in a research presentation. For example, after you are introduced, it is a good idea to leave the lights on for a minute or two, thank the audience for inviting you, and give a brief but not overly zealous explanation of your interest in the job. Then with a smile and a transitional remark such as, "My interest in this kind of work has increased with my research on.... Today I'd like to show you one part of that research in which...." At that point you are ready to adjust the lights and turn on the projector. This brief interlude between your being introduced and your presentation can put the concentration on you and can add immeasurably to the audience contact.

As with any presentation, maintain good eye contact throughout the talk. If you have a choice, keep the speech itself short, no more than 20 to 30 minutes; explain fully a limited number of points; and relate your study to that of other researchers. Some of them may be in your audience. Establish credibility with your experimental design and analyses, and report results for which you have strong evidence. Discuss possible meanings or applications for the results, and exude both confidence and humility. This is not the time for you to speculate on momentous breakthroughs that you believe you have made in science, although you should not be overly modest. Show the audience an example of the good work that you have done, and invite questions so that you can provide answers that will establish your expertise. Your attitude should be that of any good speaker—confidence flavored with a good dash of humility.

Limit the amount of material you present. The mistake I see made most often is that scientists seem to believe that they must display all the data they have collected and analyzed over a period of several years. Be selective; present only a limited but impressive part of your study. A few years ago, I watched a former student of mine interview for a position. He was given 30 minutes for

his talk, and he unwisely decided to present work that he had done since he had received his doctoral degree, plus a segment on the different work he had done for the doctorate, and still another subject from the data collected during his master's degree. When I asked him why he had presented so many studies, he said that he believed the audience would be more impressed with the amount of work he had done than with the details. I disagree. The audience can assume that he has done a great deal of work in earning two degrees and holding a responsible position for 3 years thereafter. What they can't do is digest three complex studies in 30 minutes. The speech had loose organization to accommodate all three studies, it ran beyond 30 minutes, and there was not time to demonstrate credibility with details and to show quality research. (The young man was not offered the position.) Audiences are accustomed to time limitations. Establish your credibility, present quality methods and results, and show the relationship between your work and that of others. The audience can then readily assume that you have done other work of the same caliber.

Don't be surprised if, after your talk, the listeners seem rather uninterested in your research and ask questions that have no relationship to what you've been talking about. Remember that their concentration is on you, not your research. For them, your talk serves as a critical demonstration of what you can do and of how articulate you are. They already have a resume, transcripts, and letters that reveal your experience and abilities; they are now checking out a personality. Recognize that point and respond to it positively before, during, and after your talk.

One last word on presentations at job interviews. Do your homework. Learn all you can about the position, the location, and the people in your audience before you get to the interview. Information on the Internet or at the library can tell you about a company or university or agency to which you are applying. Often asking questions of the person who has invited you to come for the interview or the secretary who answers the phone can help you to understand the semantic environment in which you will be interviewing and making your presentation. Your major professor or other advisors can be helpful in providing background information and preparing you to go to the job interview. They may know some of the personnel you will be talking with. Knowing what kind of research is being carried out by particular scientists, even if it is unrelated to yours, can influence whether you are offered a job. But paramount to all this background knowledge are your own communication skills; present your best.

THE QUESTION AND ANSWER SESSION

In any formal presentation, your interaction with the audience is crucial to your success. This interaction is perhaps most focused during the question and

answer session. The question/answer session allows the audience to clarify points or add to their knowledge of your subject and find out more about you. It can build your reputation as a scientist and speaker, and it provides you with an opportunity to surmise the strengths and weaknesses in both your research and your delivery by the kinds of questions asked and your ability to answer them. You must keep the entire audience in mind during the question/answer session. Preparation for the session requires that you know your subject and maintain your confidence.

Give clear, concise answers. Don't dismiss any question without a response, but don't belabor any point. Any question is important even if it sounds trivial. Don't allow yourself to be pulled into a controversy; although you probably know your subject better than most of the people listening, the time and place are not appropriate for any heated disagreements. After the presentation, you may want to continue a discussion with an individual, but do so only after you have released the audience.

Most people will not interrupt you during your talk, but if someone does, don't panic. Answer his or her question or respond to a remark courteously and completely but as briefly as you can. Keep your place in your own presentation (probably via your notes or slides) and return to your prepared speech as quickly and smoothly as possible.

Above all, maintain a professional attitude throughout the question/answer session. Many speakers tend to lose their professional demeanor when the last note on their conclusions dies down. They may loosen a tie or lean on a podium and relax their diction. "Yeah" is not a good way to begin the answer to a question. Avoid these distractions and maintain your role as speaker. If possible, let the moderator make the transition between your speech and the question/answer session. This technique gives the speaker a chance to relax momentarily. Anholt (1994) and Haakenson (1975) provide some good information on handling questions. The following suggestions may also help.

1. Listen closely. You cannot answer well without hearing and understanding the question. Don't interrupt before the question is completed, even when you know what is being asked.

2. Repeat the question aloud if there is an even remote chance that it was not heard or is not clear to you or the audience.

3. Pause. There's nothing wrong with taking 2 or 3 seconds to think, and your answer will probably be better for it.

4. Answer the question completely but as briefly and directly as possible. Don't go into a new speech. Others may also have questions.

5. Take questions from various parts of the room. If the same person keeps asking questions or wants to discuss an issue beyond a reasonable

answer, suggest to him or her that you meet to discuss the matter further after the session.

6. Maintain eye contact most of the time with all the audience, not just the person asking a question. Although an individual is asking, you are answering to all.

7. Don't be afraid to say you don't know. Questions may be asked that are only remotely related to your subject. Simply indicate that your research has not supplied an answer to the question. Refer to the literature if you know a source for an answer, but don't guess. Never try to bluff an audience.

8. Reply courteously to all, and don't become defensive. Accept statements and "loaded" or trivial questions and maintain you professional composure. You can often dignify a question or comment that was not presented with dignity by supplying a serious, professional reply that is related to the subject.

9. Always maintain your dignity. Anger is the easiest way to lose it. The audience will have increased respect for you if you reply to the hostile question with a smile and a serious answer.

10. Don't speak beyond your time limit. End the questions if the moderator does not do so, and make a final summarizing statement if possible.

ROLE OF THE MODERATOR

Whether the occasion is a departmental seminar, a speech at a professional meeting, a job interview, or some other speaking situation, the speaker may need to coordinate efforts with other speakers, a program coordinator, a slide projectionist, and especially a host or moderator. The speaker should arrive at a meeting early and meet the moderator and perhaps the projectionist. If more than one speaker is on the program, the projectionist needs to know who you are and when your speech is scheduled so that he or she can have your slides or disc ready. Let the moderator have any information he or she needs to introduce you, and be sure to coordinate your efforts relative to lights, time signals, and the request for questions.

On the other hand, you may be the moderator and chair an entire session at a professional meeting. Be sure that you can pronounce the names of presenters and the words in their titles. Your job is to introduce them, help them feel comfortable, and solve or buffer problems that arise. In chairing a session, you should provide transitions from one presentation to the next, and be sure that you keep everyone on schedule so that one speaker does not encroach on the time of another.

To Be a Moderator

1. Obtain copies of abstracts or information about the talks you are moderating and familiarize yourself with each topic. Prepare a few relevant questions for each speaker to get the discussion started if the audience does not.

2. Help the speakers arrange visual aids or needed equipment. The moderator should coordinate the operation of lights, projectors, and other equipment with the speakers and should be present in plenty of time before the session to assist with last-minute details.

3. Talk with each presenter or obtain a brief resume and prepare a short introduction, including the speaker's name and title, academic and professional background, any special distinction, and title of presentation. At professional meetings, don't use up the speaker's time. Your introduction may include simply the speaker's name, institutional affiliation, and the title of the presentation.

4. Keep up with time. For example, with 15 minutes provided, we might expect the speaker to talk for 12 minutes (plus or minus 1 minute) and answer questions for 3 minutes. The moderator must be responsible for keeping everyone on schedule, that is, see that speakers start on time and finish on time.

5. Be sensitive to problems the speaker may have. Check equipment and know where replacement bulbs are located. Coordinate all efforts with the speaker. Buffer him or her from a hostile question or a string of questions that do not allow the speaker to move on.

6. Accomplish all your responsibilities in a congenial and professional manner.

FIT THE OCCASION

Scientific presentations can take numerous forms other than those described here for departmental seminars, professional meetings, and job interviews. In these situations, as well as presentations to such groups as public school children or civic clubs, you may make a speech without visual aids, provide a demonstration of a scientific reaction, host a video or film presentation, or serve as moderator for a symposium or a group discussion. Equipment may dictate the kind of visual aids that you use. Be sure to find out whether an electronic projector, a slide projector, or an overhead projector for transparencies is available, and be ready for any problems that might arise with such equipment. Always have a back-up plan; plan B has seen many people through difficult situations. Adapt to the situation, but keep basic principles of clear communication in mind as you make use of new situations and alternative media or equipment.

In the following chapters you will find more specific information on visual, verbal, and symbolic communication used in speech making, slide and poster presentations, and group communications. Most of the decisions on how best to communicate rest with you, but knowing the expected conventions can serve you well in making these decisions. Communication is both a personal and a social activity. Be creative, but also rely on standards or conventions that everyone uses. In other words, be yourself and use techniques that best serve your personality, but satisfy the expectations of your audience by using conventions that they will receive well.

In addition to Lehr's admonitions (Appendix 13), Anholt (1994), Booth (1993), Peters (1997), and Tierney (1996) have very good suggestions for making oral presentations. Briscoe (1996), Woolsey (1989), Anholt (1994), and Knisely (2002) cover the basic conventions for presenting posters. You can also find information on the Internet. For example, one good site on presentations is from Oregon State (2003) and can be accessed at <http://oregonstate.edu/instruction/bb311/discussion4.html>. Those sources, as well as this one, reflect the personalities of their authors and may not always be in agreement with each other or with you, but the principles of communication remain the same. Consider the audience, the subject, and the format and present information in the simplest, clearest way possible with your own personality and abilities.

References

- Anholt, R. R. H. (1994). *Dazzle 'em with Style: The Art of Oral Scientific Presentation*. W. H. Freeman & Co., New York.
- Booth, V. (1993). *Communicating in Science: Writing a Scientific Paper and Speaking at Scientific Meetings*, 2nd ed. Cambridge University Press, Cambridge.
- Briscoe, M.H. (1996). *Preparing Scientific Illustrations: A Guide to Better Posters, Presentation, and Publications*, 2nd ed. Springer, New York.
- Haakenson, R. (1975). "How to Handle the Q & A." In *A Guide for Better Technical Presentations* (R. M. Woelfle, ed.), pp. 158–170. IEEE Press, New York.
- Knisely, K. (2002). *A Student Handbook for Writing in Biology*. W. H. Freeman, Gordonsville, VA.
- Oregon State University. (2003). "Data Organization and Presentation." <http://oregonstate.edu/instruction/bb311/discussion4.html> (verified June 6, 2003).
- Peters, R. L. (1997). *Getting What You Came for: The Smart Student's Guide to Earning a Master's or Ph.D.*, revised ed. Farrar, Straus & Giroux, New York.
- Tierney, E. P. (1996). *How to Make Effective Presentations*. Sage, Thousands Oaks, CA.
- Woolsey, J. D. (1989). Combating poster fatigue: How to use grammar and analysis to effect better visual communications. *Trends Neurosci.* **12**, 325–332.