

# **SURF**



Summer Undergraduate Research Fellowship

# **THE SURF TALK BOOK**

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# The SURF Talk Book

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## **PREFACE**

### **The SURF Program**

Caltech's Summer Undergraduate Research Fellowships (SURF) program gives continuing undergraduate students an opportunity to conduct research under the guidance of leading scientists and engineers. Each summer more than 300 students from Caltech and from other colleges and universities participate in the program. SURF is modeled on the grant-seeking process. In collaboration with their mentors, students write proposals for their projects. The proposals are reviewed by a faculty committee; awards are made on the basis of reviewer recommendations and available funding. Research is carried out during ten weeks in the summer; at the conclusion of the summer, students submit a technical report and give an oral presentation on SURF Seminar Day, a symposium modeled on a professional technical meeting. The *SURF Talk Book* was written to help students prepare for their final presentations.

### **The Importance of Communication**

Throughout a career, individuals have numerous opportunities to discuss their work both formally and informally. It has been said that science not communicated is essentially science not done<sup>1</sup>. Those who speak well, speak often. They are invited to give presentations, encouraged to explain their work or the work of others. Their audiences may be colleagues and students, or they may be lay people—the public, the media. To speak well requires developing skills and practice, practice, practice.

The SURF program requires that students give an oral presentation at the conclusion of their summer work. For many, this presentation is their first opportunity to speak formally to a diverse audience of faculty, alumni, parents, and peers. The purpose of *The SURF Talk Book* is to help students prepare for their final presentations.

This publication specifically addresses the SURF presentation. The purpose of the book is not that of a speech textbook providing information useful for all types of speaking purposes and environments; the purpose is narrowly focused on the oral presentation, by undergraduate students, of highly technical information to a general audience.

The best time to begin preparing the presentation is when the project begins. It is worthwhile to consider how one will discuss each new facet of his or her research, its importance, and how it connects with other work. Students can ask more iterative questions of their mentors and deepen the research experience.

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<sup>1</sup> Ch 90 Syllabus

## **INTRODUCTION**

When you accepted your SURF award, you agreed to give an oral presentation about your research project at SURF Seminar Day in either August or October. This talk is required for several reasons:

- During your career, you will make many presentations about your work to educate your colleagues or the public, to enhance your own professional development and recognition, or to raise money to carry on your work during your career.
- Through the Seminar Day presentations, students share their research experiences, approaches, and results with their peers in other disciplines.
- Richard Feynman said that he really understood something when he could teach it to a freshman class. The principle is the same for your SURF talk. You must understand your work to tell other about it. Your final presentation is a tool to help you discover what you know and what you don't understand yet.
- Many of SURF's financial sponsors will attend Seminar Day; your excellent presentation will help to encourage their continued appreciation and support of the program in general and the work of individual students in particular.

## **The Assignment**

You will have 15 minutes for your presentation and 3 minutes for questions and discussion. The audience will be peers, mentors, faculty, alumni, parents, staff, and donors to SURF.

## **The Standard**

There is one standard for each talk: the presentation must be of professional quality—an excellent representation of you, your advisor, your work, and the SURF program!

## **What's in It for You?**

- *Personal satisfaction.* Excellent presentations bring personal satisfaction and a sense of confidence and self-esteem. They also give you a chance to pull together final thoughts about your research and get feedback from an audience.
- *Opportunities to speak at conferences.* Students giving excellent presentations are often invited to participate in the National Conference on Undergraduate Research and the Southern California Conference on Undergraduate Research. Sometimes students are invited by their mentors to attend, and occasionally present a paper at, professional conferences.
- *Alumni Seminar Day.* The Alumni Association invites the best SURF Seminar Day speakers to speak at Alumni Seminar Day in May. This session is very popular with the alumni who attend this event.
- *Other Caltech organizations.* Good presenters have been asked to speak to the Board of Trustees, to prospective Caltech students and their parents, to high-school counselors, and to Alumni Association chapters.
- *Meet interesting people.* Students with polished communication skills frequently have the chance to meet prospective donors to the SURF program. Some students have traveled to other cities to meet with representatives of companies that collaborate with or contribute to Caltech.

## CHAPTER I

### The Audience

As you prepare your presentation for SURF Seminar Day, think about the audience. The measure of the effectiveness of your talk is what they remember when they leave the room. What they understand at the end of your talk *is* the message! The number of overheads doesn't count. The length of your talk doesn't matter—not even the number of really long words! Nothing counts that does not help your audience understand and appreciate your work.

The SURF presentation is particularly challenging because the people who will attend your presentation—faculty, JPL technical staff, alumni, parents, peers—represent a wide range of initial understanding of your research. As one SURFer asked: "My professor *and* my mom?" The answer is: all of them.

Imagine members of your audience standing on the rungs of a ladder. Those with the greatest expertise in your field are at the top of the ladder; those with the least knowledge of your subject are at the bottom. All are there because they hope to learn more about your research. Every person should take something from your talk and have a higher level of understanding when you have finished. You are responsible for helping each audience member move up at least one rung of the ladder.

You should plan your talk so that you go up and down the ladder several times, speaking to people at the various levels throughout your talk. Envision yourself as very flexible, moving easily from the bottom of the ladder to the top and back down again, engaging those listeners on the bottom rungs and those at the top.

How do you do it? A speaker starts by making sure everyone is on the same ladder. The three part *introduction* picks up everyone and gets them ready for the climb.

The *hook* captures their attention and gets them on the ladder.

The thesis, a *clear statement* of your work summarizes what you are about to tell them.

The *map* of how you will address the topics lets them know where they are going with you.

Chapter 3 addresses introducing and organizing the speech.

Throughout your talk, discover ways to keep the top-rung sitters interested in the intricacies of your work, the challenge of the project, and how it fits into other work in the field. For those who can appreciate the depth, deepen their understanding. Help other audience members think about your work in terms they already know, through analogies, clear explanations, the use of visual aids, and explanations of how to think about your material.

Audience members are attentive and persistent if they know that a speaker has prepared a talk with them in mind, has considered how to help them understand the material, and will return throughout the speech to keep them moving up the ladder.

## Help the Audience Learn New Information

People judge new information based on what they already know. It is your job to create experiences for them so that they can accept the new information easily. Following are some suggestions for helping the audience learn what you want them to learn.

- *Connect new information to old knowledge.* We are most comfortable with what we already know to be true.
- *When you want an audience to remember one idea above all others, tell them! "This is important. Remember it."*
- *Present material in patterns.* Give an overview. Group similar ideas together.
- *Tie material together with one unifying concept.* Use transitions, internal summaries, and foreshadowing sentences to show how your ideas are interrelated. Use a continuing analogy.
- *Give the most intensity to the most important ideas.* Use more specific images. Deliver important ideas with energy. Choose words for intense effect.
- *Use a novel approach.* We remember what is different. Incorporate puzzles, mysteries, and appropriate humor.
- *Incorporate repetition.* We remember an idea best when we hear it three times. An astonishing idea can be repeated immediately for effect.
- *Give new material meaning and context.* Explain the significance of ideas in terms that are important and familiar to the audience.
- *Create variety.* We remember change, difference.

## Present Statistical Support So the Audience Can Understand It

Audiences don't hear and retain numbers well without specific help from the speaker. If a number is worth mentioning, it is worth the time it takes to make it understandable and interesting. Use the following techniques:

- *Prepare the audience to hear the numbers.* Tell them the importance *before* giving a number.
- *Ask questions to create a mental space for the information.* "Why would we want to know this?"
- *Repeat the numbers.*
- *Compare the statistics to something else.* "This would compare to . . ."
- *Tell an incident around the number.*
- *Relate it to immediate needs.*
- *Put it in charts, graphs, and other visual formats.*
- *If you move a number from one graph or chart to another, help the audience follow it:*
  - Tell them to remember the number.
  - Use color to highlight information in two or more similar graphics.

## Use of Analogies To Connect New Information to Old

*Example 1:* A simple example of population coding can be seen in the great Rose Bowl prank of 1961, where each University of Washington fan knew only that he or she was holding up a white or a dark card and, fortunately for the Caltech students who pulled off the prank, no one person could see the whole message. When they all flipped their cards in unison, they inadvertently spelled out CALTECH. To understand the brain and how it processes visual images, we not only

have to know what each single element is saying, but also what the whole ensemble of activity is saying together<sup>2</sup>.

*Example 2:* Of course fundamental particles such as electrons or photons ultimately are capable of escaping from any Flatland, and at the most basic level (at high energies and in vacuum) they are certainly required to be either bosons or fermions. Yet the most direct and appropriate description of the low-energy behavior of a material is generally not in terms of these elementary particles. *For example, an electron in a material exerts forces on the other constituents of the material and creates a little pocket of disturbance in its neighborhood, like a movie star moving thorough an admiring crowd.* The basic excitations in a material may not behave at all like electrons or other elementary particles in vacuum. For this reason, they are known as quasiparticles. One can hope that quasiparticles in effectively two-dimensional materials are sometimes anions. (Example was excerpted from *Scientific American*.)

*Example 3:* A SURF student explained the concept of fuzzy logic by comparing it to the process that the human mind goes through when dealing with “gray area” decisions, such as whether or not to go through a yellow traffic light. (Kyle Miller, SURF, 1991)

## **Observations From Former SURFers**

Previous SURFers have made the following observations:

- An audience will get as excited about or committed to a topic as the speaker is.
- The speaker's clarity of thought and expression and thorough preparation help the audience understand better.
- The way you present your research (seriously, committed, excited, ho-hum) is the way the audience perceives it.
- Never belittle your work or your presentation.
- All talk creates images in the minds of the listeners. The speaker must control those images so that they lead to his/her conclusions. This will happen only when the images are carefully planned.
- Topics are most engaging when they are presented as problems to be solved. When a speaker states the problem or obstacles clearly, the audience is more interested.
- A presentation is more interesting when the presenter tells a story and uses an analogy.
- Do not work through complicated formulas. You may need to display the formula in such a way that the people who are familiar with it can recognize it and understand why you used it, and the people who are not familiar with it can accept it, even though they may not necessarily understand it.
- Audiences want you to connect your topic to them in ways they understand. All audiences ask: What's in it for me? They want to know you have planned to answer that question.
- Do not stretch the possible connections of your research. Mentors were unanimous in not wanting any false promises put forth about where research might lead!
- You are ready to give a presentation when it is fun for you! When you have discovered an organization plan that works for you, and have found or created support material that is exciting to you, you are ready to talk to others.

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<sup>2</sup> *Engineering and Science*, Volume LX, Number 2, 1997

## **What Will I Talk About If My Research Didn't Turn Out as I Expected?**

Sometimes a SURF student finishes the 10 weeks with no results to talk or write about. This happens for many reasons: the project took longer than 10 weeks, or the project just didn't work out, or the equipment that was ordered specifically for this work did not arrive. Often no result *is* the result.

The oral presentation, however, is required even if you have no results to report. What should you talk about? You can discuss what you proposed to do, how it fits into the flow of research in your sponsor's research group, why you have no results, or what will happen to the project. Will you or someone else continue the work? What will they do and how will they do it? What conclusions are expected? How will you know when you have reached a conclusion? What did you learn? Did you advance knowledge in this area? You can report your experience with research, or compare it to your initial expectations or other research experiences.

Do not apologize for or belittle your efforts or those of others in your group because the project was not completed or didn't work as you expected. This is research where the unexpected can happen—and usually does.

## **WORKSHEET I**

### **Focus on the Audience**

**GOAL:** Focus on connecting the topic to the specific audience.

Think about your audience. Each is asking: "What is in this for me?" "Does the speaker care if I understand this?" Ask yourself:

- How can I connect this audience to the topic?
- What background information does this audience need to know to understand my research, to get on the ladder? Where are they starting on the ladder?
- How does my project fit into the flow of research in the field? Or in my research group?
- How can I connect my topic, or a part of it, to something this audience will commonly understand?

Exercise A:

Prepare a three to four minute talk. Time each exercise.

- Introduce your general topic of research. Discuss concisely the background and one or two terms that are necessary for an audience to understand your research.
- Describe what your audience will need to know, in general, to understand your topic.

Exercise B:

- Your goal is to create a strong, specific image in the minds of your audience that will help them think about your topic. (See sample analogies on page 4.)

Create an analogy that will connect a part of the research, or the whole of it, to something that is generally familiar. Try out your analogy on your friends.

## **CHAPTER 2**

### **Visual Aids**

Imagine an audience sitting before you, the speaker. You have a clear picture of what you actually did during your days or long nights of work, what the results looked like, or what it was like when you did not get results. Most of your audience has little or none of this information. Your job is to paint the picture of your research for the listeners. Visual aids enhance your presentation by helping your audience visualize what you are describing.

Chapter 1 focused on the audience; the message lies in the receiver. Your goal as a speaker is to create meaning and understanding for the audience. The use of appropriate visual aids enhances your message and helps the audience to move up a rung on the ladder of understanding. Visual aids also can add structure to the speech, with a few well-chosen phrases providing an outline.

Remember that a majority of any audience probably prefers to learn visually and will recall information from visual images. Make use of this learning mode!

Visual aids are available in many forms: overheads or viewgraphs, slides, flip charts, writing on boards, videos, and computer-generated projection. You must decide which of these will best link your audience to your research, which will bring the best understanding and appreciation.

Visuals almost always take more time to prepare than you expect. It is important that you allow enough time at the end of the summer to do professional-quality visuals and practice with them until you feel confident using them.

#### A Few Key Reminders About Visual Aids

- The audience will evaluate you and your information, in part, on the appearance of your visual aids. Attractive, legible, and well-organized visual aids reflect positively on the content and, therefore, on you!
- Audiences are impressed with visual aids that capture the right information and lead them logically from one point to the next, interpreting an idea and clarifying the point.
- Audiences are *not* impressed with many visuals flashing on and off a screen in front of them. Too many visuals often indicate that the speaker has not done enough preparation, especially in adapting the material to a particular audience.
- Visuals that are not clearly labeled and easily understandable detract from understanding the material, as the audience shuts out the commentary while trying to make sense of what is on the screen.
- Words on a slide or overhead should be few, large, and significant. The purpose of the visual is to give structure to the speech, not to provide the text.
- Regardless of what is being projected, the audience wants the speaker to talk to them, to face them, and to be concerned with their understanding of the material. Talking to the projection breaks the connection with the audience.
- You will know you have the right visuals when you can walk through them with a friend who is not familiar with your research and then ask him or her to take them and explain back to you what he or she has heard. This is an excellent exercise. Try it when you still have enough time to refine the visuals.

## **General Guidelines For Designing Visual Aids**

- Use a computer to make lettering.
- To keep a relaxed pace, plan one visual aid for each one to three minutes of your talk.
- Use phrases with key words, not whole sentences.
- Keep each line short; use no more than 6 to 8 words.
- Limit material on each projection; use 4 to 6 lines.
- Type size should be no smaller than 28 points.
- Center information, leaving wide margins.
- Use bullets for listing items.
- Use upper and lower case type. (LETTERING IN ALL UPPER CASE IS HARD TO READ!)
- Use printing that is easily read (best fonts to use are Times and Helvetica).
- Use color, boldface, or larger-size type for emphasis.
- Underlined text is not recommended.
- Use dark background (blue, maroon, black) and very light-colored text (white or yellow); do not use rich red or blue text colors against a dark background because there is not enough contrast.
- To create cohesiveness in your presentation, be consistent with the background color of your visual aids.
- Limit the number of overlays on one transparency.
- Secure transparencies to frames.
- Number the transparencies in the upper right corner of the frame.

## **Guidelines for Charts, Graphs, Maps, and Tables**

- Identify each graphic with a heading.
- Label each part clearly.
- Label axes and include legends.
- Keep graphics simple; limit the amount of information; incorporate only the essential elements of a diagram.
- Use color to highlight your message.
- Emphasize the data lines, not the axis lines.
- In a bar graph, make bars broader than the spaces between them.
- Represent the information accurately. Visuals can easily distort the information.
- When you rehearse your talk, stand back and look at your visual aids from where your audience will see them.

## **Guidelines for Using Overheads**

- Be familiar with the operation of the projector. Know where a spare bulb is and how to change it.
- Turn off the projector when you are not discussing the points shown on the transparencies.
- Be sure that neither you nor the projector blocks anyone's view.
- Face the audience. Keep your body turned to them.
- Use a pointer or a sharp pencil to note a detail on the transparency.
- Hold your pointer in the hand closest to the screen so your torso stays open to the audience.
- Point once or follow a sequence slowly. *Avoid over-pointing and flailing the pointer.*
- Use overheads for key ideas, for numbers that need interpretation, and for emphasis. You do not need an overhead for every minute of your speech.

### **Guidelines for Using Slides**

- Be familiar with the operation of the projector. Know where a spare bulb is and how to change it. Know how to operate the remote control: forward, backward, focus.
- Know the lighting in the room; have some lights on so that the room is not in total darkness while your slides are on the screen. Know how to operate the lights or designate someone to turn lights off and on.
- Stand to the right (yours) of the projected image; face the audience; if you must point, use your left hand.
- Use slides for key ideas, for numbers that need interpretation, for emphasis and interest. You do not need a slide for every minute of your talk.

### **Guidelines for Computer-Projected Slideshows**

- Make sure the hardware and software are running properly before your talk begins.
- Be sure the fonts you need are installed on the computer from which you'll be presenting.
- If you'll be bringing a device of your own (e.g., an external hard drive), provide and test any cables, connectors, and software needed (such as driver software) and check it out ahead of time.
- Be sure there's a backup bulb available in the projection unit, and know how to change it.
- If your presentation involves unusual or highly-demanding media such as digital movies or large photo-quality images, confirm that the presentation computer has adequate storage space, RAM memory, and color depth to handle it and that the projection unit is capable of projecting the material faithfully.
- If your presentation involves large file sizes, plan ahead for how you'll transfer or transport them to the presentation computer.
- Arrange to install and test your presentation on the equipment you'll actually be using to give your talk and to do so early enough to fix any problems you may find.
- Be prepared to give your talk without the computer! Bring a set of overheads as backup in case the computer crashes.

## **WORKSHEET 2**

### **Visual Aids**

GOAL: Present a visual image of a part of your research that involves a process or that needs a multistep explanation. It may be a procedure that scientists carry out or it may be something they observe. Use a visual aid to help the audience understand this part of the presentation.

#### **As You Prepare:**

Think about the audience. Ask yourself:

- What do the people out there need to *see* to understand this research?
- What part of the research process must this audience understand to grasp the point or the wonder of the work?
- What mystery did you face? What was the most challenging, exciting, satisfying part of the work?
- How can you best explain it so that the audience can appreciate the skills required?

Prepare a five minute presentation of a process, supporting your explanation with visual aids.

- Review Guidelines for Preparing Visual Aids.
- Label visually and verbally any slide, overhead, or graphic presentation.
- Remember: Label each visual at the top of the graphic.
- Visually identify all technical names or terms that your audience might not know or that might confuse them.
- Tell the audience clearly what you are showing them and what it means.
- Tell the audience what they need to remember from each visual aid to understand the next piece of information.
- Be creative! This should be fun for you!

Remember: The final goal of any presenter is to create understanding in the listener's mind. Ask yourself: Will this create understanding?

#### **Exercise:**

Explain your process to a friend using your visual aids. Ask your friend to use your visual aids and explain it back to you.

## **CHAPTER 3**

### **Organization**

As you prepare your presentation, you hold in your mind hundreds of details that played a part in the outcome of your project. Your goal is to turn ten weeks of information into knowledge for your audience. Your objective is to connect the audience to the topic, to help them understand your work, and truly appreciate the intricacy and uniqueness of your research.

As the speaker, it is your responsibility to (1) create a format that makes this information accessible to your audience, and (2) make it interesting so that they stay tuned to hear about your research, and to learn the outcome of your work.

The final step in adapting your speech to the needs of the audience is organizing your talk. Research on public speaking tells us that most audiences need three basic parts in the introduction in order to get oriented to the topic and care enough to stay with you in the difficult areas. See "Outline for Presentation" below. Nothing, however, replaces your thinking about the connection that will work between your topic and the specific audience you will address.

For the SURF presentation, we have a standard format we suggest you use because of the nature of your audience and their expectations of SURF Seminar Day. Other audiences will require different organizational structures. In structuring your talk, think about how easily you can move up and down the ladder of understanding with your audience. Experiment with different formats to see which makes sense for each particular audience.

### **OUTLINE FOR PRESENTATION**

#### **Acknowledgment**

Always acknowledge your research sponsor(s). Create a viewgraph listing the title of your research project, your name, and the name(s) of your mentor and collaborators and financial sponsor. Thank your mentors for the time they spent with you during the summer and your financial sponsors for their support of your SURF. If there is something particularly interesting about them that stands out in your mind, mention it. You may do this at the very beginning, at some point in your introduction, or at the end of your speech.

#### **Introduction**

You spend ten weeks of your summer thinking about your research. In that time your mind creates its own way of structuring what you know. It has attached this new information to what you knew in June when you started your SURF.

#### **Background Information**

The majority of your audience will probably not have thought about your topic in any depth over the past months. You must provide context for their understanding of what you are going to tell them. A well-organized speech allows your audience to get up to speed quickly and to stay with you through complex ideas and materials.

## **The Hook, Thesis, and Map**

Give the audience an initial hook to draw them into the topic so that they will want to stay with you throughout the speech. The hook might be an anecdote or story; it could be a question, or a puzzle. It should be natural and comfortable for you. Your enthusiasm for and enjoyment of your work and of giving your talk should be evident in your hook.

Next give them a clear thesis statement. The thesis statement *summarizes* your speech. All key ideas and development will support the thesis. Word it carefully.

## **Thesis Examples**

Thesis Statement:

The use of Y in ABC is the most effective tool in reducing X.

The placing of the geologic markers was a challenge in physics.

NOT a Thesis:

The topic of my research was. . . . .

My research was about. . . . .

The thesis and the main headings must all tie together logically or you will drive your audience mad! They may spend time trying to make sense of the organization instead of listening to the content.

Some speeches might revolve around the challenge that had to be solved in the research. Others might focus on a process that was unique. Choose a thesis that captures the essence of your research, and one you can do justice to in 15 minutes.

## **Map**

The map explains the highlights of the speech, usually paraphrasing the three main ideas of the speech.

A speaker who plans for these three parts of the introduction demonstrates to the audience that he or she has thought about the audience and values their understanding. A speech that does not include the hook, thesis, and map in the introduction demonstrates a disregard of the audience.

## **The Body of Speech**

A simple organization of your work might include statements about three areas:

1. What is the larger context into which your project fits?
  - Place your work in the context of your field.
  - Give an overview of the field.
  - Demonstrate where your research fits in.
  - Supply the background the audience needs to appreciate your work.

2. What was your role in the project? What did you contribute to what is known about the project?
  - Describe what you did.
  - Discuss the specific problems you faced and how you worked through—or didn't work through—them during the summer.
3. Results
  - State the results of your research.
  - Give the implications of your results.
  - Discuss how they will affect the ongoing work.
  - If you have no conclusions, give your recommendations. If you have no results, state why not and make recommendations.
4. Recommendations: What is left to do, who will do it, and how should it be done?
  - State what you have learned and how you learned it.
  - Discuss what is yet to be done on the project.
  - Discuss what did/didn't work.
  - Recommend next steps.

### **Summary and Conclusion**

- Briefly summarize the material you have presented.
- Draw conclusions. Help the audience think about what you have said. Leave them with a final image.

### **For General Speech Organization, Consider These Standard Formats:**

1. Time pattern. Describe a sequence of events that led to a conclusion.
2. Topical pattern. Divide your speech into a few main topic areas. Example: [political problems, economic problems, social problems.]
3. Spatial pattern. Best used to explain the structure of something physical or geographic.
4. Cause-Effect pattern. Divide your speech into two major divisions. Examine the causes of one topic and their effect on that topic.
5. Problem-Solution. Identify, delineate, and show the magnitude of a problem. Argue for the best solution in the last part of your talk.

Choosing a format for the SURF talk will be different from preparing one for your peers in your own discipline. Both experiences are valuable and necessary. When presenting in your discipline, consult your mentor about specific expectations, requirements, or traditions common to that discipline.

## **Worksheet 3**

### **Organizing Your Presentation**

**GOAL:** To outline the general organization of the speech. The emphasis is on hooking the interest of the audience and organizing the body of the speech so that ideas flow smoothly and logically from one to the next.

#### **As You Prepare:**

- Acknowledgment.
- Introduction.
  - Hook or Interest-Getter: A story, mystery, graphic, puzzle, or quotation.
  - Thesis Statement: One clear sentence that you want your audience to remember at the end of your presentation. (Viewgraph.)
  - Map of Speech: Brief description of your plan for presenting your information. Include main ideas. Possibly include a rationale for your thesis statement. (Viewgraph.)
  - Background Information: the audience needs to understand your work.

**Body of the Speech.** The body of the speech should be organized into three to five key points. All of your support material will develop these points. At the end of the speech, any audience member should be able to tell someone else what your main points are.

- Use short sentences as key ideas so that the audience hears them easily.
- Develop each of your points with explanations, visual aids, interpreted statistics, etc.
- Summarize each key point before going to the next. Use transitions between key ideas that show connections of thoughts and processes. This is where you can help the audience follow the unfolding information.

**Summary and Conclusion.** At the end of your speech, briefly return to the key ideas of your speech and draw a conclusion from what you have said. Leave the audience with a clear image or thought. Know your exit line.

## **CHAPTER 4**

### **Presentation**

When you learn a new skill, like playing an instrument or a sport, you have to think about each motion individually. You have to practice each aspect of the activity—dribbling a ball or executing a smooth trill—until you can do it with ease. Then you combine it with other skills you are developing until you master your instrument or your sport. The only way to become good is to practice, practice, practice. Giving a public presentation is no different.

You have worked on various parts of your talk. You have considered the audience, developed analogies, created visual aids, organized your talk. Now you must put the cerebral parts together with the physical components of your presentation. The physical components involve your mouth and tongue speaking the words, your facial expressions, and your body motions. Your body language must match your verbal language to give a cohesive message. This last step, combining all parts of your presentation, is as important as all the others, and it requires practice, practice, practice!

Recall the most outstanding speakers you have heard. Think about the qualities that they exhibited. What about their presentations separated them from merely good talks? It may be an air of confidence, creative use of visual aids, absolute comfort with the material, clarity and smoothness of verbal expression. Many characteristics contribute to excellence; they were learned, practiced, revised, practiced, evaluated, practiced . . .

All of the faculty members who have talked at previous "Scientists as Speakers" sessions said that they always rehearse their presentations, even after they have given them several times! They practice smooth transitions from one point to the next, they alter portions of their talks to appeal to different audiences, they review their visuals, and they time their talks so that they will not exceed the time limit. They do not assume that they can successfully "wing it."

This chapter provides presentation guidelines, ideas, and techniques to help you polish your talk.

#### **Ten Presentation Guidelines**

- Your mind is on the audience and their needs.
- Your weight is on the balls of your feet and you are standing straight. Your body is balanced so that you can respond naturally.
- Hand gestures are in front of you and toward your audience.
- You respond to ideas—facially and bodily—as you say them. Your commitment to the material shows clearly.
- You look at people to see acknowledgment of an idea. You speak to what you see in their eyes.
- You are attentive to audience members in all areas of the room, especially to the non-dominant hand side. You embrace the entire space.
- You walk toward the audience on important points and avoid backing-away on any key ideas.
- Your voice responds to the material and uses volume and pitch to support the content of the speech. You speak louder than in normal conversation, and project your enthusiasm.
- You use pace to enhance your talk and stimulate your audience. Slow down for new and difficult material and for emphasis. Speed up when reviewing material.

- When you leave, the audience knows that you enjoyed being there, talking about this topic.

As a speaker, you set the level of commitment and enthusiasm. The audience will be as committed to your topic as you are.

## **Rehearse—Use Creative Means to Get Ready**

You must find the rehearsal techniques that work for you. Some are included here. Try all of them until you discover the right combination—which may change for different presentations.

Remember: rehearsals are for you. Make them work for you!

### **Rehearsal Techniques to Try:**

- Rehearse individual parts of your speech. Tell a story to one person, try the statistics with someone else. Run through the overall outline with a third.
- Informally talk through your speech with someone, sitting at a table. Allow her or him to ask questions after each major part to see what she/he understands.
- Rehearse the "big picture" in your mind for "flow." Use post- and pre-sleep time for this. Review main ideas, key supporting evidence, etc.
- If you must memorize something, make it a good quotation, the opening statement, and the closing idea. All other parts should not be memorized, but you should know them well enough to talk about them with few notes.
- Use different times of the day to rehearse. Rehearse when you are "up" so that you can create mental images of your delivery full of energy and commitment.
- Use positive visualization. Every time you review the speech in your head, see yourself doing it well. Watch how well you gesture, relate to the audience, smile, look confident. *Always* see yourself doing well.
- Use auditory rehearsal. Time it. Give your tongue and mouth a chance to try out the words.
- Record your talk on audiotape and play it back. If your mind wanders, that part isn't good enough yet. Make it more interesting for yourself.
- Record your presentation on videotape and watch it twice, once to get used to seeing yourself on video tape. The second time critique the speech for content, organization, and delivery. *Do not wait until the last minute to do this exercise!*
- Keep all rehearsals extemporaneous. Relive the experience of thinking about your ideas each time you present them.

### **For more fun:**

- Try singing your presentation in the shower as if it were an opera. This can be great fun!
- Rehearse while holding a book in each hand to tame gestures.

## Final Rehearsal and Centering

The following techniques can be used almost anywhere to get your mind and body ready to perform:

- Use classical music to focus your mind. Try Pachelbel's *Canon in D*. Use it often and learn to breathe with it. When you are getting ready to present your talk, play the music in your head and breathe with it.
- If laughter helps you relax try (1) calling a friend who makes you laugh or helps you feel confident, (2) listening to good comedy tapes that make you smile, or (3) reading excerpts from a book that makes you chortle. (Mary Ann Smith uses *The Incomplete Book of Failures*, by Stephen Pile.) Recall these before you start.
- If you need energy, play tapes that pick you up. Try "Do You Hear The People Sing?" from *Les Miserables*, or Bach's Concerto in *D Minor for Oboe and Harpsichord*. How about Helen Reddy's "I Am Woman, Hear Me Roar?"
- Rehearse in front of a mirror. Look confident—this is no time for modesty. Practice until you get it right. Then remember what that feels like. What do the facial muscles feel like? Where are your shoulders? What is your stomach doing? Walk away from the mirror and replay those feelings. Practice recapturing confidence throughout the day in many situations.

"The *appearance* of self-possession eventually leads to the *feeling* of self-possession. Inner calm comes from the ability to project it." (*Self*, 3/86)

- Use inner dialogue to coach yourself. Use your second voice to repeat positive affirmations:  
    *"I am the expert on this piece of work."*  
    *"I can do this. I can help this audience."*  
    *"I am thoroughly prepared. If I make an error, I will recover."*  
    *"I am ready and I want to do this."*  
    *"I hear the trumpets and the drums playing my song."*
- Sitting in your chair, let your hands dangle so that any unwanted tension drains. But keep the energy that your friend adrenaline has given you. This is your body's gift to you. Interpret it as a help. Learn to channel it and use it.

## Progressive Relaxation Techniques

Allow approximately 20 to 30 minutes for beginning progressive relaxation training. Dim the lights; then seat yourself in a comfortable chair. Now close your eyes. Your legs should be extended, head resting on the back of the chair. No part of your body should require muscle support. The room should be quiet.

Begin by making a fist with your dominant hand. Make a fist and then tense the muscles in your hand and forearm; tense it until it trembles. Feel the muscles pull across your fingers and the lower part of your forearm. Hold this position five to seven seconds, then let go and relax the fist. Pay attention to how the muscles feel as relaxation flows through them for 10 to 20 seconds.

Again tense these muscles. Pay attention to the muscles involved for five to seven seconds. Relax; attend to those muscles and note how they feel as the relaxation takes place. With each repetition you'll relax a little more until your arm and hand retain no tension.

Now apply the same tensing-relaxing procedure to all your other muscle groups as follows:

1. Your dominant bicep, leaving your hand and forearm on the chair.
2. Your nondominant hand and forearm; feel your muscles over your knuckles and lower arm.
3. Your nondominant biceps.
4. Frown your head, tensing the muscles of your forehead and the top of your head (note that your head muscles often tingle as they relax).
5. Wrinkle your nose, feeling the muscles across the top of your cheeks and upper lip.
6. Draw the corners of your mouth back, feeling your jaw muscles and cheeks.
7. Tighten your chin and throat muscles, feeling the two muscles in front of your throat.
8. Tighten your chest muscles and the muscles across your back; feel your muscles pull below shoulder blades.
9. Tighten your abdominal muscles; make your abdomen hard.
10. Tighten the muscles of your right upper leg; feel one muscle on top and two on the bottom of your upper leg.
11. Tighten your right calf; feel the muscles on bottom of your right calf.
12. Push down with your toes and arch your right foot; feel the pressure as if something were pushing up under the arch.
13. Your left upper leg; calf; foot. (Repeat 10, 11, 12.)

Concentrate on breathing deeply and rhythmically during the tension-release cycle. You should take a deep breath, then hold it during the tensing cycle. Exhale while releasing the tension.

Practice this twice a day, but for no more than 15 minutes at a time, and no more than twice in any three-hour period. Do it sitting up to avoid going to sleep.

### **Appropriate Dress for Your SURF Presentation**

Your audience will evaluate you and your presentation, in part, on your appearance and dress. Appropriate dress for men is a coat and tie; for women, a suit or dress. If they do not have a coat or a suit, men can wear a shirt with a collar and tie and slacks, and women can wear a blouse and skirt or dressy slacks. Clothing should be clean and pressed. Your hair should not fall around your face. Avoid excessive or noisy jewelry. Do not chew gum! If you believe you look good, you will feel more confident. When you are well prepared, well rehearsed, and well groomed, you are ready!

## **CHAPTER 5**

### **Poster Presentations**

Poster presentations are increasingly seen at professional meetings in many disciplines. They offer several advantages and opportunities. An excellent poster draws people to it through a good use of graphics and succinct descriptions of technical material.

#### **Why Poster Presentations?**

- Some people prefer this presentation format.
- Papers submitted late to a conference can be accommodated easily.
- A conference can accommodate more attendees, many of whom must present in order to get their travel costs paid by their institutions.

#### **Advantages**

- People who stop at your poster will be ones who are interested in your project.
- Dialogue (one-to-one or one-to-few, instead of one-to-many) encourages questions.
- Some people will gain a deeper understanding of your work than they would if you gave an oral presentation.
- Viewers can go through your material in the order and at a pace best suited to them.
- Opportunities for follow-up are more likely to develop.
- You can expand your professional contacts, you can network.

#### **Disadvantages**

- Your audience may be smaller.
- You will be on duty longer.
- Arrangements or locations sometimes are not ideal.

#### **Logistics**

- For SURF, each poster presenter will have a free-standing board, approximately 6 feet high. The actual poster area is 4 feet by 4 feet.
- Presenters affix their displays to the board by means of pushpins (usually provided by conference staff).
- Occasionally presenters use computers, models, or other exhibits that cannot be tacked onto a vertical board. If you need a table or other equipment, request it well in advance of the conference and be prepared to change your presentation if the request cannot be accommodated.

#### **Preparation Guidelines**

- Learn the display conditions and constraints (e.g. how much time, how much space, where). If possible or necessary, lobby for better conditions.
- Pare your message to its bare essentials.
- Develop a display strategy.
- Don't forget Rule 1.

## **What Is Rule 1?**

- A poster session is not the proper forum for giving a stand-up presentation or posting a journal article.
- Plan a presentation that will take advantage of the poster session's unique opportunities. But pay particular attention to Rule 2.

## **What Is Rule 2?**

- The same *type* of thinking is needed for planning an oral presentation or a poster session or for writing a paper.
- Concentrate on the essential points of your message and use communication methods that exploit the advantages of your forum, whether oral, poster, or written.

## **Display Strategy**

- Limit the scope of your message so that you can communicate it in the poster format.
- Think about how you will attract attention to your display.
- Analyze your message into its main point (or points), subsidiary points, and details.
- Plan how to illustrate the main point and the subsidiary points.
- Reserve the details for the written paper and for questions (which you will be available to answer).
- Have copies of the written paper available for people who ask questions.

## **Execution Guidelines**

- Prepare a banner containing a title that accurately identifies your subject and technical content, its authors, and their affiliations in very large type that can be seen over people's heads from a distance of 15-20 feet. Position the banner at the top of the poster.
- Put your introduction at the top left and your conclusions at the lower right. Many people will read only these two pieces of information.
- Make charts, graphs, and photographs large enough that people will be able to read them from a distance; they should be clearly labeled with the message you want people to remember.
- Text below illustrations should be in smaller type and contain more information than a typical figure legend. Only the most interested will spend time reading this information.
- Use large letters for your subsidiary points, larger ones still for your main message (to help people tell the difference).
- Make the flow of information explicit by using inch-high numerals. Information should flow in columns rather than rows.
- Be imaginative in your use of color, interesting but readable fonts, and layout, to attract and focus attention.
- Include a summary display that presents the essential points of your research and conclusions in large print.
- Your display should be self-explanatory in case you are unavailable to talk with someone who is interested in your work.
- Prepare a short presentation (2-5 minutes) to give an overview of your work to those who are interested.
- Make your poster ahead of time and rehearse with your peers, in the same way you would an oral presentation.

## **What to Do During Your Session**

- Don't block your display. Stand to the side, near the summary.

- Introduce yourself to people who seem interested, but are hesitant.
- Try to talk one-on-one with as many people as you can during your session.
- Have business cards prepared (formal or informal) telling people how they can reach you.
- Repeat your main point and subsidiary points in conversation, using the same words as are in your display.
- Offer a copy of your written paper to people who seem interested.

### **What to Do Afterward**

- Follow up with people who were interested in further contact and who gave you phone numbers or addresses.

### **Summary Guidelines**

- Study your boundary conditions.
- Plan your session thoughtfully.
- Be creative in execution.
- Be attentive during the session.
- Follow up on all opportunities.
- Keep notes on what went wrong this time so that you can do better next time.
- Pass your notes and observations to the Student-Faculty Programs Office for the next edition of *The SURF Talk Book!*