research poster design

Designing effective research posters: How to successfully communicate your science through conference poster presentation

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Research is meant to leave the lab, without dissemination, research never really happened. There are a few different pathways research can take when leaving the lab. In most cases, the first step is through some sort of presentation, either a talk or a poster given at an academic conference, in your scientific field of study. The second and more permanent way is through publication as a paper in an academic journal or as a chapter in an academic book.

The focus here will be on the academic conference as a venue and the poster presentation as the medium. If you have ever been to an academic conference you know they are unique gatherings that attract a bunch of socially-awkward scientists that want to tell you all about

their most recent findings. Faculty usually go to mingle with their colleagues, drink, and travel to a location that is more exciting than their hometown. Students attend conferences for many of the same reasons, but also to network, build their CV, gain experience, and grumble to anyone who will listen about their experiences in their graduate program.

Conferences

Do you remember the last conference you attended? If you do, the poster session was most likely held in a large, hot, crowded room where you and your fellow presenters stood side by side while others strolled down your very own “lane of science” quickly looking right and left trying to find a topic that somewhat interested them. You were probably also nervous and hungry, I mean why not add insult to injury. You need to remember all of these environmental details when you are designing your poster. Your poster needs to be eye catching, clear, concise, and aesthetically pleasing. You are in a competition for attention, and putting yourself in the shoes of your viewer will help you design a poster people will want to stop and talk to you about.

Great Posters

Great posters are well organized and visually appealing; they show, but don't necessarily always tell the viewer, information. Remember, it's a poster… a giant piece of paper that you can put pictures, figures, and graphs on to tell your story, so utilize these elements to your benefit. Great posters are interesting to a diverse audience. I know you think everyone should be interested in your work (I mean why wouldn't they be, you are solving the world’s problems, aren't you?), but sometimes people need a little coaxing when it comes to convincing them they should be interested in your research. You should make it a point to create a poster that is easy for just about anyone to understand in under five minutes and one that is a positive reflection of you, your work, and your affiliated lab, university, or institution.

It might sound like an easy task, creating a great poster, but once you get into the nitty gritty of designing a research poster, you might succumb to a handful of bad habits that naturally occur when telling someone about your life's work. I call these bad habits the "sad six". Horrible posters are...

(1) unorganized.
(2) cluttered; remember, you want your viewer to ENJOY their experience, so make your poster easy to navigate.
(3) extremely confusing to those outside your field of study (I'll talk later about knowing your audience).
(4) filled with superfluous text. Remember that in addition to your wonderful poster hanging on the board in that hot, crowded room, that you yourself are also there to TELL the viewer about your work. Don't fill your poster with so much text that *you* become redundant. Most people would prefer to sit back, relax and listen to you tell them about your work while they look at pretty pictures, than to read thousands of words, in too small of a font, while inebriated.
(5) picture-less, posters without pictures suck, they're boring, and usually lead to people walking right past you and on to prettier posters.
(6) embarrassing to your colleagues, your school, and your lab.

Where to Start?

OK, so you're sitting in front of your computer ready to be creative. Where do you start? First, let's talk software. Most people know if they are a Mac person or a PC person, it doesn't matter which platform you prefer to use, both offer great software for getting the job done. The majority of students I come in contact with use Microsoft PowerPoint to design their research posters. This is a great program that is available on both Mac and PC

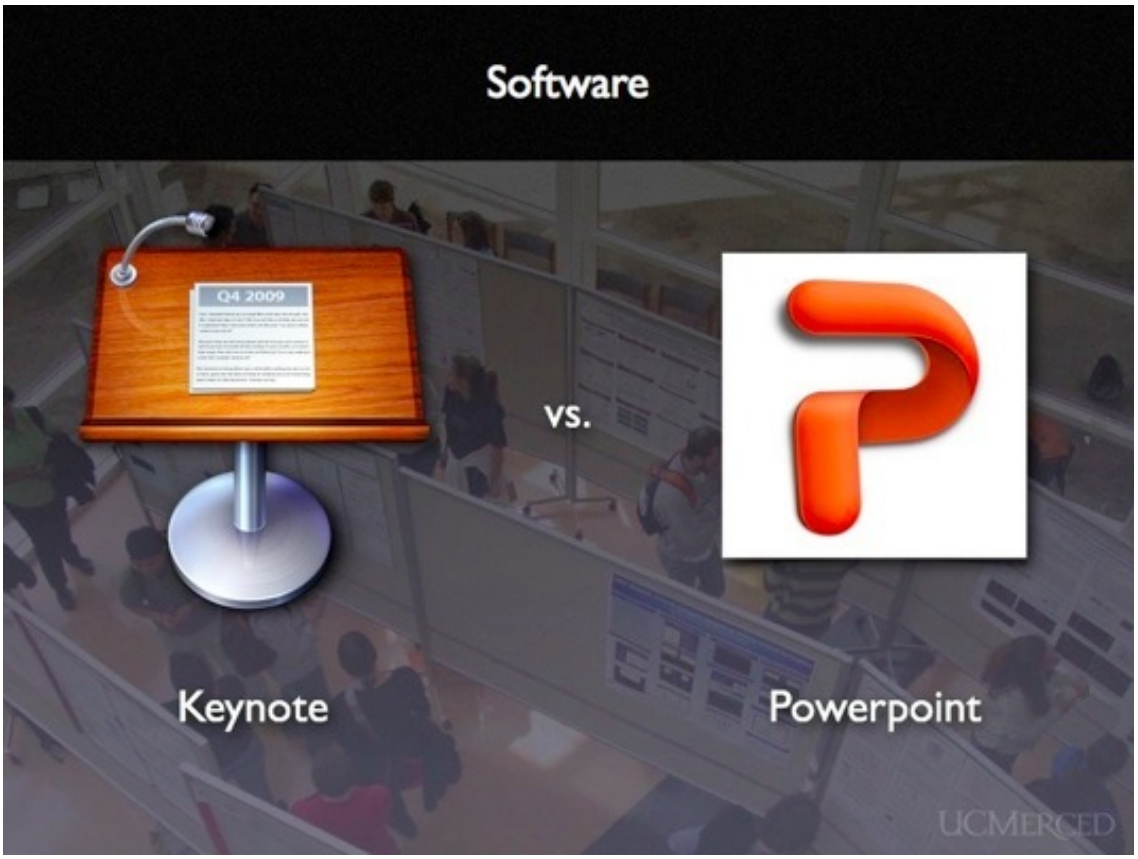
platforms. It will allow you to manipulate text, photos, graphs, and figures as needed to create a visually appealing research poster. Another great piece of software is Apple's Keynote presentation program. Similar to PowerPoint, this software package too is great if you are a Mac addict at heart. Both programs allow you to incorporate all of my tips and tricks when creating a poster. So, let's start talking shop…

Software Specifics

I prefer to use either PowerPoint or Keynote and create one GIANT slide. You can do this in the settings of the program and customize your slide size to match your printer's capabilities as well as your conference's guidelines. In my field (Cognitive Science) our poster boards are usually shared by two presenters who each get a space that is 4 feet wide by 4 feet tall. This size is also usually compatible with large format printers (or plotters) that universities usually have specifically for poster printing.

After setting the slide size, you might want to configure your program to use either the RGB or CMYK color palate. If your poster will be photo heavy and color accuracy is critical to telling your story, you might want to read up on using "printer profiles" to maximize the probability that your poster will print with accurate color. Most large format printers are CMYK printers meaning they print by mixing four colors: Cyan (blue), Magenta (red), Yellow (yellow, duh), and Key (black). You can download specific printer profiles and install them on your computer so that when the time comes to print to a specific printer your computer will know how to exactly tell the printer how to mix colors for maximum color accuracy.

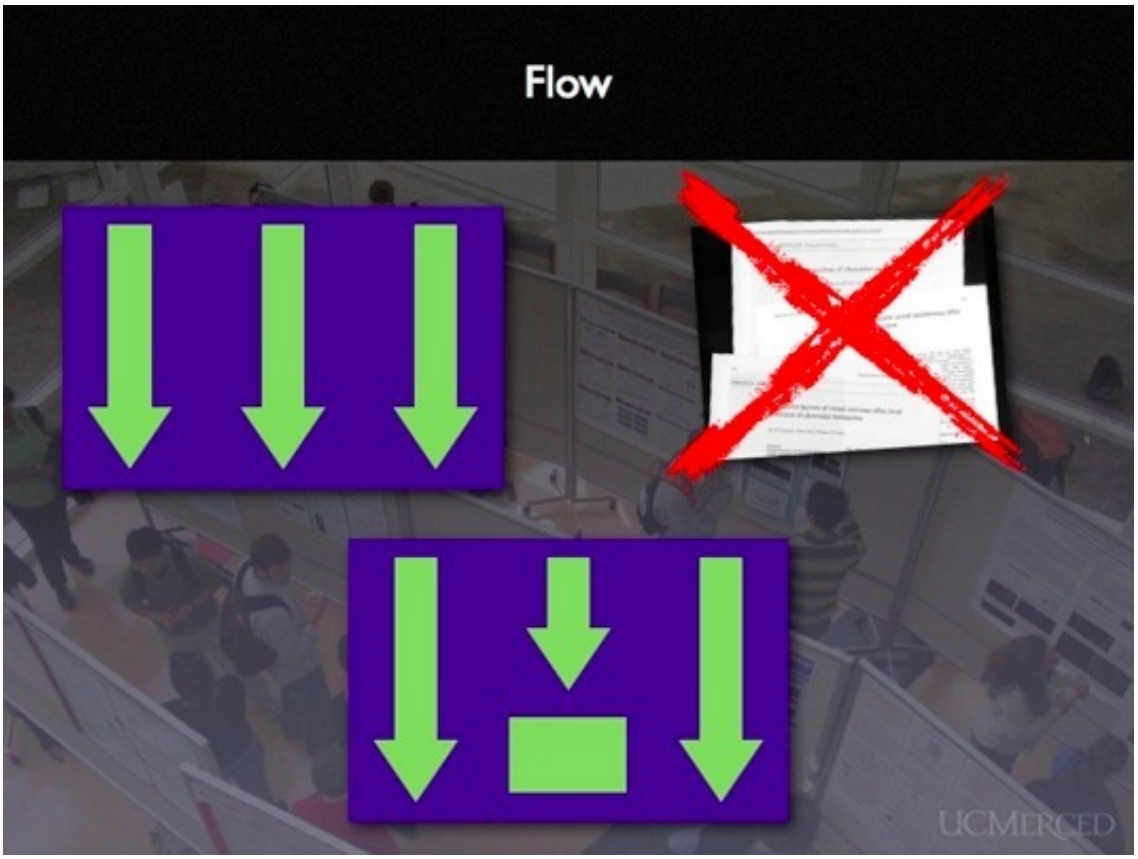
In addition to becoming familiar with color printer profiles, you might also want to become familiar with the procedures for exporting your final poster to Adobe PDF. Adobe PDF is a file type that is somewhat universal, meaning most computers can read the file, and the file is really good at preserving formatting information, fonts, and colors so if someone else, like your dearly beloved department administrative assistant (you should bring them chocolate and gifts, by the way), is printing your poster, their computer will most likely transmit your file to the printer in a way so it prints EXACTLY how it looked on your screen when you designed it. So, become familiar with exporting your final product to PDF and always remember to save, save, save throughout the entire design process.



“Flow”

Okay, Let's begin by talking about the overall layout or "flow" of your soon-to-be awesome, award-winning research poster. I like to think of a poster as a large canvas where you will tell a story. Now, in most of the Western world, we read from left to right, top to bottom, and this script or “schema" is very strong, hello we've been doing it all of our life. I would venture to guess that this would be a great way to layout a poster so it has a familiar feeling to the reader when they’re progressing through the information.

Typically, I start at the top left of the canvas and work my way down to the bottom right in a columnar format. I like to include four distinct columns in my posters and traverse, from the top of each column to the bottom of each column, while moving left to right across the entire canvas. This progression has a very natural feeling for the reader. It also serves another important function; as they read, viewers can move their body from left to right across the poster, making way for others to follow them without overcrowding the viewing area in front of your poster. If, by chance, you were to use one large column that spanned the entire width of the canvas, a person would need to visually scan, from left to right, multiple times as they encountered each line break. Also, extremely long lines of text are not very efficient, about 40 to 60 characters per line of text is a good rough estimate to make reading a pleasure.



Fonts

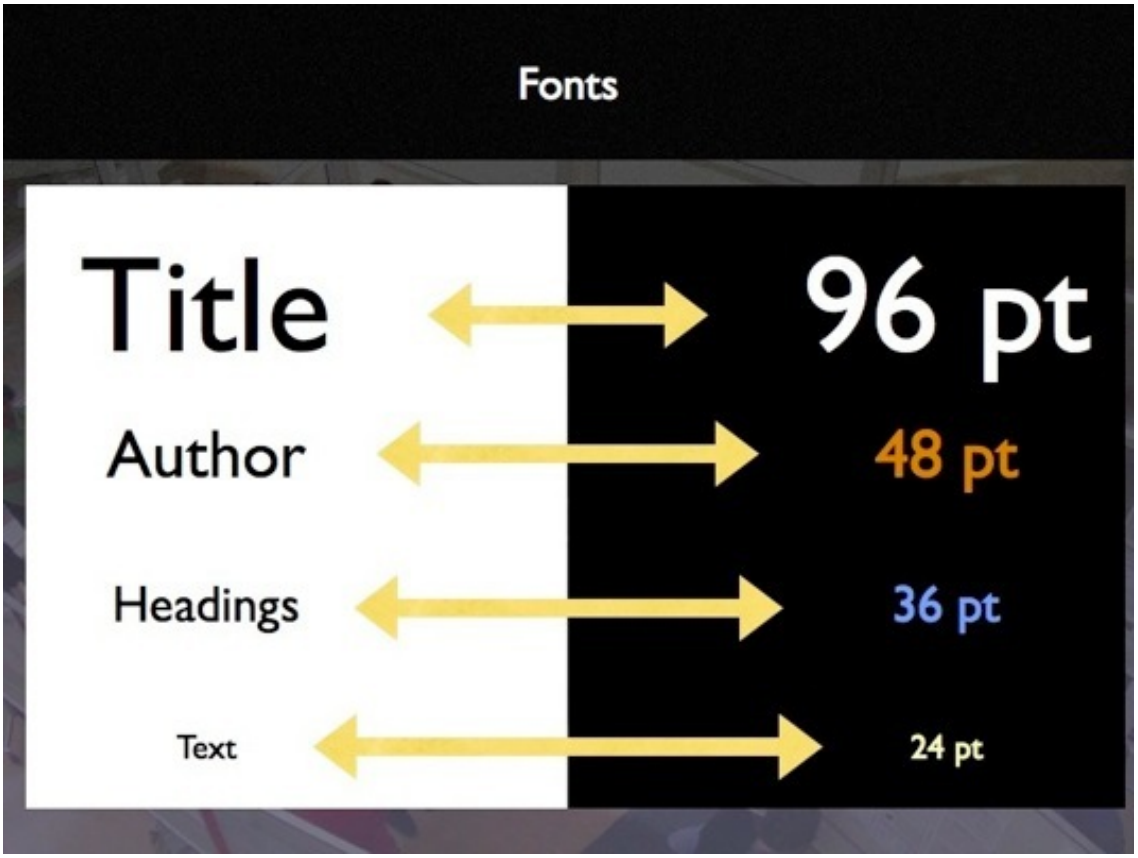
Let's take a quick moment to talk about fonts. Fonts are an important piece of the poster puzzle. Fonts have a lot of attributes that are customizable and customizing the correct way can dramatically improve your viewer's experience; do it the wrong way and you'll tend to piss people off, very quickly. Fonts can be customized with regard to style, color, size, and emphasis. Discussing each of these characteristics one by one will help you choose the best font attributes for your poster.

Fonts can be divided into two major styles: serif and sans serif. Serif fonts have little "wings" or "extensions" from the edges of the letters that add a little bit of style or grace to each character. Sans-serif fonts are just as their Latin root suggests, "without serif", they do not have the little wings or extensions on the corners of the letters. Many people find sans-serif fonts to be cleaner looking than serif fonts, and typographers (yes, they exist) will tell you that these two different font types are optimized for use in different situations. Use a serif style when your font is relatively small, within a block of text; use a sans-serif font when your font is rather large, like in a title or heading. Small fonts are easier to read with serifs, large fonts are easier to read sans-serif.

Also, with regard to style, choose a standard font that compliments your poster, avoid using fonts that are "CUTE", "whimsical" or "fancy". Any font can also be customized by changing its color. With color you always want to remember two things: what is the background color the font will rest on and what is the font color. These two colors should contrast each other well so that the words that the font is conveying are easy to read. Avoid the following horrible combinations: yellow font on a white background, blue font on a red background, and red font on a blue background. Stick to dark colors on light backgrounds and light colors on dark backgrounds. Remember, contrast is your friend.

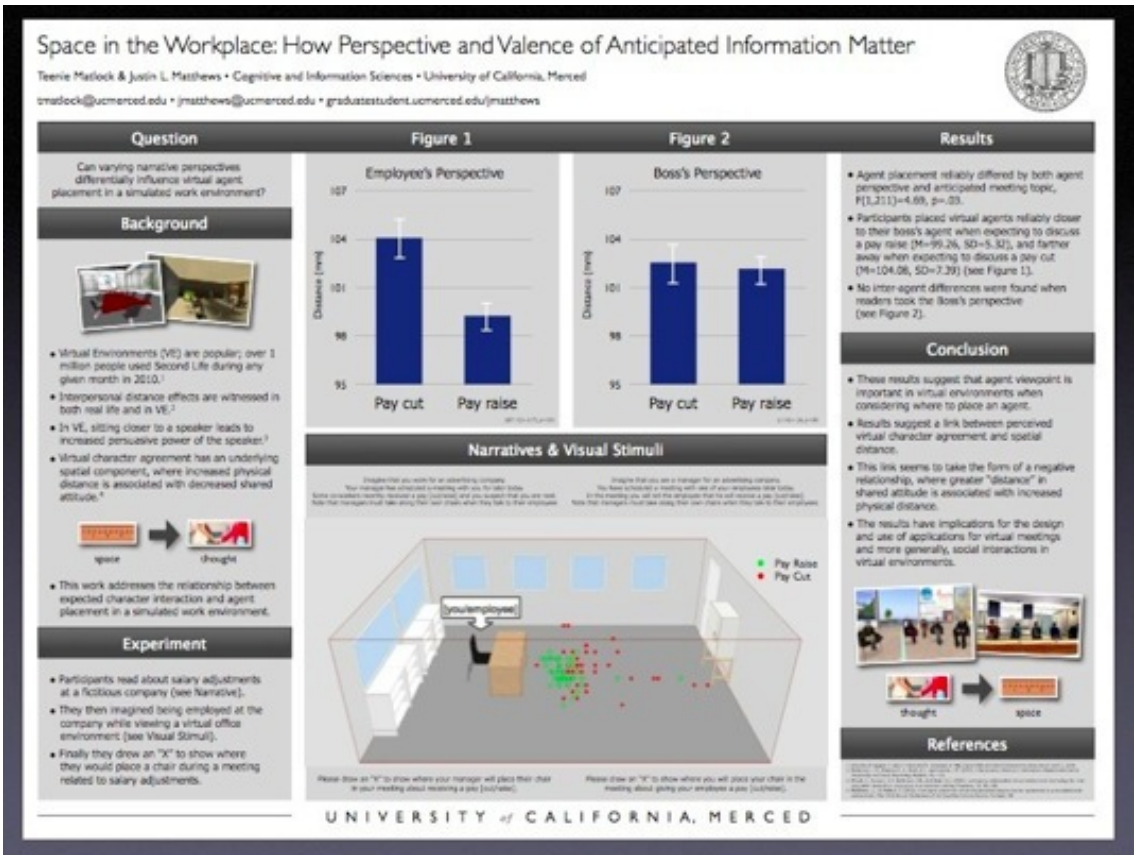
Font size can help draw your viewer's eyes to specific parts of your poster with ease. Use font size to convey importance and guide the reader's eyes. The following are great recommendations for size guides: title = 96pts, author/institution line = 48pts, section

headings = 36pts, and finally something around 24pts for the body text. Do not regularly use any font that is smaller than 24pts (except for acknowledgements and/or references, as discussed later). The last part of the font you can customize is emphasis. You can emphasize a word or sentence by using a bolded or italicized version of your font. Try to avoid underlined text in a poster, it tends to crowd your precious white space.



Elements

Next, let us discuss the individual elements that will come together to create a great research poster. Now, you might be tempted to follow in the "manuscript" footsteps and begin your poster with an abstract summarizing your research findings. I would encourage you to nix the abstract entirely. If you think about it, your research poster is a short, to the point, explanation of your research project, do you really need a short, to the point explanation, of your, short to the point poster? No. If the conference organizers require you to include one, minimize the space it takes up, then kindly write to them and tell them that it's inclusion is useless and a total waste of space. I would consider including the following sections in any research poster presentation: a title and author line, some background, your research question(s), a description of your methodology, a summary of your results, a discussion about your findings, a list of references, and a place to acknowledge those who helped you along the way, I'm sure there were a few. Let's talk about each of these sections one by one.



Title

The title is a very important piece of information that viewers will use to decide whether or not they will talk to you about your research, therefore, word it carefully. Since it is the selling point, a title should be somewhat catchy but also simple and concise: "You don't want people to walk up to your poster and stand there for a few minutes trying to read your title while they decide whether they should stay and read the rest of your poster or go and get another drink or maybe go to the next poster that has a shorter title, or the bathroom, oh my god this is taking forever. Ugh." See, that was painful, don't be the person with the long title that takes too long to read. I hate them and so should you. Sometimes, people use a semi-colon to break their title into two pieces, first a piece to intrigue the reader, and a second piece to really tell the reader what the research is about. I don't mind the semi-colon, but remember, if you choose to use it, check to make sure you are not lengthening your title unnecessarily.

Background

All posters need a bit of background or introduction to acclimate the reader to the topic at hand. This section will probably be the first section of your poster and it should be written to bring the reader up to speed. Now, remember that you most likely will be standing next to your poster, so write this section with that in mind. You will be there to guide the reader, so bulleted sentences that drive home the main ideas are ideal. Resist the temptation to write an entire paragraph for this section. Tell the reader any influential work that led you to your research topic. This is also a great place for a photo or figure to show the reader that your work is interesting and worth their time. When using photos, go for broke on the resolution. When you print your poster it will probably be a lot larger than it looks on your screen and you don't want the photos on your poster to be pixelated or looking like they were taken with a cell phone camera from the 90's (did cell phones even have cameras back then?).

Research Question

Presumably, you are at this conference, presenting your research because you set out to answer a specific research question, and you now have some sort of answer that you, or more likely, your advisor, thinks merits a poster presentation. Here is the place to tell the reader your question(s). State them in everyday, simple language that will help anyone relate to the issue. Remember, you are at a conference that attracts a variety of people, even if they are all in your superordinate field of study, break it down for them and appeal to simplicity. You might want to emphasize your research questions by *italicizing* or **bolding** them, so they stand out.

Method

The next section that is typically included is the method section. That's method not methods. Refrain from getting lost in the details. This is not a manuscript, and no one in their right mind will attempt to replicate your work by remembering what they read while standing in front of your poster a little wasted. Remember, you can always send them the paper at a later date (if you ever finish writing it). Again, pictures and diagrams are your friend. It is much more pleasant to quickly look over a flow chart describing a series of events than it is to read about those events unfolding in sentence form, that's booooooring. Also, I hate to belabor this point, but you will be STANDING right there, so if a visitor has a question about a reagent dilution, an eye-tracker calibration routine, the stability of your carbon dating isotope, or which library in Calcutta you found your ancient manuscript, you will be there to tell them all about, in great, probably hugely boring, detail. They'll probably regret ever asking.

Results

After the method, you usually progress directly into the results section. The results section usually contains statistics so that people will actually believe what you're saying. Unfortunately, many people will not always be familiar with the statistics you used, don't hold that against them, not everyone can be as savvy as you. Use graphs and figures here to tell your story. Displaying data graphically has become way easier over the last few decades and there really is no excuse to not have a few nice graphs or figures that show your fabulous results. This is also a nice place to use bulleted phrases that tell your reader that widget group A was different from widget group B on some measure or constellation of measures. Keep it simple, and resist the temptation to explain "why" in this section, that is what the discussion is for.

Discussion

The discussion, ahhhh, the final section that tells everyone how important your research results are and what they all mean. You might want to restate your research question(s) or hypotheses here, then state whether or not they were supported or not supported. Remember, never use the word "prove". Ever. I mean it. Again, use simple everyday language to tell the viewer why your results are interesting by placing the findings in a broader context. This might require you to actually think about how your results fit into that bigger picture everyone is always yammering on about. Trust me, this exercise will be good for you, because that one curmudgeon professor (you know the one) will inevitably ask you the question anyway, so you might as well be prepared. Also, tell the viewer what is next? What are you going to work on now that this stage of your project is complete, well not complete, but you know what I mean.... ongoing.... for what seems like forever, or until you graduate.

References & Acknowledgements

Now we get to the two sections that tell your reader where you got a lot of your information, because I know you just didn't know all of it already. These sections also tells them who helped you along the way. We're finally at the references and the acknowledgements. For

the references section follow your field's standard citation format. I prefer to use a slightly smaller font for the references since most people don't read posters for the references. Of course, they have to be there, but you might as well minimize them as much as possible. One way to minimize them and prevent them breaking the flow of your poster is to use superscripts in text to reference certain bodies of work. Superscripts are those little numbers that sit slightly above a line of text like in math where the 2 sits when it's squaring something. Use consecutive numbers in text to refer to a numbered list in the reference section, this saves a lot of room on the poster, no more (Hickenlooper, Smith, & Longassnamenoonecaresabout, 1975) repeated multiple times, just once in the reference list. Full stop.

In the acknowledgements section, you should list the names of people who helped with the project. Resist the temptation to use a person's title (i.e. Dr. or Professor) just use their name, and if a person is an author, you don't have to thank them in this section, their name on the author line is recognition enough. You can also add grants or funding agencies that gave you all that cash here too (you know from all those funded grants you have).

Contact Information

Obviously, you will be there to guide your viewer through your poster and they are standing in front of it, but what about when they are back at their lab and they actually want to share, with you, an epiphany they just had? you're going to need to provide some contact information. Be sure to include your full name, your email address, your website address (if you have one) and maybe even a miniature handout of your poster or a business card with your information on it.

Oh, and one thing about email addresses… it's best to keep it professional and use your institution sponsored email address, not the email you use when selling your used items on Craigslist, you know the one… I think it's drunkenfool89@yahoo.com. Yeah, don't use that one. In other words, make it easy for them to contact you as well as respect you.

You

Did you shower this morning? I know that is a weird question but, believe me you'll at least want to shower prior to presenting your research at the poster session, you might even want to put on some deodorant... yes you, put it on. As mentioned previously, poster session rooms are notorious for being hot, loud, uncomfortable places, and you want to feel and look your best. Some of the people you see, might be interested in hiring you in the future, or maybe even serving as your graduate advisor, if you're an undergraduate student and you're planning on going to grad school (ahhh, ignorance is bliss).

While selling your research remember to stand up straight and look interested. If you're not interested, trust me, your viewer will share your disposition. Smell nice. This means take a shower and put on some clean clothes. If you are unfamiliar with the conference you are presenting at, ask a colleague about the conference's sartorial history. Is this conference a dressy casual type of event or can you wear sandals and jeans? Believe me, conferences vary with regard to fashion. If it's a super relaxed conference you might look out of place in business attire. If the conference has a somewhat highbrow fashion history, you'll look out of place and lazy in jeans and a t-shirt. Do your homework, ask someone who has been before.

When you are talking to your viewer, do just that, talk TO them, not TO the poster. No matter how much you talk to your poster it will not talk back, trust me, I've tried. Don't chew gum, wear sunglasses, or look at notes. You know this research front and back, act like it. Have the following statements prepared and committed to memory prior to stepping out on stage: a one sentence summary of your project (for those in a huge rush), a one minute summary of your project (for those who care a little bit more), and a full bodied five minute

spiel for those who are super interested (yes, they exist). Those three preparations will satisfy almost any person who you end up dragging, kicking and screaming over to your poster. Candy also works as a quick bribe.

Tips & Tricks

Now that we've gone through all the major sections of the poster, and I've reminded you to shower, let's go over my dozen tips and tricks that will make your poster that much better and maybe even win an award, since you're a cash-strapped student. Here they are in no particular order:

(1) Keep your word count low (< 600 total words).

(2) Use blank space! (Freely ignore your advisor's mandate to fill every square inch of your poster with crap. Your reader needs some "breathing room" while looking at your poster, remember blank space is their friend as well as yours).

(3) Stay away from ALL CAPS, use sentence case, it's easier to read.

(4) Keep line spacing or leading (if you're old 'skool') at exactly 1.0 (this ensures that any superscripts or subscripts will be protected from line intrusion).

(5) Visit your university or institution's communications page. Here you can usually find high quality versions of your institution's logo or branding. Don't settle for logos or branding you find through a Google image search, most of the time the resolution is too low for printing on a large poster.

(6) Use **Bold** or *italics* for emphasis, don't underline.

(7) Use sentence lists or bullets, not paragraphs.

(8) Choose your background color carefully. Remember to watch out for transparency issues that might arise with certain photos or figures, sometimes they require that the background be white, put a white box behind your problem figure if it's needed.

(9) Label all your figures, photos, and graphs. Make sure they stand on their own, and they don't require one to dig into the text to find out why they are on your poster.

(10) Avoid acronyms and industry jargon when you can. Remember to keep it simple.

(11) Make sure that your poster is readable from 6 feet away and that your reader can go from beginning to end in 5 minutes or less.

(12) Visit edwardtufte.com for some ideas on how to keep your graphs simple.

Hello & Thank You

Last but not least, I'd like to tell you about a phenomenon known in the Cognitive Sciences as the serial position effect. This phenomenon basically states that in any chunk of time where you are learning about something, listening to someone speak, or reading about something new, you'll remember things in the beginning and end of the session better than you will anything buried in the middle. Take advantage of this, make a good first