

## Designing a Scientific Poster

### Purpose and General Information:

Scientific Posters are designed to briefly convey a body of work at a scientific conference that can be understood by a reader with a minimum of knowledge in the field. These should be easily read from about 3 feet away. There may be slightly discipline specific differences in how posters are put together. What is shown below is how a biomedical, biochemical or biotechnology poster should be organized.

It is important to realize that each conference may have slightly different requirements, so read the requirements for poster presentations carefully before beginning. Additionally, poster abstracts must be accepted for presentation at the conference. Abstract deadlines tend to occur months before conference registration deadlines. However, often conferences will also have a "late breaking abstract" submission deadline as well. Check with the conference for these details.

Be sure to ask if the conference provides tacks or if Velcro tabs are sufficient to attach to the bulletin board used at the conference. Also be aware that a few conferences have easels instead of bulletin boards, which will require a hard surface to which the poster must be mounted. Be sure to sort-out these issues out before beginning to prevent confusion at the conference.

Finally, check the times when the poster is supposed to be displayed and when the author is required to be there to answer questions. This will appear in the abstract book.

### 14 Questions to Consider Before Writing the Abstract and Beginning the Poster:

Generally in scientific writing the abstract is the last part of a publication that is written. Since abstract deadlines can occur so early, the abstract is generally written first. Before beginning there are several questions that the author should ask to frame the research as they write their abstract and design the poster. These questions also help to prepare the author for presentation at the conference. Take a few moments to answer them before beginning.

**1) What is the purpose of the research performed?**

(e.g. To identify proteins that regulate tumor progression)

**2) What is the value of the research performed?**

(e.g. Identifying proteins that regulate tumor progression will help identify cures for cancer)

**3) What hypothesis is being tested?**

(e.g. Protein X is increased in metastatic cells and assists metastasis in breast cancer)

**4) What information will a reader need to understand the poster generally?**

(i.e. Be prepared to cite these references in the poster and to comment on them when it is presented. For example, this information may include a description of the protein or gene of interest. It should help to define necessary terms and concepts used in the poster.)

**5) What body of scientific literature supports the hypothesis?**

(i.e. Be prepared to cite these references in the poster and to comment on them when it is presented.)

**6) What body of scientific literature refutes the hypothesis?**

(i.e. Be prepared to cite these references in the poster and to comment on them when it is presented.)

**7) What technical approaches were used to test the hypothesis and why?**

(i.e. Be prepared to comment in the poster presentation why this approach was chosen.)

**8) What are the important pieces of data needed to understand the conclusions made by the author?**

(i.e. Create a flow chart of the work to assist in “telling the story” of how the research was done.)

**9) What did the data show?**

(i.e. Create a very specific list of what the data shows directly in each experiment and how that data is interpreted in context of each experiment.)

**10) What does the data not show?**

(i.e. Every technical approach has its limitations. What were the limitations of the approach chosen?)

**11) What can be concluded from the data obtained in the study?**

(i.e. Look critically at the data and assess what can be concluded and what the data does not show. Be prepared to comment on gaps in the evidence shown in the poster when it is presented.)

**12) Does the work show multiple lines of evidence supporting the conclusion, and if so where are they?**

(i.e. Often what separates a body of research worthy of a poster vs one worthy of a scientific publication in a journal is multiple lines of evidence supporting the conclusions. A poster can be written from a complete body of research that has been submitted for publication. But generally, as a research project matures it may yield more than one poster before publication. So often a poster represent earlier stages of project development.)

**13) What scientific literature supports or refutes the conclusions?**

(i.e. Be prepared to cite these references in the poster and to comment when the poster is presented)

**14) What are the next steps in the work?**

(i.e. In a research project there is always something more that can be done, thus it may not be included in the poster. However, when the poster is presented it is not uncommon for someone to ask this question.)

**Formatting:**

As mentioned before, be sure to follow the formatting specification provided by the conference.

Generally:

- Posters are 3' x 4' in size.
- Should be easily read from 3 ft away.
- Use font, colors and font sizes that support easy reading.

### **Formatting (ctn):**

- Chose to express data in figures that are easily read.
- Chose font/background color combinations that are easy to read. For example, black on white are easy to read, but yellow on white is not.
- Print on paper and lamination is highly recommended
  - Keep in mind that it may take a few days to get the poster printed and laminated, so budget time for this.
  - Posters are rolled-up for transport and it is highly recommended to purchase a transport tube of some kind to protect the poster.
  - Generally poster tubes can be brought on the plane as “carry on” if needed, but check with the airline before you arrive at the airport.
  - Put the author’s name, address and cell phone number on the tubes to minimize confusion and lost during travel.
- More recently, printing on cloth is also possible for transport in luggage.

**The following sections are presented in the order it appears in the completed poster:**

### **Title and List of Authors-**

The title should briefly but precisely describe the work done. For example, a bad title would be “Proteins in Cancer”. A good title would be “Expression of Protein X Increases in an Experimental Model of Tumor Progression”. Underneath the title, a list of authors should be included in smaller font with professional affiliations indicated with superscripted symbols.

For example:

### **Expression of X Increases in an Experimental Model of Breast Tumor Progression**

AB Smith<sup>\*</sup>, PD Harvey<sup>\*\*</sup>, ZV Peterson<sup>\*\*</sup> and CD Jones<sup>\*</sup>

<sup>\*</sup> University of Denver, Denver CO

<sup>\*\*</sup> Community College of the Bahamas, Fort Antarctica, Bahamas

- **Order of authors depends on their contributions to the project.** The last author is the principal investigator who provided primary intellectual input and direction for the research. The first author performed experiments themselves and will present the poster at the conference. Other contributors are then ordered based in their intellectual and practical contributions to the project. Sometime principal investigators reserve the next to the last authorship for those who also made significant intellectual contributions to the work. Order of authorship should be agreed upon with the principal investigator before proceeding with the poster.

### **Abstract-**

Keep in mind that what appears on the poster should be what was accepted by the conference for presentation. The overall point of the abstract is to stage so a reader can understand why the research matters in just a few sentences. It provides a snapshot of why the reader should take the time to read the poster and ask questions of the authors.

The abstract should be a 1-2 short paragraph description of the work performed. The first sentences should describe the problem being addressed and the value of the research. The relevant “players” in the research should also be described.

### **Abstract(ctn)-**

- Using the example study shown in the title above what “X” does in general and its perceived role in breast cancer should be described. Relevant details about the current understanding of breast cancer tumor progression and the model of breast cancer used in the study should also be described in a few sentences.

The hypothesis that is being tested should also be very clear to the reader. The next points discussed in just a few sentences should include the work that was performed and finally the conclusions the authors made based on the data.

- **Side Bar on Scientific Writing:**

Remember to use the rules of sound scientific writing-

- No first person
- Generally past tense is used for the entire piece, except for introduction
- Write in as few words as possible (e.g. use “to” not “in order to”)
- Keep in mind that some words have very specific meanings (e.g. significant to a scientist is statistically significant and it will be expected that a mean, standard deviation and p value will be stated).

### **Introduction-**

In respect to laying down important information for the reader, the introduction is in many ways an expanded abstract. The introduction should provide an expanded overview of relevant information needed to understand the research done, in 3-4 paragraphs.

- It should define the relationship between “ the players” in the scientific question being addressed (e.g. in the example above between “X”, breast cancer and the model of breast cancer used for the study).
- It should also define terms used later in the poster.
- It should also express the hypothesis directly or indirectly and in a sentence.
- Lastly, the author’s conclusions should be stated to Segway to the rest of the poster (e.g. “Herein data is provided that shows...”).

When the reader finishes the introduction, they should have a good understand of why the study was done, why the hypothesis was generated and who “the players” are in the project.

### **Methods-**

One question always asked when writing a methods section is “how much information is too much information”.

- The methods sections should include any relevant information needed for someone to perform the research. That said, if a kit is used according to manufacturer’s specifications, simply say so. However, any deviations from specifications should be noted.
- The concentrations and identity of components of chemical reactions should be included (e.g. concentrations of constituents of PCR reactions, primer sequences and Thermocycler settings are required).
- Also include the number of specimen, the identity of specimen and if done specimen processing, etc.
- The order of methods should roughly follow the order of data shown in the results section.

The key is to convey the needed information in an abbreviated format. Remember only 1/3 of the poster is finished when this section is complete, and the poster usually has to fit in a 3’ x 4’ area. Some things can be compiled as a table if needed to abbreviate the format. An author will have to work closely with the principal investigator to complete this section.

## **Results-**

This section is the heart of story for presented research project. To compile and organize the results, it is helpful to first make the figures and figure legends first. Organize the figures and associated legends to “tell the story” of the results. Text should be provided to guide the reader through the results and to note other important data that may not appear in the figures. Here are some things to keep in mind.

- There should be a flow of results that makes sense, so a reader can understand why the author did each part of the project. For example, if a protein must be purified and then used in a study, results about the purity of the protein would logically go first.
- Some stand-alone data (e.g. a mean, standard deviation and p value for the number isolated cells used in the study) can be simply mentioned in the text. Not all data needs a figure.
- Remember to make figures large enough and clear enough to be seen 3 ft away.
- Where relevant, error bars (i.e. standard deviations) should be seen on figures and p values should be noted in figure legends. This tells the reader that statistics were done and that the data was reproduced (an important part of scientific method).
- Be careful to put yourself in the shoes of the reader and deliberately explain the parts of each figure. For example, if an agarose gel is shown, number each lane and provide a key on the side of the figure to define the content of each lane. And be sure to indicate the size of important bands on the gel using arrows or other means.

## **Conclusions-**

It is not uncommon to simply bullet conclusions to save space. Be sure to tie in the conclusions to what is already published in the scientific literature where relevant. When the reader finishes this section, they should have a good grasp on how the author places their data in context of what is already known in the scientific literature.

## **References-**

References should be numbered sequentially as they appear in the poster. Listed references should be indicated in the text of the poster by placing the number in parentheses at the end of the appropriate statement (e.g. Breast cancer can spread to brain, lung and bone (4)).

The format of the reference list at the end of the poster is not really important so long as the reader can use that information later to find the reference in a scientific journal. It is not uncommon that the font used to list references is quite small to save space on the poster and maybe italicized.

## **Parting Thoughts and Reiterating Important Comments:**

- Add pictures for general interest only if you have space. The primary concern is communicating the results of the scientific project. Make good use of limited space.
- When constructing the poster, it can be helpful for students to start with the results section followed by methods, since they are more confident with their own work.
- It takes real time (a couple of weeks in fact) to prepare a scientific poster properly. Don't wait until the last minute.
- Make sure to budget in the time to print and laminate the poster, which can take days.
- Think about the details when you get to the conference. Know how to mount the poster for display, where and when it will be displayed. Also know when the author must be there to answer questions.
- If flying to the conference, investigate the airline policies for transport of posters before arriving at the airport. And always put a name, address and cell phone number on the transport tube in case it is misplaced during the trip.