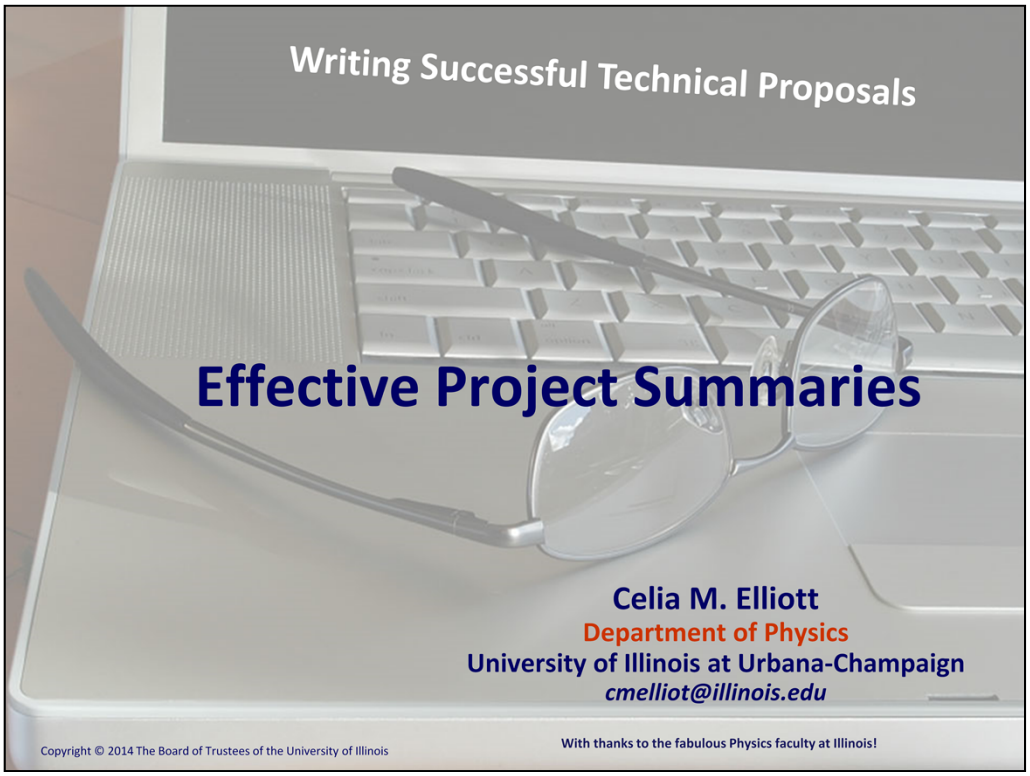

Disclaimers:

All of my experience has been in physics and nuclear engineering, and most of it has been with National Science Foundation, National Institutes of Health, and U.S. Department of Energy proposals. I think the advice I offer is applicable to all the physical sciences, but your mileage may differ.

I do not know anything about how research is funded in Brasil.

Anything I say is ***always*** trumped by individual agency rules, specific instructions in calls for proposals, and advice from program officers. ***READ*** the directions. Follow them witlessly.

All images used in this presentation are royalty-free and were purchased from istockphoto.com, unless otherwise noted.

First, let's define our terms—
a project summary *is*

a stand-alone document
in a formal multi-part proposal
that explains the goals, methods, and expected outcomes of the project

A project summary is *NOT* a scientific article—

Emphasize *meaning*, not technical details, in the summary.

Image taken from *Physical Review* **43**, 491 (1933).

First, let's define our terms—
a project summary *is*

a stand-alone document
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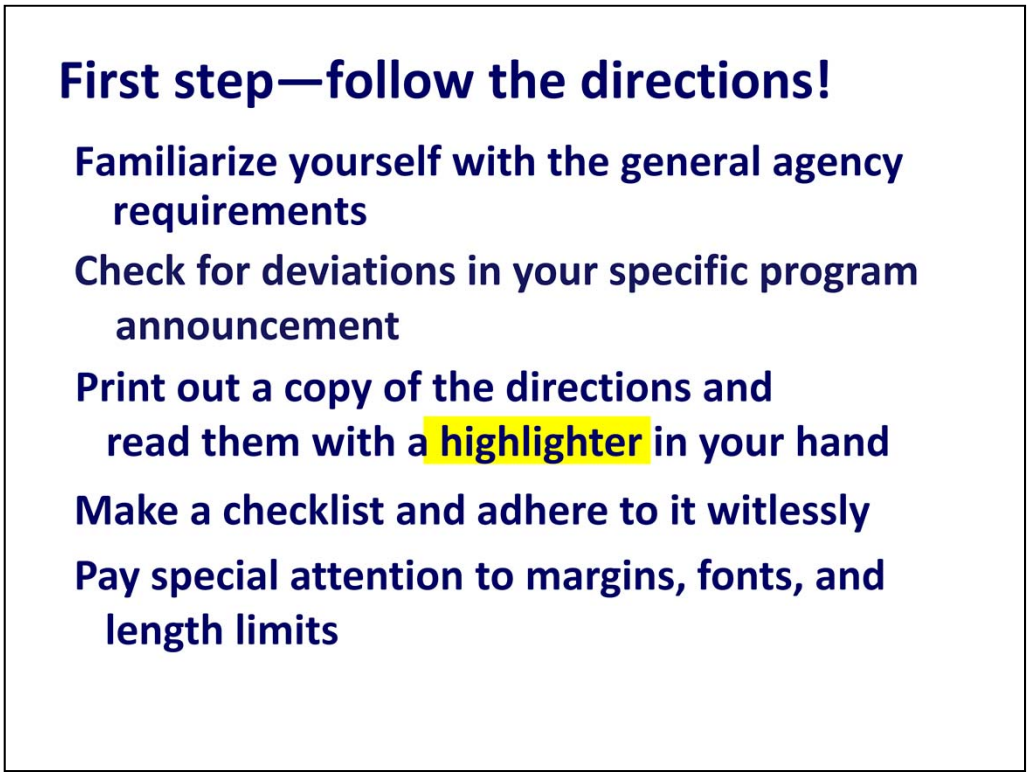
A project summary is *NOT* a scientific article—think of it as a *prospectus
why the funding agency should invest in your research

Different agencies call this document different names (abstract, executive summary), and they all have their own rules

A prospectus is a document provided by a business to potential shareholders that explains why it's a good idea to invest money in the business.

Use all three elements of persuasive argument—logic, authority, and passion—in your project summary.

For more about the role of persuasion in science, see http://courses.physics.illinois.edu/PHYS496/Lectures/Persuasion.pdf.

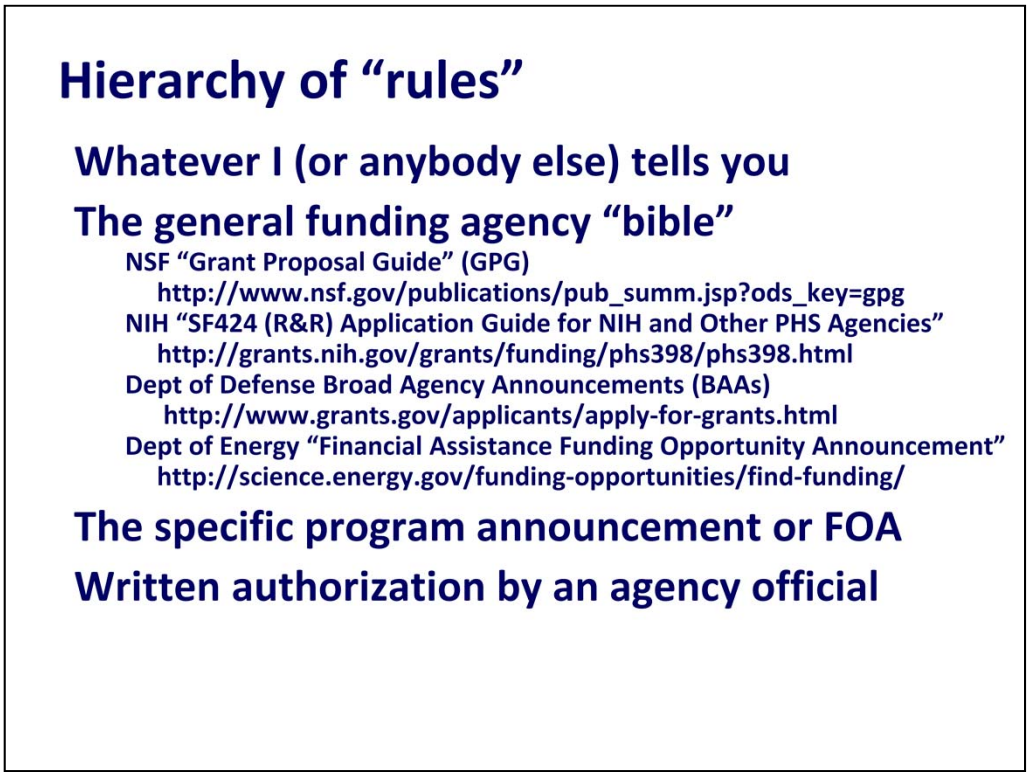


A truly astonishing number of proposals are returned without review every funding cycle because of "technicalities." The science might be brilliant, but no reviewer ever even *sees* it because the proposer failed to comply with the most basic instructions on how to prepare and submit his or her proposal.

Different agencies have different rules for project summaries, and individual program announcements trump general rules.

Make sure you know what the rules are. And don't just assume you know what they are, or that if you got away with doing it this way the last time you submitted a proposal, you can do it again without checking.

If you don't know what the rules are, look them up. If you're sure you know what the rules are, look them up anyway—you will learn humility.



Most institutions have grant specialists who can assist you, and all federal funding agencies have written documents that specify how proposals are to be prepared and submitted.

Most agencies have one comprehensive set of instructions that establish general rules for that agency.

Individual program announcements may have special requirements in addition to or different from the basic instructions.

In some cases, for some agencies, it is possible to deviate from instructions (e.g., exceed page limits, or include appendixes) with the written authorization of an agency official.

Hierarchy of rules:

Anything in an agency's written instructions trumps anything I say.

A specific program announcement trumps the general instructions.

A deviation authorization trumps both.

Quiz Question #1

How important is the project summary to the success of your proposal?

a) Not as important as the technical description
b) Not as important as the overall budget
c) Not as important as having a novel method
d) Not as important as having a well-qualified team

Answer: None of the above.

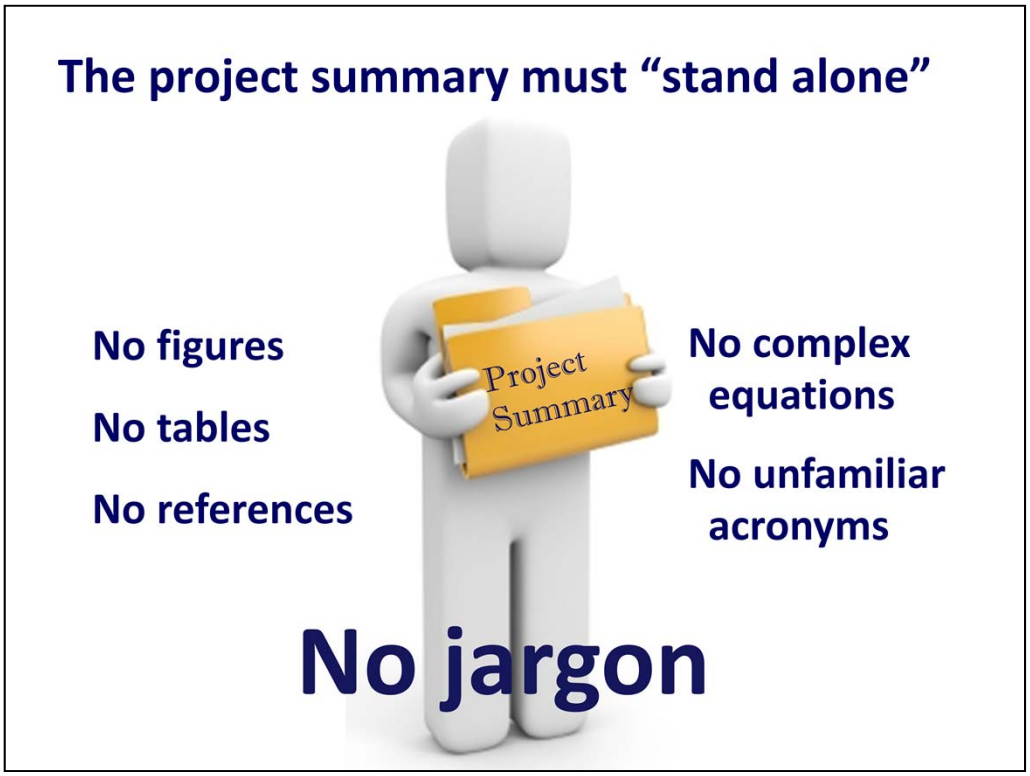
An effective project summary is *critical*.

You may be able to recover from a poorly conceived, badly written summary, but you'll have a big hole to climb out of.

The project summary will probably be the first thing most reviewers read

And it may be the *only* thing that some reviewers read…

Funding agencies are increasingly using panels to review proposals; not everybody on the panel may read your proposal in detail.



The project summary may be separated from the rest of the proposal and read independently.

It may have to be submitted via a form interface that accommodates text only.

It is often character-, word-, or line-limited.

Eschew jargon. Write the project summary for a generalist. Emphasize the *meaning*, not the technical details.

Rule #1 of George Heilmeier's catechism for proposers:

"What are you trying to do? Articulate your objectives using absolutely no jargon."

G. Heilmeier, "Some reflections on innovation and invention," Founders Award Lecture, National Academy of Engineering, Washington DC. (Sept. 1992)

For the rest of the catechism (superb advice for proposers):

http://en.wikipedia.org/wiki/George_H._Heilmeier

Hit every one of the funding agency's merit review criteria in your summary

- **Advances knowledge**
- **Benefits society or advance desired societal outcomes**
- **Explores creative, original, potentially transformative concepts**
- **Represents a feasible plan with articulated metrics for evaluating success**
- **Well-qualified team**
- **Adequate resources available**

Give the reviewers "quotable quotes" for their reviews

"When evaluating NSF proposals, reviewers should consider what the proposers want to do, why they want to do it, how they plan to do it, how they will know if they succeed, and what benefits would accrue if the project is successful."

National Science Board, *National Science Foundation's Merit Review Criteria: Review and Revisions* (National Science Foundation, Arlington, VA, 2011), p. 2.

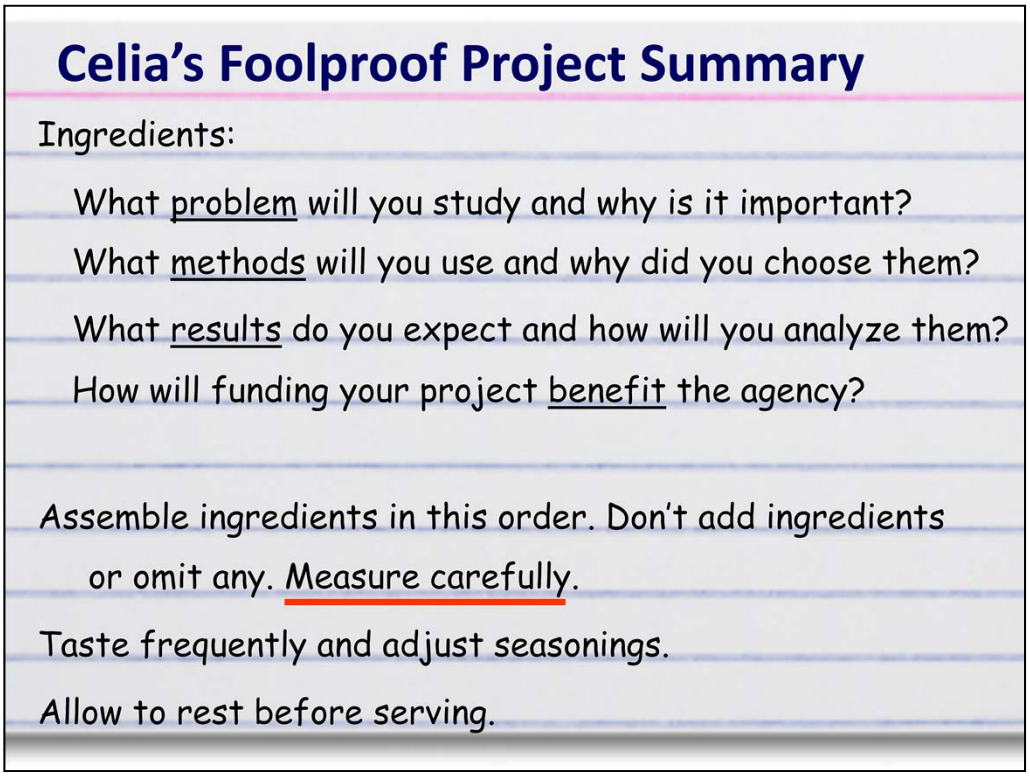
Make it easy for reviewers to pick out the important points of your proposal from the project summary and help them write a positive review.

Map the summary to your technical project description

- Present the same concepts
- In the same order
- Using the same terminology
- So that reviewers remember them

Give the reviewer a guide for what's to come

Same concepts, same words, same order



Control the length of the summary by the length of the answers to the four questions. Don't omit any of the questions, and don't add superfluous information.

Short summary?—one-sentence answers
Longer summary?—several-sentence answers

Stick to this four-ingredient recipe—Don't omit ingredients to shorten a summary or add superfluous ingredients to lengthen one.

"Measure carefully" in two dimensions:

1. Be sure your summary complies with length limits, font sizes and types, and margins.
2. Make your summary as specific and *quantitative* as possible.

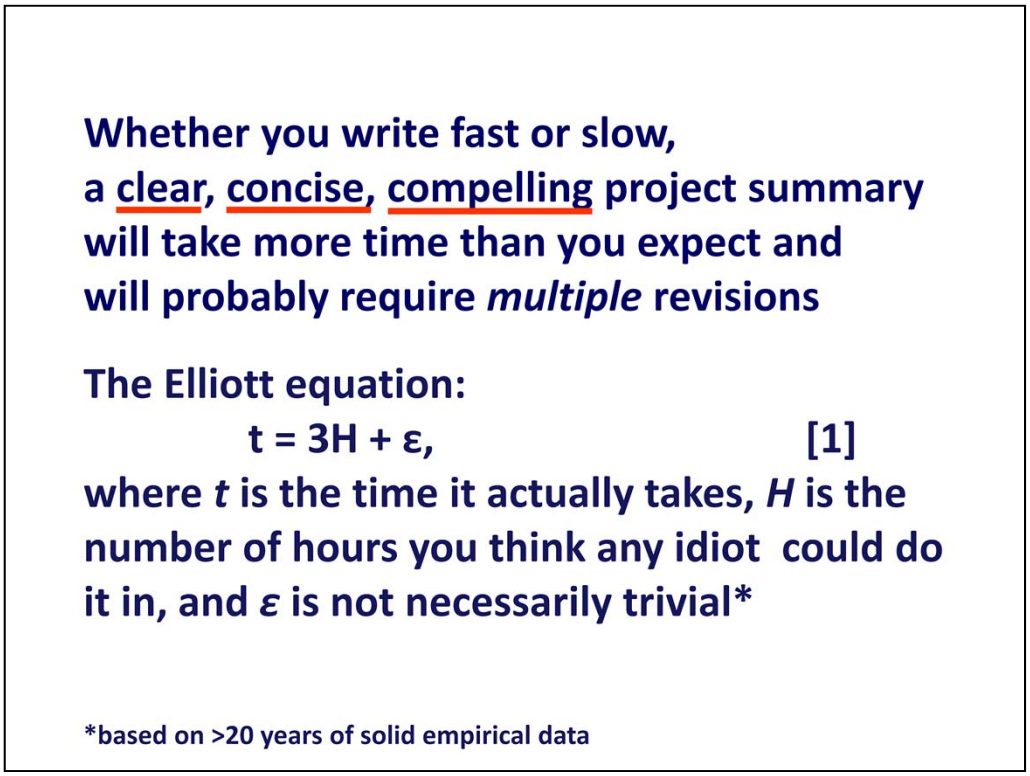
Don't expect to whip up a good summary** at the last minute. Write it, put it aside for a day or two, and look at it again with fresh eyes.

**or anything else

Quiz Question #2

How much time should you allow to write a good project summary?

a) <3 hours; don't overthink it
b) 1–2 days
c) At least 3 times as much time as you *think* it should take
d) A week



Clear, concise, compelling—the probability that these effects will spontaneously appear in a first draft, ripped off the printer 30 minutes before the deadline, asymptotically approaches 0.

Don't write a partial summary

Don't just cut-and-paste the first few paragraphs of the technical description—remember, it's a *prospectus*, not an abstract

Describe the *entire* project:
- significance to science and society
- goals and objectives
- methods, data analysis, metrics
- qualifications of the team
- unique resources
- benefit to the funder

Omissions and ambiguities raise immediate questions in reviewers' minds about the whole project

Don't assume all reviewers will be an expert in your narrow field—some will, but some won't, and they may all have equal votes

Advice from NIH:

"This section should be informative to other persons working in the same or related fields and insofar as possible understandable to a scientifically or technically literate reader."

Get rid of irrelevancies; eliminate introductory fluff*

Project summaries are always constrained by word or page limits; make every word *count*

Don't waste precious space on any idea that is not directly relevant to your project, no matter how "interesting" it might be

Delete, rephrase, clarify, quantify

***In fact, eliminate all fluff; reviewers appreciate conciseness**

For more information on eliminating fluff in scientific writing, see http://courses.physics.illinois.edu/PHYS496/Lectures/Fluff.pdf.

If your project is funded, the summary may be made public

Do not include any confidential or proprietary information

Don't put anything in the project summary that you wouldn't want the whole world to see on the agency's website

The summary should make you look good to prospective collaborators, other scientists, and other funders

For most proposals, you may include confidential or proprietary information in the technical narrative if it is essential to understand and evaluate the project being proposed. If you include confidential information, the cover page must be so marked, and the confidential text on each page must be set off from the rest of the narrative and identified as such. The government will then redact the confidential information before sending the proposal out for external review.

Note that only the project description may contain confidential or proprietary information—the project summary must not.

To recap…

- Follow the rules—witlessly
- Map your summary to your technical narrative
- Follow the four-ingredient recipe
- Aim for the three C's: *clear, concise, compelling*
- Write for a generalist—emphasize *meaning*
- Leave out proprietary information
- Plan for time to revise and polish

cmelliot@illinois.edu

Sources of good advice and further reading/watching:

"Getting Funded," *Making the Right Moves: A Practical Guide to Scientific Management for Postdocs and New Faculty* (Burroughs Wellcome Fund and the Howard Hughes Medical Institute), 2nd ed. (2006), pp. 153-174. Downloadable free-of-charge from http://www.hhmi.org/resources/labmanagement/downloads/moves2_ch9.pdf.

NIH Grant Review Process YouTube Videos

http://public.csr.nih.gov/aboutcsr/contactcsr/pages/contactorvisitcsrpages/nih-grant-review-process-youtube-videos.aspx

"NIH Peer Review Revealed" provides a fly-on-the-wall perspective of an NIH review panel meeting.

"NIH Tips for Applicants" offers practical advice for both novices and veterans.

NIH *Center for Scientific Review* "Answers for Applicants"
http://public.csr.nih.gov/FAQsRelated/Pages/ForApplicants/Answers-for-Applicants.aspx