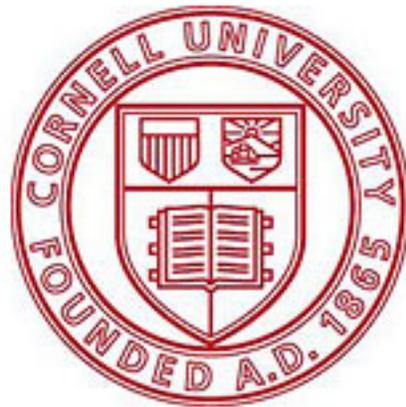


Psychology Honors Program Handbook

Last revised August 24, 2015



Cornell University

I. Introduction to the Honors Program in Psychology

The honors program is designed for exceptional students who wish to pursue intensive and independent psychological research. The honors program offers students the closest contact and consultation with faculty they will likely experience while at Cornell. Successful participation serves as evidence of the two most important skills required of an academic psychologist: the capacity to integrate theoretical and factual material, and the ability to devise and successfully execute a creative empirical research project. Students who successfully complete the Honors Program graduate with honors noted on their diplomas. Qualified majors who are planning postgraduate work in any field (academic or otherwise) should consider applying. However, completing an honors project is an extremely demanding undertaking, both in time and effort, and therefore may not be recommended for everyone.

II. General Expectations

Under the guidance of a Faculty Mentor, Honors Students will conduct an empirical study, analyze the data, and interpret the results. Honors Students will produce a professional research report, present a poster of their project at the annual *Honors Program Research Symposium*, and deliver an oral presentation to their committee during their *Honors Defense*. The Honors Student should aim to be the “principal investigator,” bearing primary responsibility for all facets of the research project.

Conducting honors research and successfully writing a thesis report requires extensive time and effort. Therefore, Honors Students may be expected to work on their projects during weekends, and breaks (e.g., part or all of fall break, winter break and/or spring break). Honors Student applicants should discuss the expectations and criteria necessary to complete a particular project with their prospective mentor.

Students in the program must register for 3 or 4 credits of Psychology 4710: Independent Study in both Fall and Spring semesters.

III. Admittance to the Program

Applicants to the Honors Program are evaluated along 3 criteria:

- 1) Record in psychology and other relevant coursework. Although exceptions can be made, a minimum GPA of 3.5 in Psychology courses is expected.
- 2) Previous independent-study research experience. The Honors Program is geared toward students who currently have an established working relationship with a faculty member. ***The prospective mentor must agree to sponsor honors research and provide a commitment letter.***
- 3) A research project. In the application, the applicant must provide a synopsis of the research proposal (the abstract).

The application form and letter of sponsorship from the Faculty Mentor are due in the first week of September. Applications and letters should be emailed to both Directors of the Honors Program.

Finally, applicants to the program should register for 3 or 4 credits of *Psychology 4710: Independent Study*, both before being officially accepted and during the second semester of honors work.

Application materials and important documents are available on the Psychology Department's website: <http://psych.cornell.edu/undergraduate-honors-program-psychology> or from the Psychology Department office (Uris 211).

IV. Program Deliverables

Failure to meet any of these deadlines can result in dismissal from the program.

1) Full Research Proposal (8-12 pages)

Two weeks after acceptance to the honors program (mid September), the Honors Student must provide an 8 to 12 page full formal research proposal that the Faculty Mentor has reviewed and approved. The formal research proposal serves two purposes. (1) It provides the foundation for the student's research over the course of their senior year. As a result, Honors Student applicants should consult with their Faculty Mentor as they develop their proposal. (2) The full research proposal demonstrates that the Honors Student is prepared to complete a project that meets the program's requirements (i.e., the completion of a professional level research project) by the deadlines (see Section IV). Details and guidelines about how to write the full proposal are outlined below (Section V). Final research proposal should be emailed to both Honors Directors and submitted to the Faculty Mentor.

2) Fall Progress Report

At the end of Fall Semester Honors Students must email a progress report (2-4 pages in length) to both Honors Directors and the Faculty Mentor. See Section VII below for details.

3) Provisional Draft of Honors Thesis

An honors thesis is a written description of the research project, including background, methods, results and a discussion of the results. Early in spring semester, students should begin composing a provisional draft of their honors thesis. This will serve as a working draft that can be exchanged with the Faculty Mentor as the project is finalized. See Section IX below for details.

4) Oral Defense

Once the Faculty Mentor approves the thesis, the Honors Student can schedule their oral defense with their committee. The defense typically lasts about an hour and typically occurs in the last two weeks of April. It consists of a brief talk and a question and answer period. Once these are complete, the Honors Student leaves the room while the committee discusses the outcome. The student is then told whether they passed and if the thesis requires revision.

5) Poster Presentation

Honors Students will create a poster that they will use to present their research in a public poster session at the end of the year (see the Appendix for additional information on creating posters). During the annual *Honors Program Research Symposium*, posters will be hung in the halls of the 2nd floor of Uris Hall. Psychology faculty members and students will attend the symposium. Honors Students will describe and discuss their research with visitors. Participation in the *Honors Program Research Symposium* is mandatory for Honors Students. (Posters will also be on display for graduation to give Honors Students the opportunity to showcase their work to friends and family and to the community at large).

6) Final Honors Thesis

Honors Students will revise their thesis to address any concerns raised by their committee during the defense. Once the Faculty Mentor approves the thesis, including its style and formatting, two copies must be bound and printed. One copy must be turned in to the Faculty Mentor and the other copy must be submitted to the Psychology administration office (Lisa Proper; Uris Hall 211). Final Honors Thesis also should be emailed to both Honors Directors.

V. Milestones, Deadlines, and Benchmarks

College of Arts & Sciences Grants (Early October)

The College of Arts & Sciences makes research funds available for undergraduate projects. Because these funds typically disappear quickly it is recommended that students apply as early as possible. See Section VIII for more information.

Honors Program Meeting I (Late October)

An informational meeting with the Honors Program Director(s) is held in the middle of Fall semester (time and place TBD). This is an opportunity to meet other students in the program and to ask questions regarding program details.

Halpern and Rosevear Undergraduate Research Grants Due (Early November)

The Halpern and Rosevear Undergraduate Research Grants provide funds to promote excellence in undergraduate research in Psychology. Students who have been admitted to the Psychology Honors Program may apply when they turn in their Fall Semester progress report. See Section VIII for more information.

Progress Report (End of Fall)

A written progress report (2-4 pages) that provides an account of the project's current state is due (see Section VII for details).

Honors Program Meeting II (Mid February)

An informational meeting with the Honors Program Director(s) is held in the first half of Spring semester (time and place TBD). This is an opportunity to discuss committee formation, preparing the poster and thesis, and the oral defense.

Form a Committee (Mid March)

Thesis committee should be formed. See Section X for more information.

Provisional Honors Thesis Draft (Late March to Mid April)

A complete provisional draft is turned in to the Faculty Mentor. The provisional draft is revised following Faculty Mentor comments. With the Faculty Mentor's approval, the complete (revised) draft is distributed to each committee member.

Schedule Oral Defense (Early to Mid April)

Honors Students schedule their oral defense after they have formed a thesis committee and their faculty mentor has approved the provisional thesis. See Section XI for more details.

Oral Defense (Late April)

Oral examination by the thesis committee should be completed before May (see Section XI for details). Revisions to the thesis are usually required.

Posters Due (Early May)

Posters must be completed and submitted to the Psychology Main Office (Uris 211). The staff will set up the posters for the *Honors Program Research Symposium*. The Faculty Mentor should check the format and style of each poster before it has been completed and submitted.

Honors Program Research Symposium (Posters Session) (Early May)

Attendance of Honors Students is mandatory for the *Honors Program Research Symposium* poster session. This is a professional public presentation of student's research.

Level of Honors and TA Ryan Award Assessed (Mid May)

The Honors Program Director(s) will receive feedback from each committee. After considering the group as a whole, the Director(s) make a final determination of the level of honors.

Revised (Final) Honors Thesis Draft (Early to Mid May)

Revisions to the thesis should be completed by early May. The Faculty Mentor should review the final draft for both content and style before it is sent for binding. Two bound copies are due in mid-May (see above, and Section IX below)

Psychology Department Graduation Ceremony (Late May)

Honors Students are recognized during the Psychology Department graduation ceremony. The recipient of the T. A. Ryan award is announced at the ceremony.

VI. Research Proposal

The full proposal provides a plan for the honors project and can be considered an initial draft of the thesis. The proposal must include a literature review with at least 10 citations of primary, empirical research articles. It also must include an overview of the methods, anticipated results, and potential significance of the proposed work. Research proposals should demonstrate that the project meets the programs requirements and that the student is prepared to successfully complete the project and meet the program's deadlines. It must adhere to APA style, as outlined in the 6th edition of the Publication Manual of the American Psychological Association. Other

formats may be permissible with the approval of the Faculty Mentor and the Honors Program Director(s).

Although the Faculty Mentor may prefer a stapled hard copy of the full proposal, the full proposal should be emailed to both Honors Directors as a MS Word or PDF file. Electronic files should be titled with the Honors Student's last name followed by the term 'full proposal' (e.g., Smith_full_proposal.pdf).

VII. Progress Report

This is a brief (2-4 page) description of the current state of the project, what has been accomplished, and what remains to be completed. The progress report should include (a) a brief description of the project, (b) descriptions of changes to the research plan, (c) an indication of which aspects of the project have been completed (e.g., IRB approval, stimulus creation/coding, data collection, etc.) and which aspects of the project remain, and (d) a brief summary of preliminary data, if available.

VIII. Funding

The College of Arts and Sciences offers small stipends to support undergraduate research. For example, the Undergraduate Research Fund, sponsored by the Dean of the College, provides some money (the maximum award is usually \$300) to defray out-of-pocket expenses that arise from students' projects. The Einhorn Discovery Grant offers students from \$200 to \$800 per academic year to support research in faculty-approved projects. Applications for the Dean's Undergraduate Research Fund and the Einhorn Discovery Grants are available in 172 Goldwin Smith. You may also contact Sue Downes and Dean David DeVries (255-3386).

The Psychology Department additionally offers the Halpern and Rosevear Undergraduate Research Grants for Honors Students. All students in the program are encouraged to apply. Applications include a 300 word abstract, a budget and justification, and a curriculum vitae. The application is due at the same time as the Fall Progress Report. Additional information will be distributed midway through Fall semester.

IX. Drafting (and Finalizing) your Honors Thesis

Honors Students will prepare their written Honors Thesis during spring semester. The thesis is a written description of research that includes all the components of a journal article. It provides a complete *literature review* that sufficiently justifies and motivates the experiment(s) that were performed (likely an expansion of the review in the full research proposal). The thesis also describes the project's *methods* in enough detail for any reader to accurately replicate the study if desired. The *results*, including any necessary statistical analyses, figures, and tables (including captions), should then be described. In initial drafts, these may be preliminary results or expected results. In final drafts, the results section should include descriptive and inferential statistics that test the project's hypotheses and that support the project's conclusions. Finally, the thesis should include a *discussion* section, in which the results are discussed in terms of what the study has

demonstrated and in terms of the larger implications for the field. A fully annotated *reference* section is required. An acknowledgments section may be included.

In consultation with the Faculty Mentor, it is best to start drafting a thesis at the beginning of the spring semester, presumably before all or any results are in. Working on the thesis early will enable the Honors Student to provide a provisional draft to their Faculty Mentor by mid semester, when it is due.

The thesis may be read and revised several times by the Faculty Mentor. Once the Faculty Mentor approves the thesis, it can be submitted to the Honors Student's committee. The committee will review and (usually) comment on the thesis. This feedback is usually provided at the time of the oral defense. However the Honor's student may wish to have one or all committee members comment on preliminary drafts as well (usually with the permission of the Faculty Mentor). The feedback provided by the committee following the oral defense should be integrated into the thesis. A final draft of the complete report should be submitted to the Faculty Mentor for final approval.

Upon receiving final approval from the Faculty Mentor, the Honors Student should arrange to have at least two copies of their thesis bound. The thesis can be hard bound or soft bound at Mann Library. One bound copy of the Honors Thesis should be provided to the Faculty Mentor. Another bound copy of the Honors Thesis should be provided to the Psychology administration office (Lisa Proper; Uris 211). The copy provided to the Psychology administration office will be placed in Psychology Department library. It is a courtesy to give other committee members a final bound copy of the Honors Thesis, but is not required.

X. Forming a Committee

By early to mid-April, Honors Students should form their committee. The committee consists of the Faculty Mentor and two other *faculty* members. At least two of these three committee members must be members of the Psychology Graduate Field (for a list, see: <http://www.gradschool.cornell.edu/academics/fields-study/catalog/?fid=62#tabs-1>). Under some circumstances, the Honors Student may need to have four committee members to meet this requirement. The Faculty Mentor should be consulted when considering potential committee members.

XI. Scheduling and Defending the Honors Thesis (Oral Defense)

The oral defense is an opportunity for Honors Students to present their research to experts in their fields. It is also an opportunity for the committee to learn more about the research project and to assess the Honors Student's understanding of their research and their role in the project.

A defense date can be set once the committee is formed and the Faculty Mentor indicates that the written honors thesis is ready. Students must provide each committee member with a copy of the complete, unbound version of the thesis at least one week in advance of the defense.

It is the students' responsibility to schedule a time for the defense. This requires polling committee members to identify a time slot (approximately 1-2 hours) when all committee members and the Honors Student can meet. Each Honors Student is also responsible for scheduling a room for the defense. Room reservations are coordinated by Lisa Proper (Uris 211) in the Psychology Office, and should be reserved by the Honors Student after a time has been identified. Identifying available times and meeting rooms can become difficult at a time when all students in the program are attempting to coordinate defenses, so plan ahead and be prepared to be flexible.

The defense begins with the student presenting an overview of the thesis work. Presentation style and format (e.g., slides, overheads) is up to individual students and Faculty Mentors. The length of an oral presentation may vary, but they are typically about 10 to 15 minutes (students should consult with the Faculty Mentor for specifics). Committee members will typically break in for questions throughout the presentation. The presentation thus functions as the foundation for a give and take between the student and the committee, providing fodder for questions and discussion. The defense is concluded when each committee member is satisfied that their questions have been answered, and necessary revisions and comments have been noted. (Honors Students should expect to have to revise the thesis before final acceptance.)

The Honors Student then leaves the room, and committee members determine whether the student has passed, thereby meriting honors. Honors are officially awarded when the advisor approves the completed and revised thesis and the student turns in two bound copies.

XII. The Poster Session

An important requirement of any research project is the dissemination of the knowledge that it produces to a larger audience. To achieve this goal, Honors Students must participate in an *Honors Program Research Symposium* poster session during the last week of classes. For the Symposium, each student is required to create and present a poster that summarizes his or her research (see the Appendix for helpful hints for creating a poster). Honors Students must be prepared to discuss their research throughout the symposium with any interested parties that come by. Refreshments are provided.

The symposium usually takes place in the afternoon (12-2 pm) on the second floor of Uris Hall. The Psychology Department administrative staff sets up the poster session. It is therefore imperative that the posters are submitted on time (no later than the day before the symposium). Posters are stored in the Psychology Department until graduation.

XIII. Level of Honors

Students that successfully complete the Honors Program will graduate with honors (Cum Laude), which will be noted on their diplomas. The student's committee will meet after the oral defense to determine whether the student has successfully completed the program. This discussion can include the Honors Student's overall performance over the course of the year, including his/her effort and dedication to their research, ambitiousness, and level of independence. The committee will also evaluate the student's understanding of the project's implications with regard to the

state of the field. Many committees compare the Honors Student's overall performance to that of a first or second year graduate student. Based on this discussion, the committee will make a recommendation to the Honors Program Director(s). The Director(s) will consider the recommendations and performance of the all the Honors Students to determine the Level of Honors each student receives.

There are three levels of honors. Cum Laude is awarded to students who successfully addressed a unique research question with a conceptually well-designed study, and who conveyed a clear understanding of where the work fits within the field. It is a significant achievement to receive the Cum Laude distinction, and it is not guaranteed that everyone in the program will receive this distinction. A small number of students will receive Magna Cum Laude. Magna Cum Laude is awarded to students that met and exceeded the criteria for Cum Laude. For example, these students will have demonstrated significant ambition and independence, as well as mastery of the broader literature in their projects. These students are typically operating at the level of an early stage graduate student. Finally, Summa Cum Laude, the highest level of honors, may be awarded to a student that completes a thesis of outstanding quality. Students receiving Summa Cum Laude demonstrated true mastery and exceptional performance in all regards. At the time the thesis is submitted to the committee it is of publishable or near publishable quality. Summa Cum Laude may not be awarded in a given year. The Honors Program Director(s) will inform students of their level prior to graduation.

XIV. Psychology Department Graduation Ceremony

The significant achievements of the Honors Students are highlighted during the Psychology Department's Graduation ceremony (which follows the main ceremony at Schoellkopf Field). During the ceremony, the Honors Student's thesis title is read as the student receives his or her diploma. In addition, the posters and bound theses are put on display in the second floor of Uris Hall. Everyone in is invited to view the posters and theses after the commencement ceremony. Honors Students are not expected to be at their posters or to present them. However, they may enjoy discussing them with family and friends.

The T. A. Ryan award, accompanied by a small prize, is announced during the ceremony. It is given to the student who completes the best research project, as determined by an independent committee of readers.

Appendix I: Guide for Thesis Writing and Format

Theses will follow APA style, as described in the 6th edition of the APA Publication Manual. If APA style is not appropriate for publications in the sub-discipline represented by a particular thesis topic, an alternate format can be substituted. However, that must be negotiated with the honors director.

The title page (a sample appears later in this document) and binding of the thesis will conform to the standards set by Cornell University. Cornell University Library Copy Center provides binding service for theses. Hardbound takes minimum 10 days and softbound takes around 4 hours, so I think honors students should order softbound copies for submitting the final draft at the psych office on Friday. Hardbound is about \$25 per copy, and softbound is less than \$4 per copy.

Below is the information for CUL Copy Center.

CUL Copy Center
B41 Olin Library
Monday - Thursday 8am - 4:30pm
Friday 8am - 3:30pm
Phone: (607) 255 - 4700
Fax: (607) 255 - 9346
Email: libcopycenter@cornell.edu

Please read the instructions below regarding how to appropriately format your thesis. In addition, refer to The Graduate School's Thesis and Dissertation Guide for details about formatting:
http://www.gradschool.cornell.edu/pubs_and_forms/pubs/thesisbook.pdf

Title page

(modified from "Doctoral Dissertation, Master's Thesis, and Advanced Degree Requirements," published by The Graduate School, Cornell University, p. 4)

Title selection. The words in the title of the dissertation or thesis should be selected carefully to represent as accurately as possible the subject content. The words in the title are important access points to researchers who may use computerized keyword search techniques to identify works in various subject areas.

Authors of dissertations or theses should use word substitutes in the title for formulas, symbols, superscripts, Greek letters, and the like. Examples are "Chromosomal localization of the alpha- and beta-globulin of the chicken, *Gallus domesticus*" and "Study of high critical transition temperature superconductivity in the neodymium-barium-copper oxide system" (from *Publishing Your Dissertation*, Ann Arbor, MI: University Microfilms, Inc., 1999)

Title page format. The title is in all capital letters, centered within the left and right margins, double-spaced, about 1 1/2 inches from the top of the page.

At the vertical and horizontal center of the margins and double-spaced are the following five lines (all centered):

Line 1: A Thesis

Line 2: Presented to the Faculty of the College of Arts and Sciences

Line 3: of Cornell University

Line 4: in Partial Fulfillment of the Requirements for the Degree of

Line 5: Bachelor of Arts

The following three lines are centered within the margins approximately 1.1/2 inches from the bottom of the page and are double-spaced:

Line 1: by

Line 2: Student's Name

Line 3: Month and Year of degree conferral (no comma between month and year)

The student's name must appear as it is on file in the University Registrar's Office. The date on the title page should be the date of degree conferral, not the date the dissertation or thesis is submitted.

Figures and tables

Figures and tables follow the APA recommendations for theses, which are a bit different than for manuscripts. Specifically, place each figure or long table on a separate page, immediately following the page where that figure or table is first mentioned. Short tables (which would look silly on a separate page) can be incorporated in the text. Captions should be typed below the figure or table in question. Tables can be single-spaced if they read better, otherwise stick to double-spaced, as everywhere else in the thesis.

Resources for Writing the Thesis

A number of relevant resources can be found on the internet, particularly with respect to write an empirical research paper (or thesis) in psychology, and APA style. A Google search with keywords like “psychology,” “research,” “empirical,” and “APA.” Help is also available locally, both for writing and quantitative analysis and presentation of your data.

For help with writing your thesis, try...

- Writing Workshop
http://www.arts.cornell.edu/knight_institute/walkin/walkin.htm

Honors Program in Psychology Handbook

174 Rockefeller Hall; 255-6349; 8:30 a.m. -5 p.m.

Offers seminars on improving writing skills. Call for appointment.

- Writing Workshop Walk-in Service
178 Rockefeller Hall: 3:30-5:30 and 7-10 p.m., Monday-Thursday; 2-8 p.m., Sunday.
222 Robert Purcell Community Center; 7-10 p.m., Sunday-Thursday.
320 Noyes Community Center, 7-10 p.m., Sunday-Thursday.

For help with statistics and graphs, try...

- Mathematics Support Center
<http://www.math.cornell.edu/Courses/FSM/support.html>
256 Malott Hall
255-4658
- Cornell Institute for Social and Economic Research (CISER)
<http://www.ciser.cornell.edu/ASPs/workshops.aspx>

(sample title page)

EVALUATING EMOTIONAL RESPONSES TO SOUND:
IMPLICATIONS FOR AUDITORY SYSTEM EVOLUTION

A Thesis

Presented to the Faculty of the College of Arts and Sciences

Of Cornell University

in Partial Fulfillment of the Requirements for the Degree of

Bachelor of Arts with Honors

By

Han R. Student

May 2003

Appendix II: Guide for Poster Format & Presentation

Preparing a poster. A poster is prepared as one big “slide” in a program such as PowerPoint, for example by setting the “slide” size to something like 48-60” by 36”. It is printed out as a single sheet on a large printer (Mann Library has such facilities. Details regarding costs can be found at: <http://mannlib.cornell.edu/equipment-software/plotters>) and mounted on poster board. It is then displayed on an easel provided by the department.

Posters should be designed to provide a brief overview of the work, and to initiate discussion. Here it is important to display the results clearly, while also recognizing that the poster can only cover KEY points, rather than everything about the research. Posters are organized following APA style, and include an abstract, introduction, methods, results, discussion, and references.

Posters should be prepared well in advance of the poster session. The title should appear at the TOP in CAPITAL letters about 25 mm (1") high. The author’s name and affiliation appears below the title (including both department and university).

Poster content flows downward in columns, starting at the TOP LEFT and ending at the BOTTOM RIGHT. Colors can be used as highlighting and to enhance overall appearance. While it is important to convey the substance of the work, posters should not rely too heavily on text. Creative use of figures, diagrams, and photos typically makes the information much more accessible. Main results should be stated six (6) lines or less, in lettering that is at least 15 mm (5/8") high. This size is needed to ensure legibility from a reasonable viewing distance. Small fonts simply do not work well on posters. The smallest text should be no smaller than 9 mm (3/8") high, and the important points should be in a larger size.

A poster should also be as self-explanatory as possible, significantly increasing the number of people who come away understanding it while also reducing the effort needed to explain the work orally. However, poster presenters should be prepared with a brief, cogent explanation. Honors students are expected to be at their poster for the entire 2-hour session.

More Poster Advice

Here are some more hints, from Sven Hammarling (Principal Consultant at NAG Ltd, in Oxford, England) and Nicholas J. Higham (Reader in the Department of Mathematics, University of Manchester).

Poster sessions are an increasingly important part of scientific conferences, and many of us are rather inexperienced in their preparation and presentation. Having been involved in organizing and judging poster sessions, however, we have given some thought to what we consider to be desirable features of a poster. (We do not address here the publication of the poster material in a conference proceeding.)

What is a poster? A poster is very different from a paper or a talk, and so different techniques need to be used in its preparation. The purpose of a poster is to outline a piece of work in a form

that is easily assimilated and stimulates interest and discussion. The ultimate aim is a fruitful exchange of ideas between the presenter and the people reading the poster, but you should not be disappointed if readers do not stop to chat—a properly prepared poster will at least have given useful information and food for thought.

A poster tells a story. In preparing a poster, simplicity is the key. A typical reader may spend only a few minutes looking at the poster, so there should be a minimum of clutter and a maximum of pithy, informative statements and attractive, enlightening graphics. A poster should tell a story. As always in a scientific presentation, the broad outline includes a statement of the problem, a description of the method of attack, a presentation of results, and then a summary of the work. But within that format, there is much scope for ingenuity. A question-and-answer format, for example, may be appropriate for part of the poster.

A poster should not contain a lot of details—the presenter can always communicate the fine points to interested participants. In particular, it is not a good idea to present proofs, except in brief outline, unless the proofs are the focus of the presentation. Keep in mind that the poster will be one of many in the exhibition area: You need to make sure that it will capture and hold the reader's attention.

The poster should begin with a definition of the problem, together with a concise statement of the motivation for the work. It is not necessary to write in complete sentences; sentence fragments may be easier to comprehend. Bulleted lists are effective. An alternative is to break the text into chunks—small units that are not necessarily paragraphs in the usual sense. For presenting results, graphs and figures—easier to scan than the columns of figures in a table—are even more appropriate than in a paper. Legends should be minimal. A brief description of the implications of a graphic, placed just above or below it, is helpful. For ideas on graphic design, a wide selection of books is available—books by Tufte (1983,1990) are an especially good choice. Conclusions, again, should be brief, and they should leave the reader with a clear message to take away.

Designing your poster. Suggestions on the physical design of a poster range from the obvious to the not so obvious. The typeface chosen should be considerably larger than standard. Because not all readers will have perfect eyesight, and because the crowd of readers around a popular poster may be several people deep, the type should be easily readable by a person standing a few feet away. In particular, the title of the poster and the author's name should be large and prominent. Good use can be made of color, both to provide a more interesting image and for color coding of the text. For added interest, try including an appropriate cartoon, or photograph. There is plenty of scope for creativity.

Both horizontal (reading across the rows) and vertical (reading down the columns) layouts are possible. While the horizontal ordering is perhaps more natural, it has the major disadvantage of requiring the reader to move to and fro along the poster. If there are many readers, congestion can result. A vertical ordering is therefore preferable, although other possibilities should be considered as well. If you are comparing three methods, for example, you could display them in parallel form, in three rows or columns, perhaps as a “display within a display.” Consider the possibility of arranging the poster to represent some feature of the problem, such as a particular

sparsity structure of a matrix. If there is any doubt about the order in which the sections should be read, guide the reader by numbering using arrows. Several examples of layout and further discussion are given by Matthews (1990).

The Poster Session. Once the session starts, stand near the poster but not in a position that obscures it from view. Be prepared to answer the questions that a good poster will inevitably generate. But keep in mind the advice that a presenting author at a poster session should behave like a waiter in a first-class restaurant. The waiter is there when needed but does not aggravate the guests by interrupting the conversation every ten minutes to inquire whether they are enjoying the food (Anholt, 1994).

References

Anholt, R. R. H. (1994). *Dazzle 'em with style: The art of oral scientific presentation*. New York: W. H. Freeman.

Matthews, D. L. (1990). The scientific poster: Guidelines for effective visual communication. *Technical Communication*, 37, 225–232.

Tufte, E. R. (1983). *The visual display of quantitative information*. Cheshire, CT: Graphics Press.

Tufte, E. R. (1990). *Envisioning information*. Cheshire, CT: Connecticut, 1990.