Physics 440 (ILab) – Information for Initial Presentations

At the large conferences held by the American Physical Society, any researcher is allowed to present his or her results in a 10-minute oral presentation/talk. Many new experimental and theoretical discoveries are first made public in this way. These talks are usually given with the aid of viewgraphs or using Powerpoint. The audience does not interrupt the speaker with questions, but there is a short Q & A period at the end.

This is the model we will use for the initial presentations in ILab: A **10-minute talk**, given with the aid of transparencies or a projector, with questions from the audience at the end. Ten minutes is a very short time, and the trick is to successfully communicate the necessary points to your audience before the time is up.

On the following pages are suggestions for composing and delivering a good talk, and a form that we will use to evaluate initial presentations. We suggest you use this as a check-list as you prepare your talk.

1. The overall purpose of the initial presentation is to convince a friendly but skeptical audience (such as a funding agency) that the group is ready to carry out the project. This means that the presenting group has done background research, looked at the apparatus available, and considered (quantitatively) likely uncertainties. There should be clear evidence that the entire group participated in the preparation of the presentation. (In particular, instructors will ask if all members of the group pre-viewed the presentation.)

2. The presentation should make sense to any physics student at the senior level. No familiarity with the project or apparatus should be assumed.

3. Preparing good slides and giving a good talk:

It is essential to have good slides. They should be clear and pleasant to look at, but not overly flashy. Each slide should have *one* major point or theme with a few items or equations *in summary form*, or should have one *significant* graph or diagram. Do not put every word you intend to say on your viewgraphs. Here are a few good techniques for making viewgraphs:

(a) Prepare slides to help *yourself* as you present: they are very useful for reminding yourself of what to say (but use bullets or schematic notation, not prose). Many people feel nervous when presenting, but good slides can help enormously.

(b) Use a large, readable font (*e.g*. 20 pt). Beware colored text, especially red or light colors. Also beware text on dark backgrounds; it can be hard to read.

(c) Always provide units, uncertainties (when you have them), and labels on plot axes. Use proper format (*e.g*. 3×10^8 m/s, not 3E8 or 3x10^8.)

(d) If you use transparencies: you can print directly on the transparencies in grayscale with a printer, and/or by hand with (colored) transparency pens. For graphs or diagrams, photocopy onto transparencies and then use pens to add labels, headings, and a little color. Use photocopier to enlarge or reduce to make your transparencies more legible and to avoid chopping off the edges of graphs.

(e) If you use a laptop + projector: avoid unnecessarily flashy graphics. See ‘policies and procedures’ for additional requirements if you choose this method (*e.g*. paper printouts of slides).

(f) Equations: almost every ILab experiment (and perhaps every one) will require at least a couple of equations and a summary of a derivation. Equations can be awkward to include in Powerpoint, but you still must include them, either using equation editor or the like, by writing by hand and scanning a document, or by writing a transparency (which can be used in the midst of a Powerpoint talk). Do NOT plan on writing equations on the blackboard; this takes too much time.

Things to avoid in slides –

(a) Pages full of text.

(b) Simply photocopying hand-written notes; this looks very unprofessional.

(c) Lettering too small or too faint to read from the back of the room.

(d) Continuation of a point from one viewgraph to the next, or any other thing that will make it necessary to swap back and forth between viewgraphs.

Things to do:

- ❍ Have the right number of viewgraphs and the right amount of material to fill the 10 minutes without running over. A talk that is much too short or much too long shows poor preparation. Good timing requires a 'real' practice, aloud and with transparencies or slides viewed on a computer. A good general rule is one transparency per minute of time. Speaking fast is *not* a good way to fit in more information (it detracts from what you present).
- ❍ Speak to and make eye contact with your audience, rather than to the screen or the overhead projector. Use a pointer to highlight specific spots while still facing the audience.

4. Typical format of an initial presentation (this is not rigidly fixed):

I. Title and authors.

You might choose to present a brief outline of the project. If you do this, then…

- The outline should appear on the first slide with title, etc. Do not spend more than a minute on the outline.
- Your outline should refer to the project at hand. "Background, Motivation, Apparatus, Expected Results" is uselessly vague. Specificity is better: 'The importance of G, The Cavendish pendulum, …'

II. Motivation, background, history

- This must be quite brief – one or two viewgraphs
- Do *not* assume your listener knows anything about what you are doing or why
- *Do* assume your listener knows about physics at the level of a senior physics major

III. Apparatus and procedure – one or two viewgraphs

- A diagram of the apparatus is usually called for. A schematic is usually better than a realistic picture.
- Convince the audience that you know what to do when you step into the lab.

IV. Theory – one or two viewgraphs

- This might come before or after the apparatus description – whichever is more logical.
- Show where things come from (what assumptions, key concepts etc) and what the key results are – but <u>*do not*</u> lead your listeners line by line through a lot of algebra. <u>*Do provide the equations*</u> that are needed (*e.g.* if you aim to measure G, then you should at least have equation(s) that show how the calculations start, as well as a final equation that says $G = \ldots.$)
- Your goal is to make your skeptical audience believe you know what you are talking about, and to present the key formula(s) that will let you use your apparatus to measure what you want to measure. Even if you do not derive these formulas in detail, your audience should go away feeling sure that you could.

V. Sample data (*i.e*. what you expect) – one viewgraph

- What will you plot vs what to analyze the data? You can sketch what sort of graph you expect to make, if appropriate.

VI. Uncertainties – this is important! – one viewgraph

- This should be *quantitative* – done with numbers. A list of potential problems is not sufficient.
- What instrument (ruler, stopwatch, scale…) will be used to measure each quantity going into your result, and what is the *estimated percentage accuracy* of that instrument? (A reasonable estimate suffices here – you won't know the precise accuracies at this point.)
- Estimate the *percentage or absolute accuracy* expected for your final results.

VII. Conclusions – one viewgraph

- Every good talk ends with a set of solid conclusions, rather than simply stopping after describing a detail. Summarize the most important things said in order to fix them in the minds of the listeners.
- Appropriate conclusions for an initial presentation might be of the form: We intend to use the … method to measure…, and we estimate we will be able to do this with an accuracy of … percent.

5. Notes on references in talks:

- References are placed as needed throughout the talk, not gathered at the end (after all, your listener cannot flip to the end of the talk).
- An abbreviated form of reference usually suffices in talks, for example:

"Most precise measurement of G to date: $G = 6.67432(5)\times10^{-11}$ N-m^2/kg^2 (Hornblower & Steamblatt 2001)" (though you might wish to provide the journal name, volume, and first page # as well, and you should certainly do so in the written manuscript).

• If you take a figure from an article, book, or web page you should *always* put the reference clearly next to or below the figure to show that you are not taking credit for someone else's work.

Instructor's Evaluation of Initial Presentation

Date _____________ Group (presenter circled) ____

Experiment ____ Evaluator's initials ___________________

Ready for delivery at the scheduled time?

Starts with title, authors, brief outline?

Oral presentation clear and well-delivered?

Viewgraphs clear and professional looking?

Presentation would make sense to a physics senior not familiar with this project?

Logically moves from introduction and background, to project at hand and conclusion?

Close to specified 10-minute duration?

Was the relevant physics presented correctly & completely?

Presentation demonstrates that the group is prepared to work in the lab?
(Apparatus & procedure clear? Likely sources of uncertainty *quantitatively* discussed??

Group participation:
Was the presentation reviewed by the entire group?

Did the entire group participate in discussion after the presentation?

Overall comments and grade: