I invite discussion. Different fields have different cultures. I think the issues raised in this talk are universal, but I could be wrong. There may also be more than one good way to do a talk.

Scientific communication includes not just the papers you write but also the talks you give at conferences and departments. Talks are a prime way for you to highlight your achievements and a major contributor to the hiring process. Think of every talk as a job talk. The people you may want to hire you may be in the audience.

What should a talk do?

Show that you can communicate effectively

Show that you can choose important problems to research

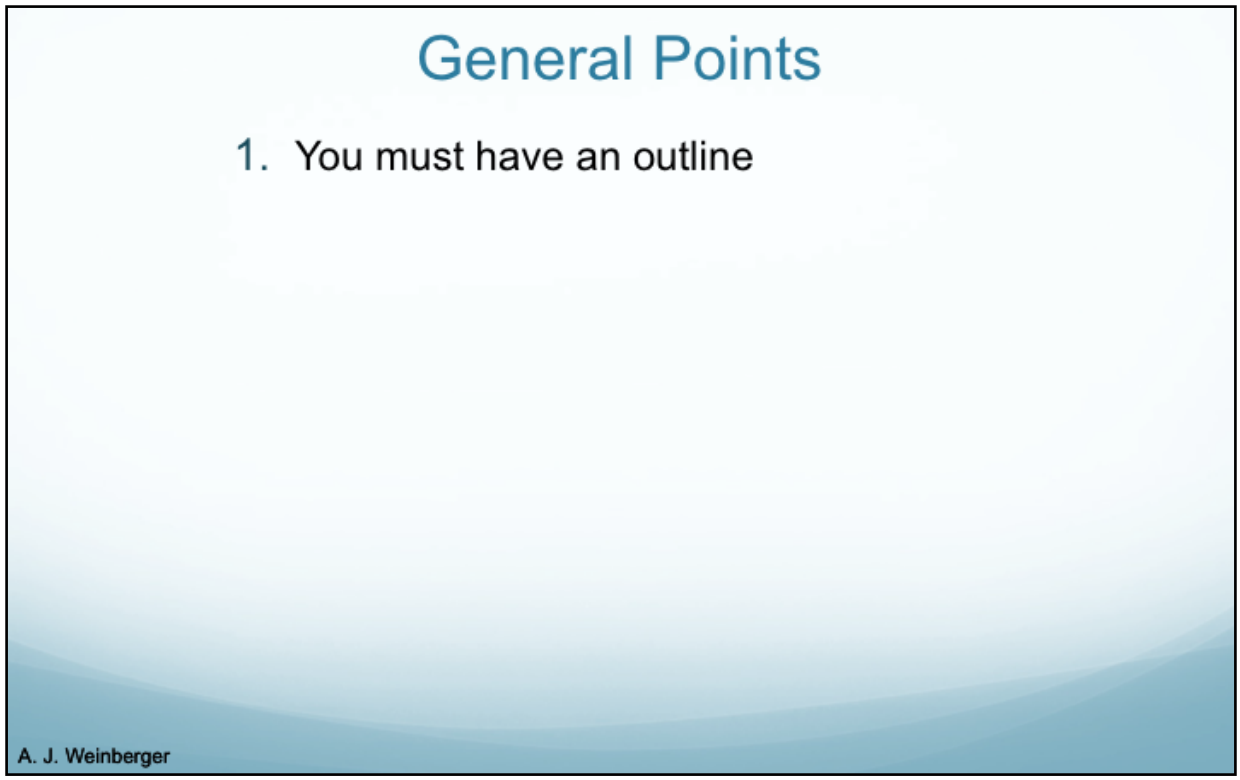
Show that you have a mastery of the big picture of your field

Show that you have a mastery of the details and techniques that you will bring to a department, i.e. present concrete results

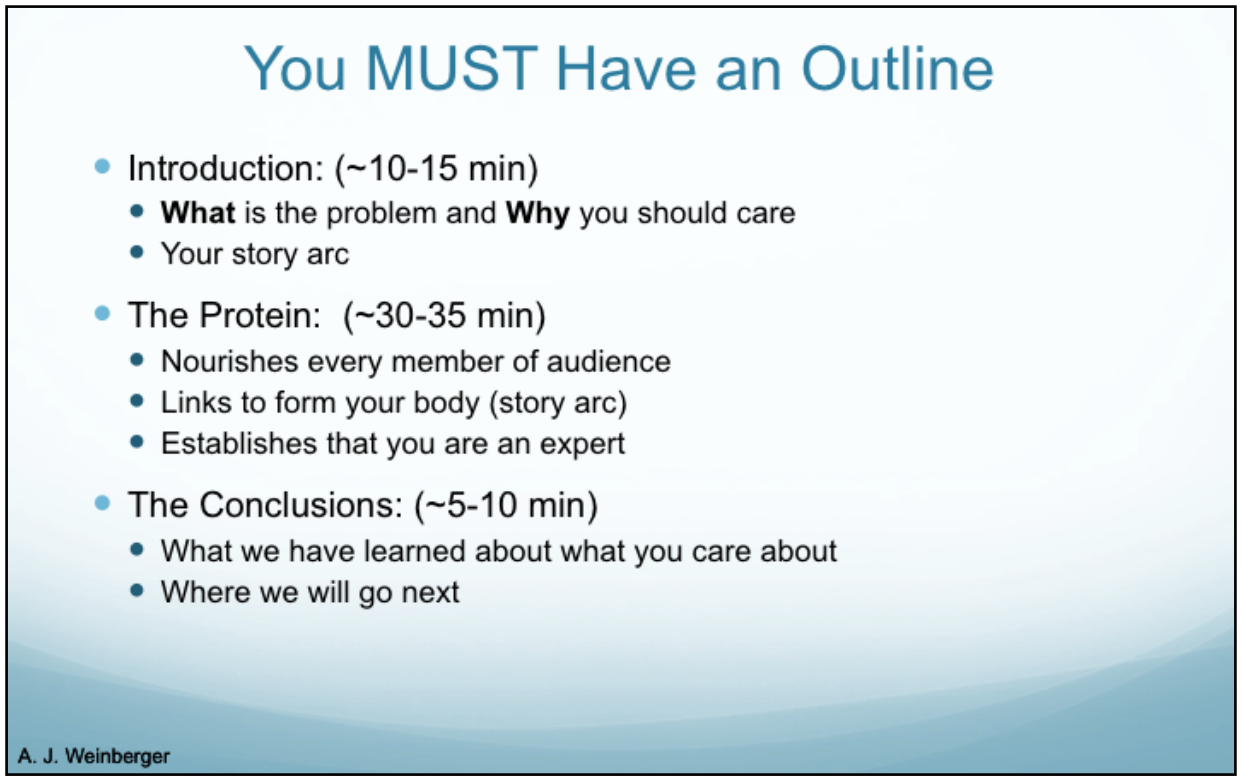
Convey that you have ideas, enthusiasm and creativity (qualities of a good scientist) in order to solve big things in the future

Teach something to every member of the audience

In my talk today, I will discuss 6 general principles that I think all good talks must follow. As part of this, I will show some specifics for how to design good visual that will enhance your research. At the end are some other resources to look at.



"In my talk today, I will tell you six general principles that I think all good talks must follow. Then, I will elaborate on how to design good visuals and I will discuss imposter syndrome as it relates to talks."



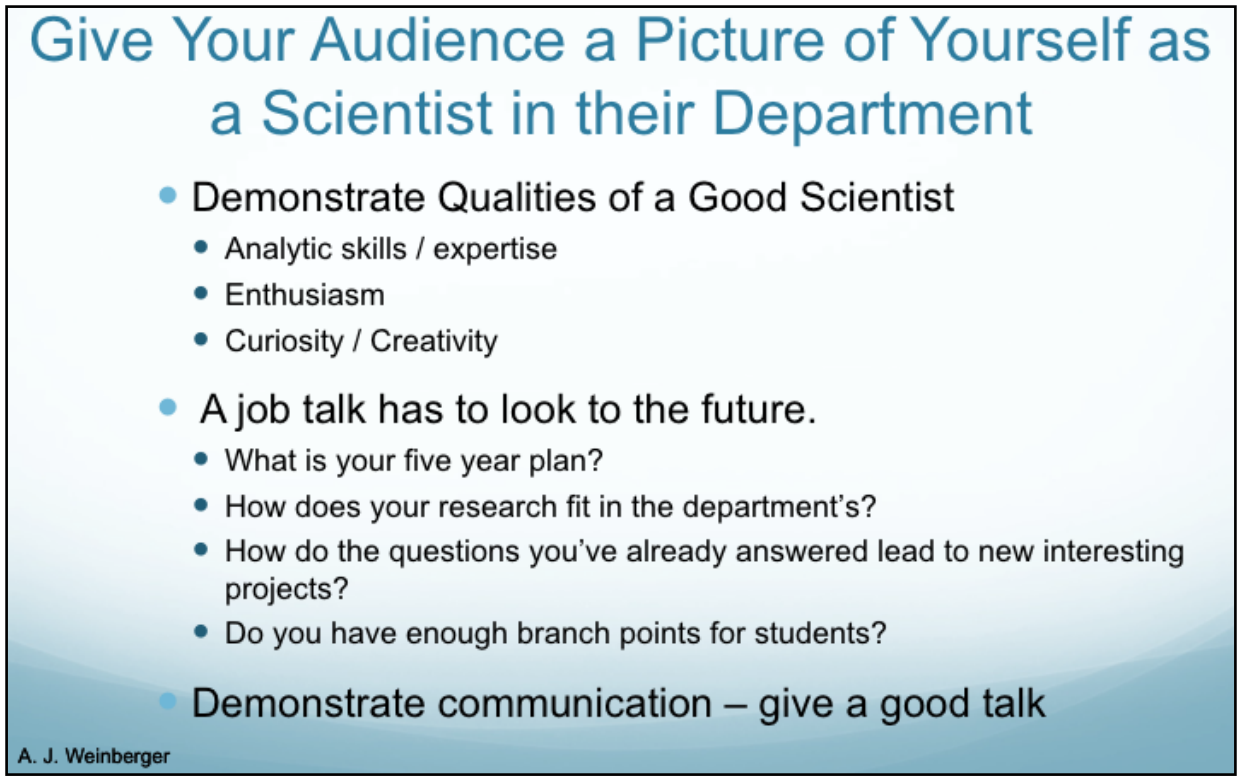
My first principle is that a talk must have an outline, which does not mean you have to show your outline to the audience. You must know what your talks' purpose is, so that your talk has an arc from introduction through the details to the conclusions. I'm not a big fan of showing an outline slide in the actual talk. I prefer to tell you my story arc verbally, as I did on the last slide:

Make your talk TITLE accessible and not so jargon-rich that it is intimidating.

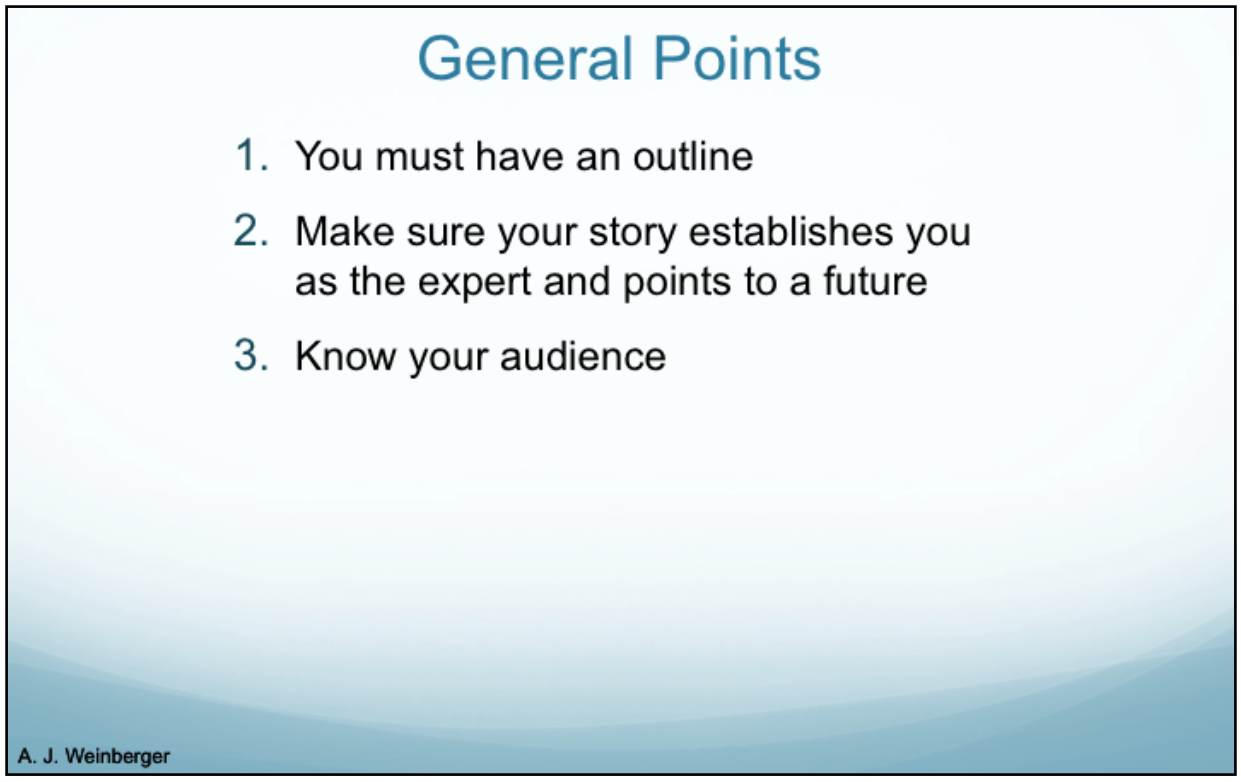
General Points

1. You must have an outline
2. Make sure your story establishes you as the expert and points to a future

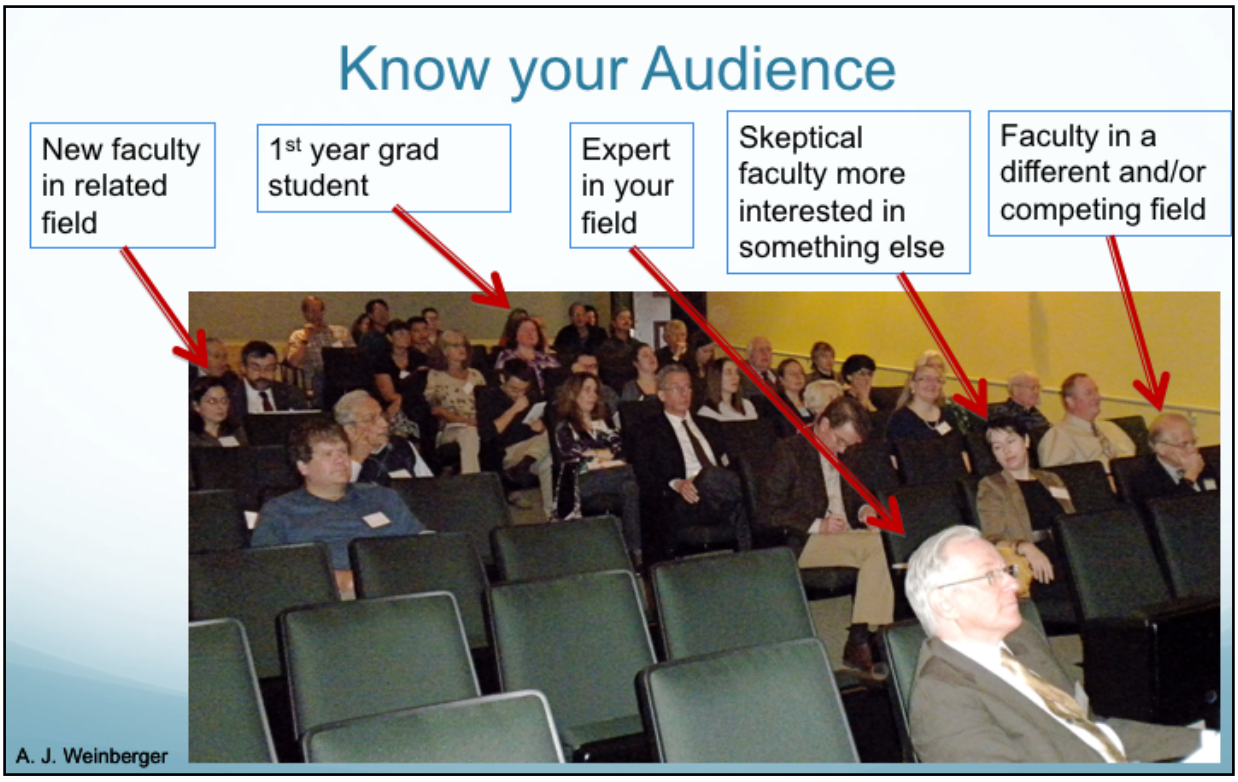
A. J. Weinberger



A job talk has to look to the future. What is your five year plan? How do the questions you've already answered lead to new interesting projects



DTM/GL are special in their breadth. I doubt there are many other places where astronomers and biochemists inhabit the same space. So, to talk to us, you need to be prepared for a room of bright people who are not experts in your field. But how many of you have seen a talk here where you didn't even understand the introduction? Yet, every speaker (DTM at least) is told to expect this breadth. Sometimes you will be giving a conference talk on a very specific subject. That may not need much introduction. Your job talk will likely be to a much broader audience. Most university departments, even if they're astronomy do cosmology and planet formation, even if they're geo-X, they may cover seismology and atmospheres.

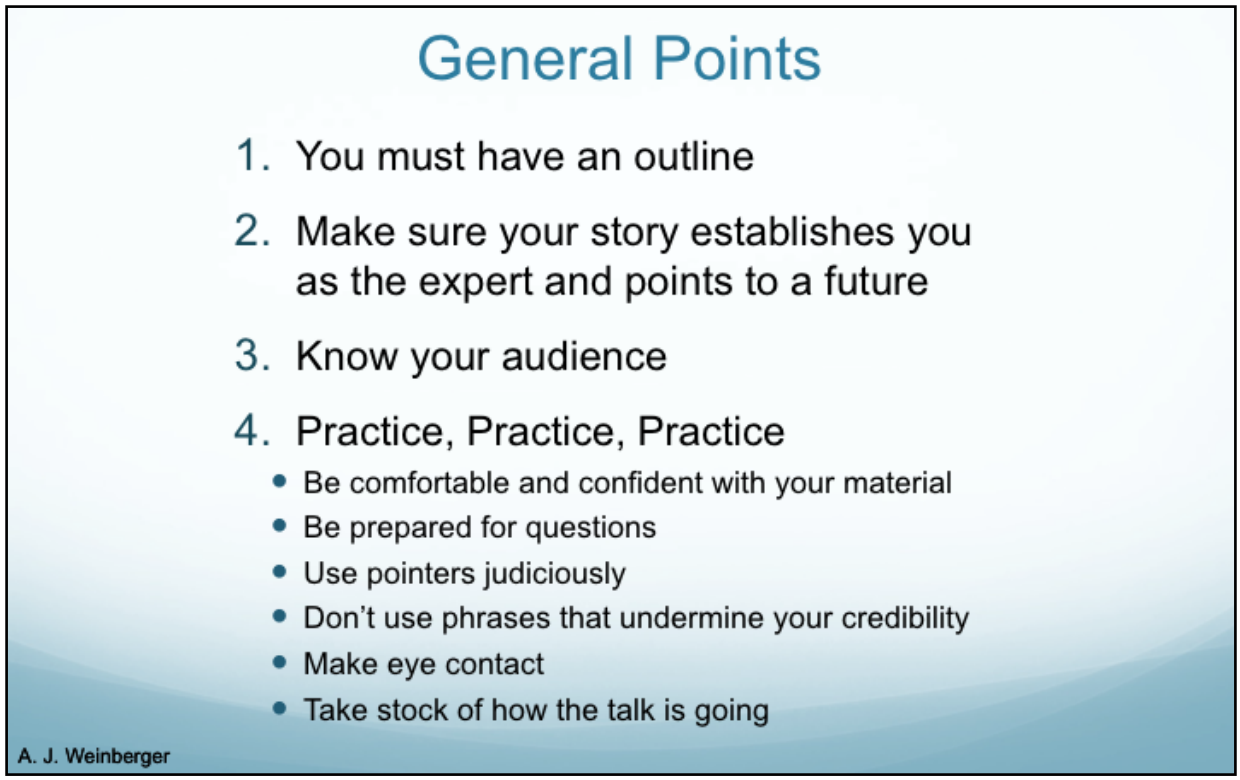


Neugebauer's (my thesis advisor) talk rule: Never underestimate how much audiences like to hear what they already know; it makes them feel smart.

In a full colloquium, you are NEVER talking only to experts in your field. Even if the department is purely astronomy, there will be 1st year grad students there and people who study something entirely different from what you do. You MUST convey why they should care about your work. Every single person should leave feeling smart and feel they learned something. So, yes, there must be some content detailed enough to satisfy even the expert.

Scope out your audience ahead of time via the department website. Be prepared to answer questions from the people you know inhabit that department.

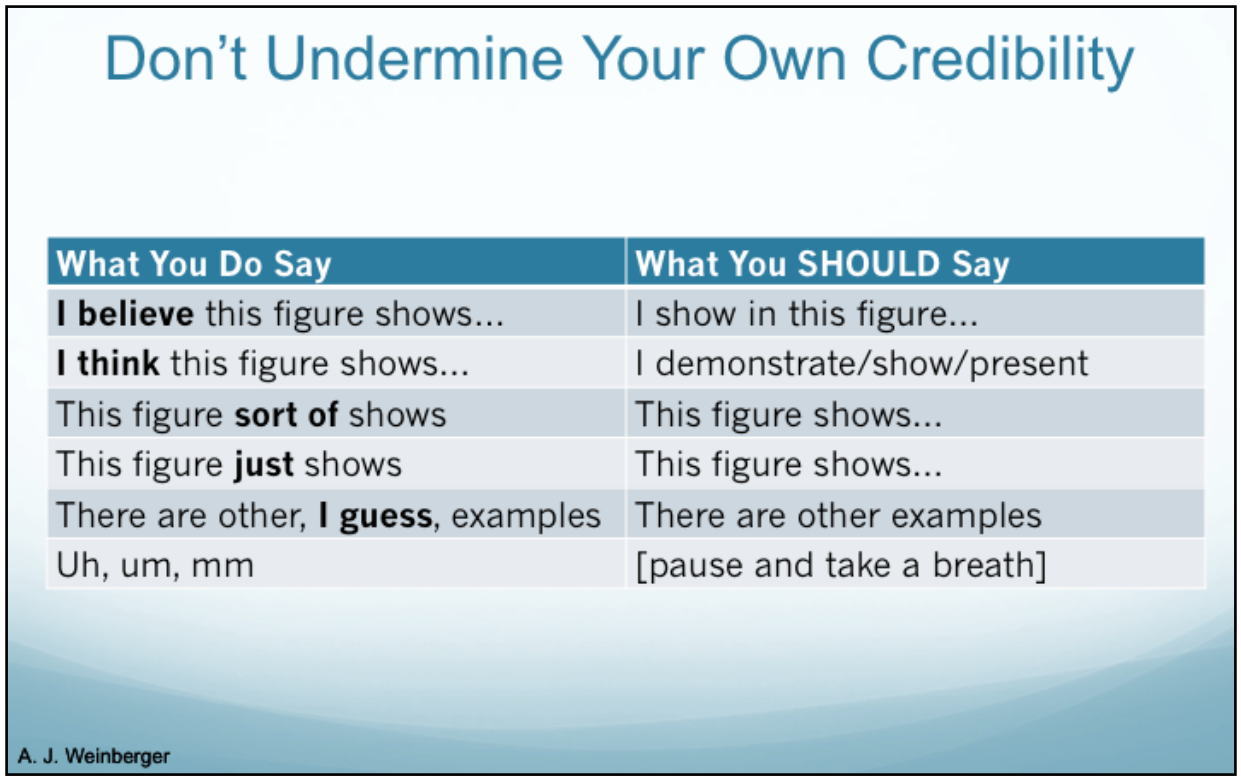
Prepare backup slides aimed at specific people in the audience who might want more details than you are going to present to the room as a whole. Anticipating questions with backup slides is a killer technique.



1. Practice. Know how long your talk takes. Once you're experienced, you will know how much time per slide. We'll talk about slide design later, but I like one idea and 1-2 minutes per slide.

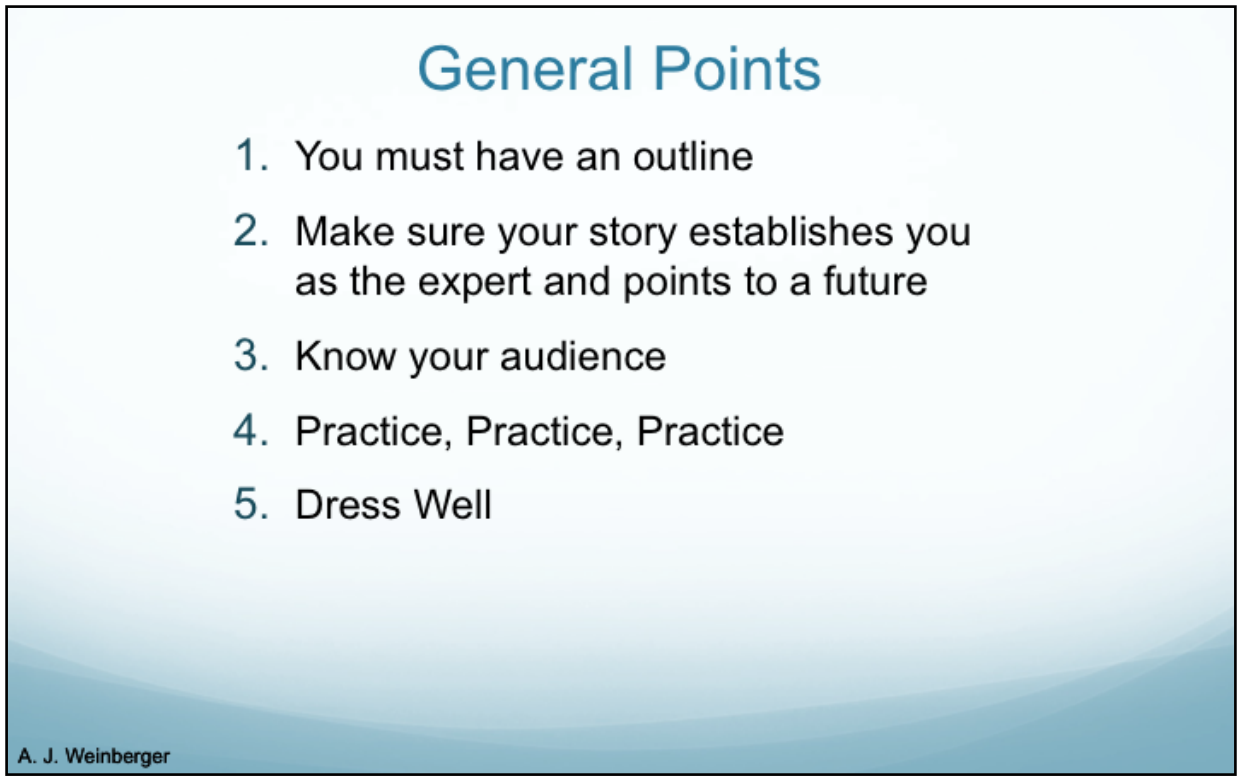
    1. I can not emphasize enough to practice, practice, practice. You MUST make sure your talk fits in the allotted time without your having to talk at lightspeed.
    2. Don't show figures you aren't comfortable with, like illustrations from the Web. Someone might ask you the details about them.
    3. Nothing says nervous like a wiggly pointer. Nothing blinds like a laser pointer aimed at one's eyes..
    4. Record yourself, and then try to take out all the "ummms"
    5. Practice for contingencies (see next point) such as if a movie or image fail to display properly; make backup slides for questions

2. Be prepared for questions
    1. Have backup slides with details
    2. Appoint an aggressive questioner at your practice talk
    3. Don't be dismissive in answering; show respect for the questioner
    4. If you don't know the answer, here are some strategies that came up in discussion: At least answer as much as you know to give the questioner some new information. Suggest where one might go to find the answer for the question (references). Admit you can't give a complete answer and offer to discuss the issue further later.



I too often see speakers use phrases that convey uncertainty rather than confidence. The one that annoys me the most is "this figure just…" You are presumably showing figures to make a point, whereas saying, "just" implies that the figure is not important. If you are dismissive of your results, the audience will be too.

I'm ignoring here my advisor's other advice: Never show a table.



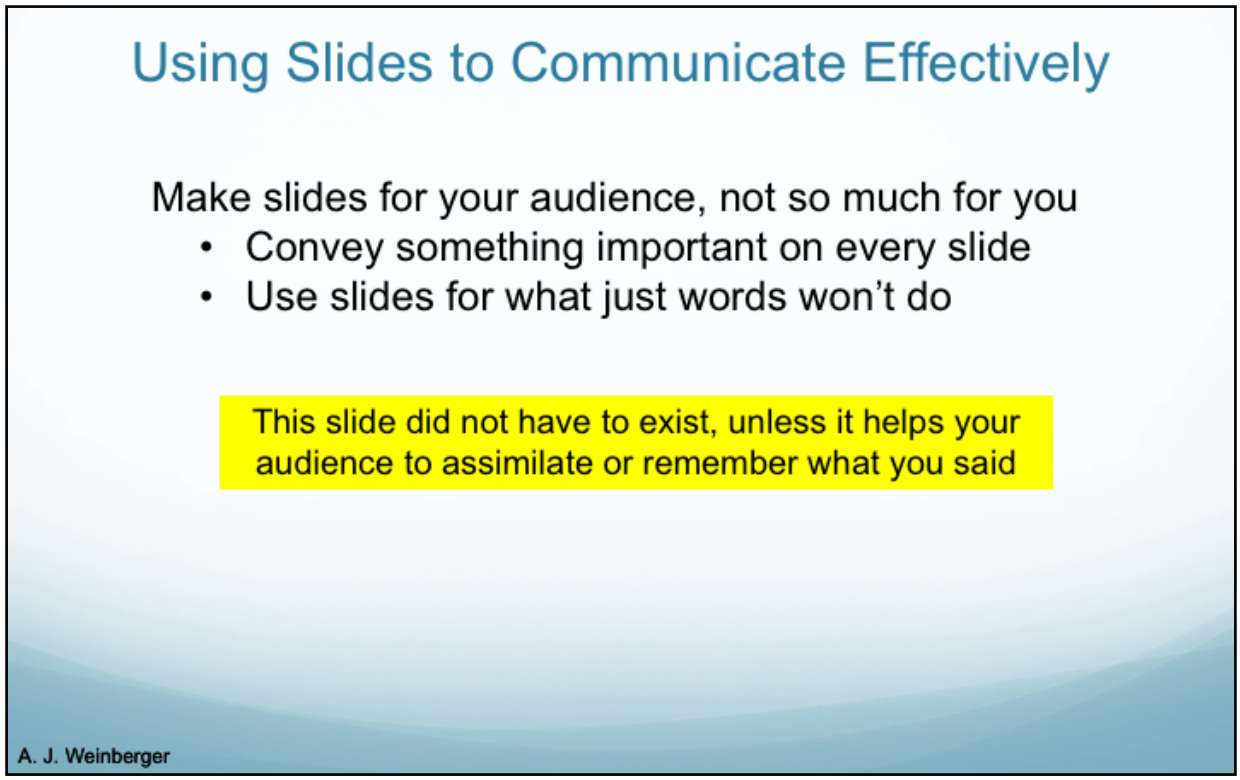
1.Your dress conveys a certain seriousness of purpose. My rule is to dress as nicely as you think the most nicely dressed person in the audience will be dressed. But don't make yourself so uncomfortable that it throws off your talk or doesn't allow you to take a campus tour.

2.It's handy to have a place to clip a microphone and a place to hook the microphone base. Jackets/blazers are great for this.

General Points

1. You must have an outline
2. Make sure your story establishes you as the expert and points to a future
3. Know your audience
4. Practice, Practice, Practice
5. Dress Well
6. Make good slides

A. J. Weinberger



What makes a good slide?

1. Conveys something important
2. Conveys something not so easily told or absorbed only if told, i.e. it is not just words or even mainly words. Every figure should serve a purpose, so should every word. Reminding yourself what to say is a purpose but not the best one. That's why I'm using this notes section instead!

A few notes:

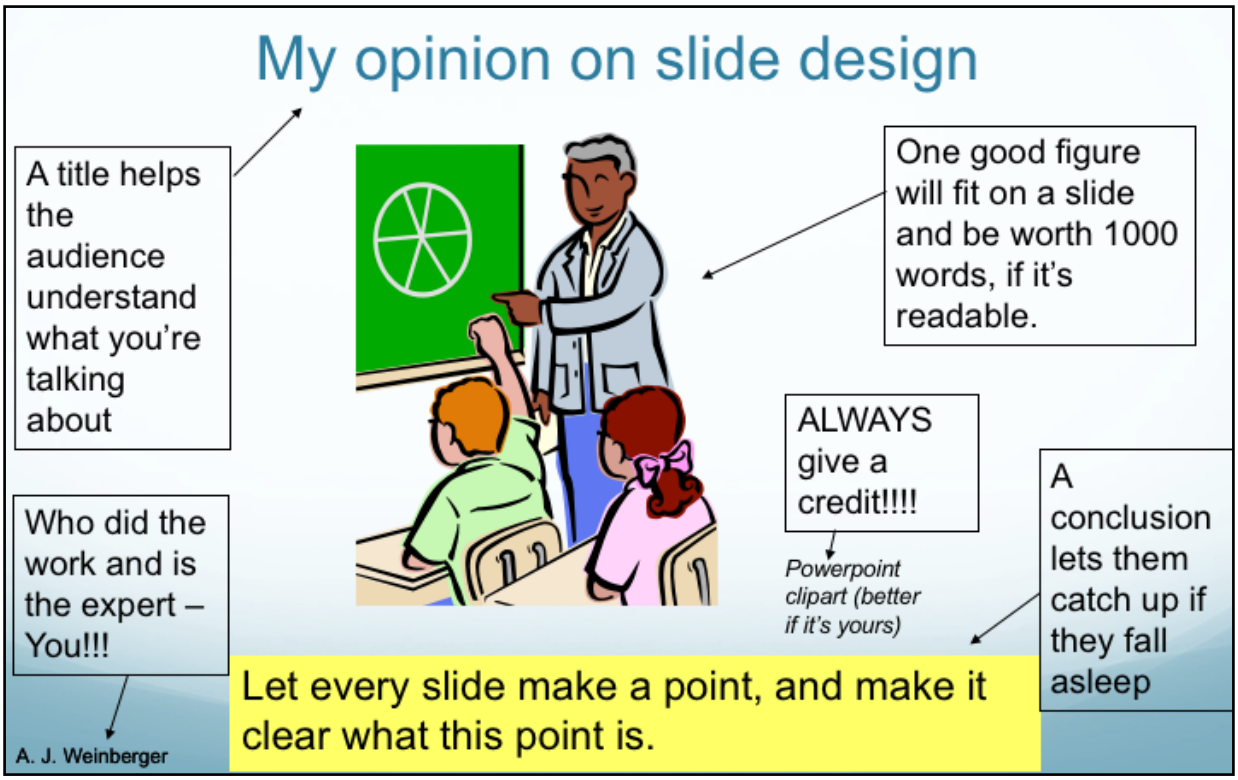
1. For maximum compatibility in PowerPoint, insert graphics, don't drag and drop; if you're worried, generate a PDF
2. Know how to copy your talk to another computer including movies if you have them

When you make slides, consider:

1. have you used projector/screen before -- will it cut off edges of slides / have enough contrast
2. Will you be able to see the screen
3. Aspect ratio of room

For my talks, 1 slide is 1 idea = 1-2 minutes

Non-native speakers may find some words helpful to assimilate the information.

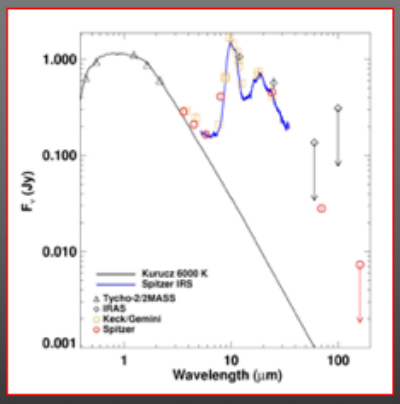


I like having a title that reminds the audience what we're talking about and a conclusion (in yellow) that reminds the audience what the point of this slide or section is. A nice figure that illustrates the point is necessary in a science talk, where we find data more credible than words. Other words may be added to give details to the cognescenti, as long as they can be made large enough to read.

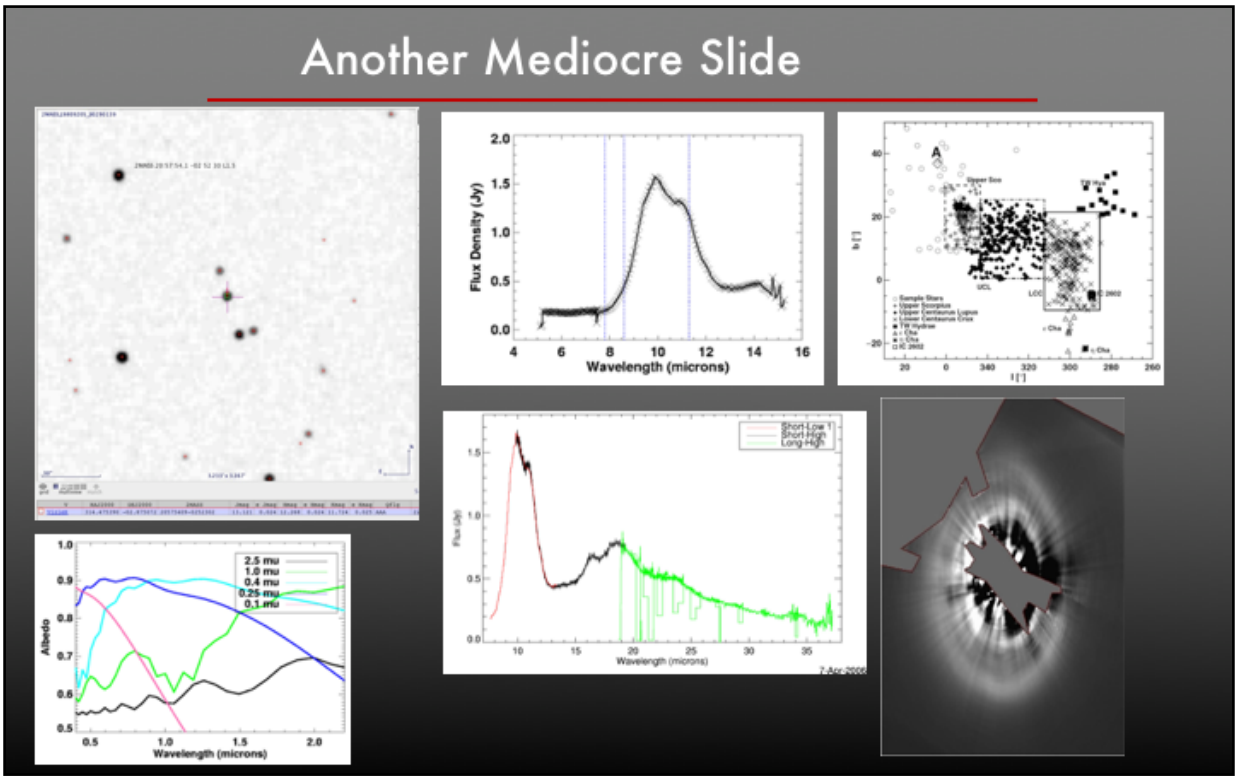
A Mediocre Slide

Infrared spectrum is unique

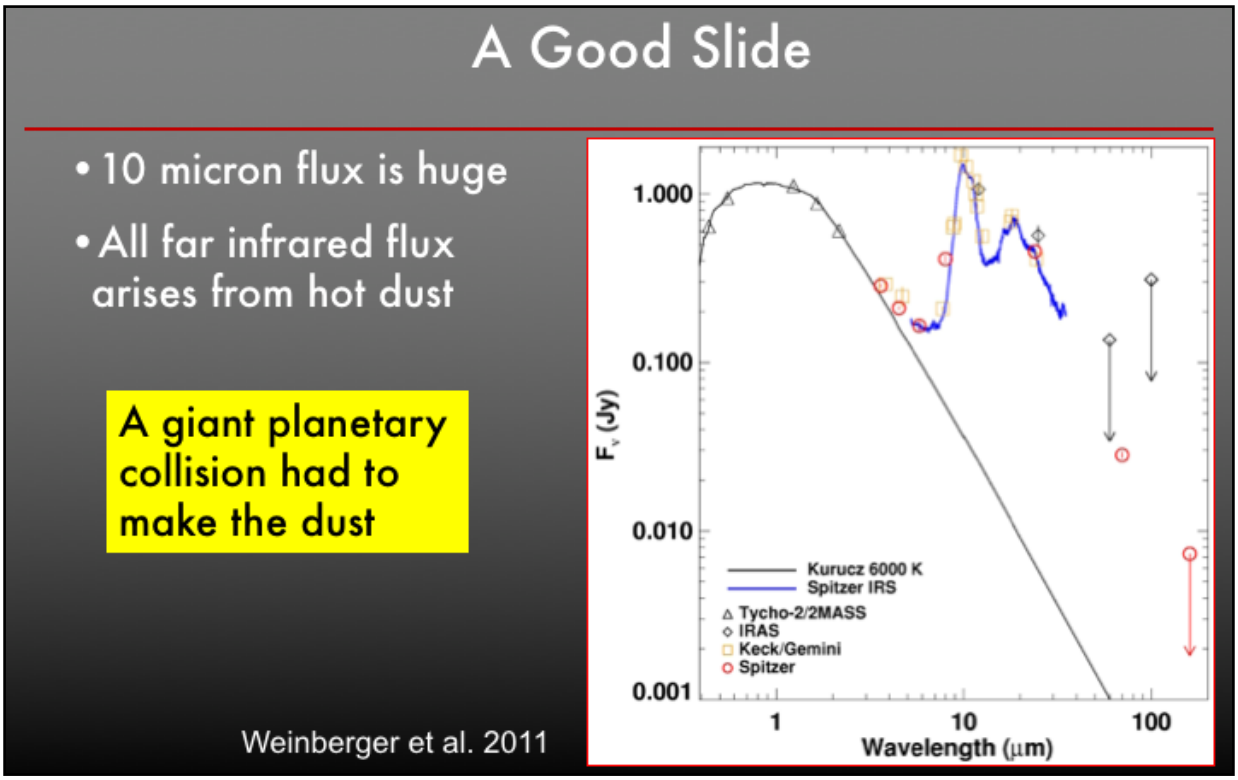
- 10 micron flux is huge
- All far infrared flux arises from hot dust



This is a slide I stole (in design) from a presentation on-line in order to make a point. Why waste all that space just showing off a gray background and a huge title area? Plus, the bullet points take up so much room, that the figure has to be made smaller (a particular problem with square figures, as Anat pointed out). Instead, make the figure bigger and easier to see and take off unnecessary words.



You're thinking – I'm going to impress my audience with all the different things I can do! And instead, no one can read anything and so they aren't impressed that you're presenting a muddle.

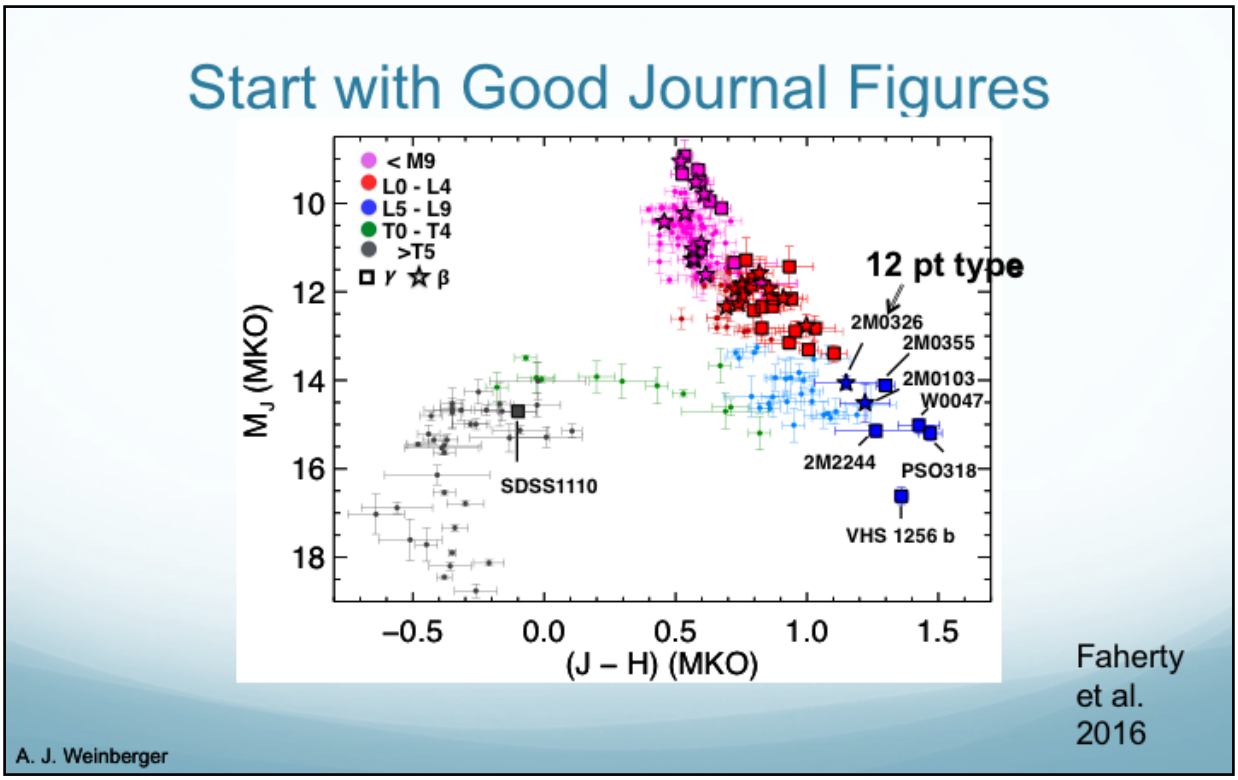


Here's my re-do of the slide. I preserved all the important text. I still don't like the white on gray as I think it's too hard to read.

----- Meeting Notes (10/28/11 14:21) -----

Dispense with the title? This allows you to make the figure bigger at the risk of eliminating helpful words to those who may not be paying full attention.

Don't overuse animations



Making labels bigger on figures in papers helps readability in your paper's PDF and also when inserted into talks. Note the before and after on this figure from Faherty et al. 2016, submitted to ApJ. 8 pt is unreadable and is even too small for a Journal. 15 pt is better.

Remember, you WANT others to use your killer figures in their talks too, so make it easy on them!

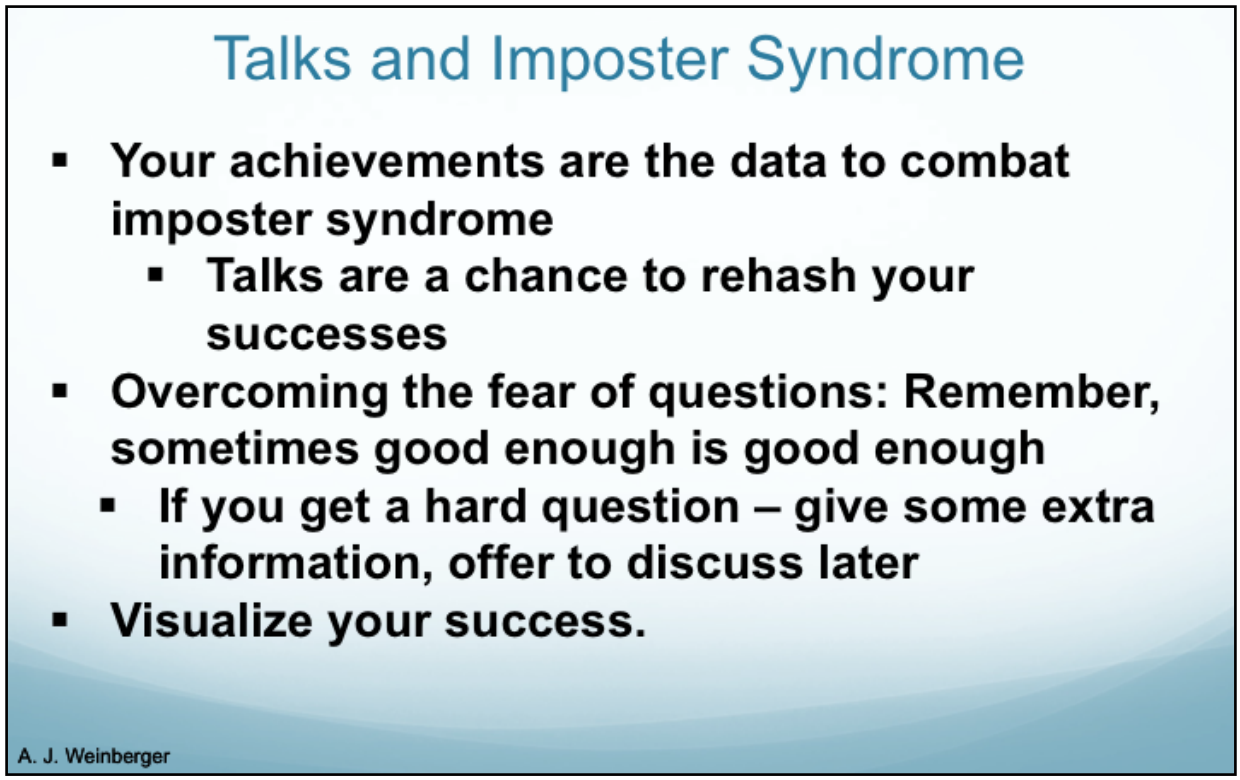
It's also important to know how to get a Figure at high quality. These were cut from a PDF viewed with Preview and then saved as PDFs. Saving them as JPEG or PNG files greatly reduced their quality. When it doubt, test your slides out on a projector! Also, you should know how to adjust the display resolution in case you need to do that to make the figures look sharp.

Screen Sizes May Not Scale with Room Size

V = (screen width / room length)

- Tuve
  - V = 6 ft / 35 ft = 0.17
- ACC
  - V(Screen) = 8 ft / 24 ft = 0.3
  - V(TV) = 5 ft / 24 ft = 0.21
- Greenwalt Seminar Room
  - V = 9.25 ft / 45 ft = 0.20
- AAS Ballroom
  - V = 8 ft / 90 ft = 0.09

A. J. Weinberger



Define Imposter Syndrome: the persistent inability to believe that one's success is deserved or has been legitimately achieved

Accompanied by chronic self-doubt and sense of being a fraud.

Imposter Syndrome Resources

"Tips to Overcome Imposter Syndrome" at https://www.uwhealth.org/health-wellness/tips-to-overcome-imposter-syndrome/52943

"Overcoming Imposter Syndrome" by Gill Corkindale, in Harvard Business Review: https://hbr.org/2008/05/overcoming-imposter-syndrome

The Secret Thoughts of Successful Women: Why Capable People Suffer from the Impostor Syndrome and How to Thrive in Spite of It, a 2011 book by Valerie Young

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BBR Library Resources

Provided by Shaun Hardy

See Library website: http://library-catalog.carnegiescience.edu/Presto/collections/BrowseContentCollection.aspx?ccID=NA==&iCatID=MjM= for 11 Books on Preparing Talks, Posters, and Graphics

Examples:

- **The craft of scientific presentations : critical steps to succeed and critical errors to avoid** / Michael Alley
- **Scientific papers and presentations** / Martha Davis
- **Dazzle 'em with style : the art of oral scientific presentation** / Robert R.H. Anholt
- **Preparing scientific illustrations : a guide to better posters, presentations, and publications** / Mary Helen Briscoe
- **Visual explanations : images and quantities, evidence and narrative** / Edward R. Tufte
- **Information graphics : a comprehensive illustrated reference** / Robert L. Harris
- **Visual strategies : a practical guide to graphics for scientists & engineers** / Felice C. Frankel & Angela H. DePace

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Useful reference websites:

Color Universal Design:

http://jfly.iam.u-tokyo.ac.jp/color/

"The Woman Physicist's Guide to Speaking" by Heidi Newberg (RPI):
http://homepages.rpi.edu/~newbeh/WIPcommText.htm

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Backup Slides

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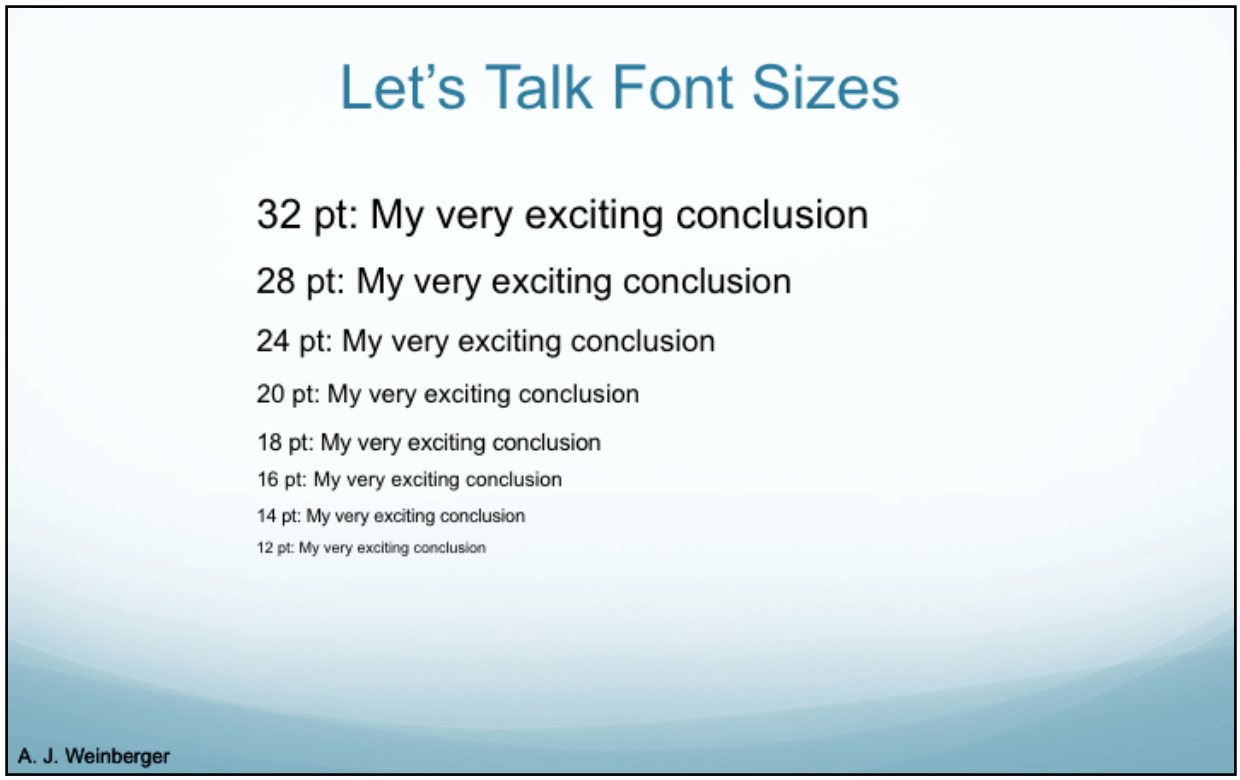
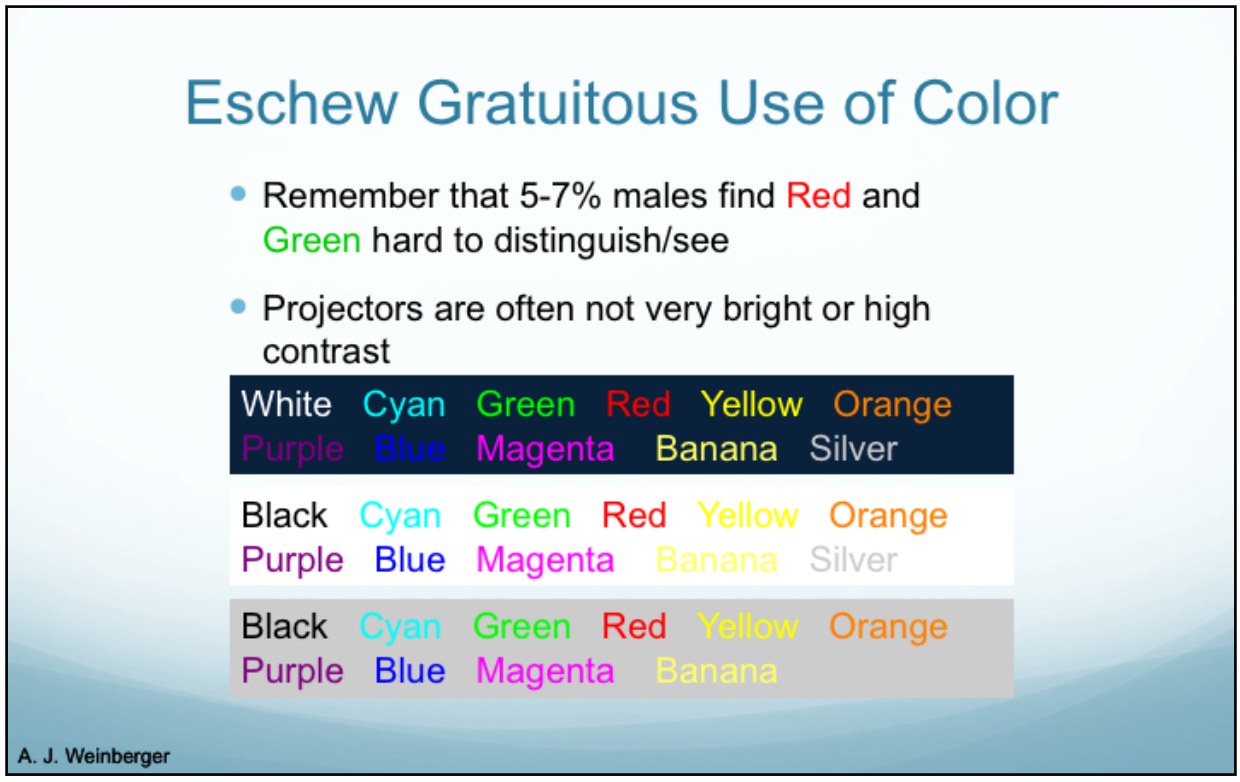


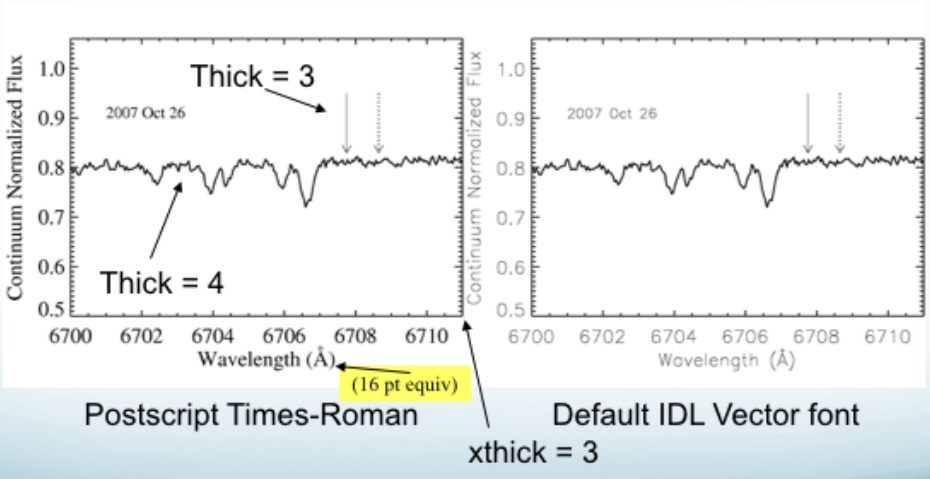
The consensus is that 20 pt is the minimum size you should use.

Also, it's nice to have your text arranged neatly (use align objects)



ROOM brightness and PROJECTOR brightness matter! Use high contrast.
For more information on how to make plots readable by the color-blind, see
http://jfly.iam.u-tokyo.ac.jp/color/

Use large fonts & thick lines



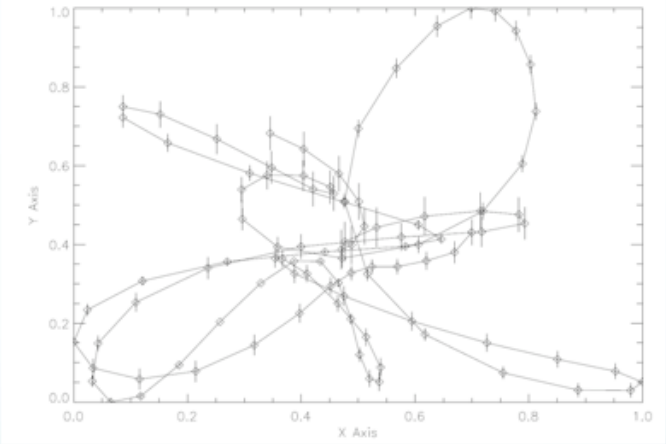
A. J. Weinberger

It's really hard to fit two figures on the same slide AND have the axis labels be a good size.

Thick lines really help!

Not so good

(Examples on these slides thanks to Larry Nittler)

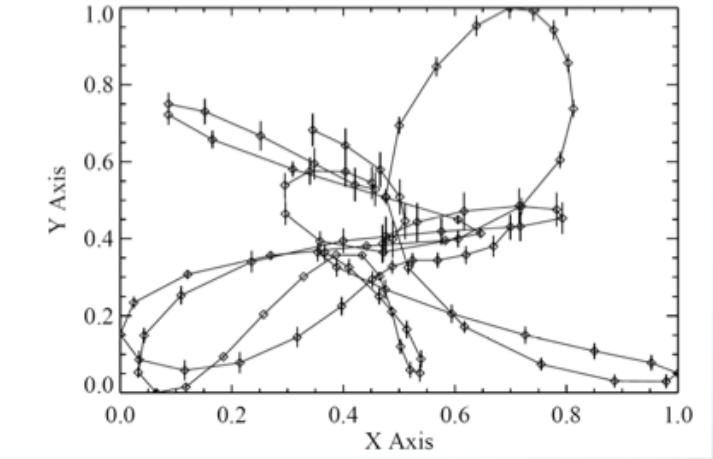


- plot,x,y,/nodata,xtitle='X Axis',ytitle='Y Axis'
- oploterr,x,y,yerr,3
- oplot,x,y,psym=-4

A. J. Weinberger

IDL commands that generated the plot are shown.

Better

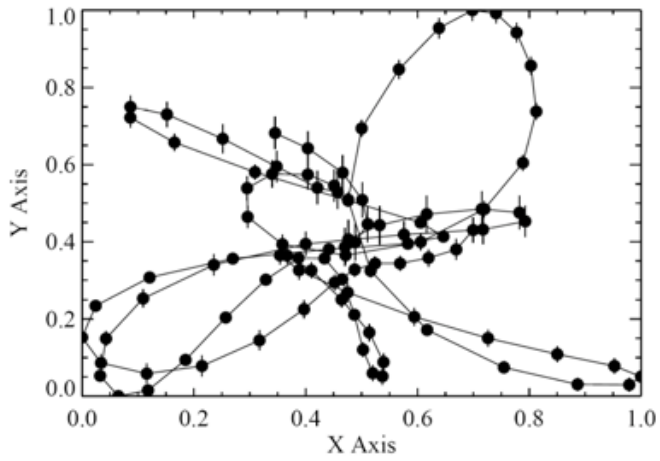


- !p.thick=3
- plot,x,y,/nodata,xtitle='X Axis',ytitle='Y Axis', charsize=1.5, xthick=3, ythick=3
- oploterr,x,y,yerr,3
- oplot,x,y,psym=-4

A. J. Weinberger

Changes from previous slide are shown in red.

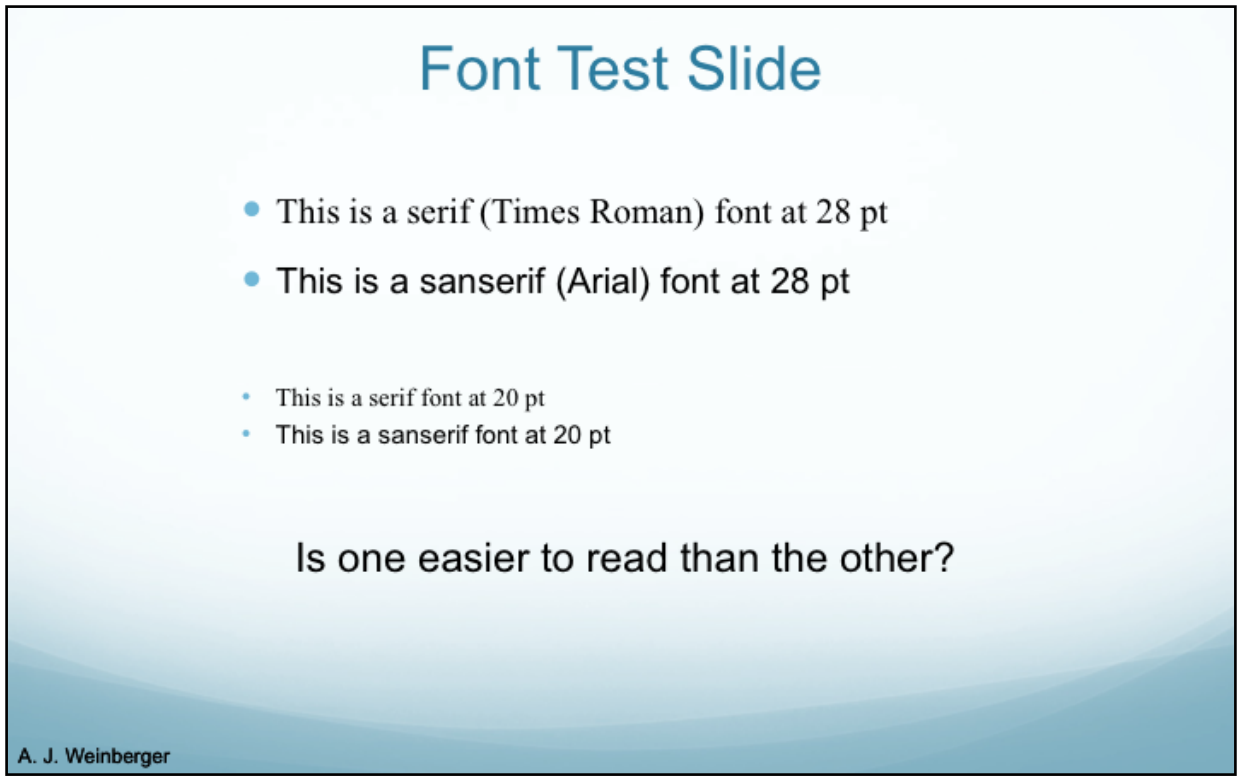
Best



- !p.thick=3
- plot,x,y,/nodata,xtitle='X Axis',ytitle='Y Axis', charsize=1.5, xthick=3, ythick=3
- oploterr,x,y,yerr,3
- oplot,x,y,psym=sym('cir',/fill), symsize=1.5

A. J. Weinberger

The only change from the last slide is the symbol, but it had the effect of making the whole plot bolder



I don't have strong feelings about this, but some people do.