



# Constructing a Competitive Proposal

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NCURA Region IV Spring Meeting  
April 16, 2013

# Workshop Overview

- Proposal components
  - Introduction
  - Statement of significance
  - Literature review
  - Goals & Objectives
  - Research plan & Methods
  - Title
  - Project summary
- Competitiveness
  - Structure
  - Pitfalls
  - Strategies

# Introduction

- Opening sentence/paragraph should be unique to your project.
  - Grab the reviewer's attention.
- After reading the introduction, the reviewer should
  - Have a basic understanding,
  - Be convinced of need,
  - Want more details.

# Intrigue the Reviewers



# Introduction

- Opening section should include:
  - Long-term goals (your research agenda)
  - Specific project goals
  - Hypotheses or research questions
  - Objectives and expected outcomes
  - Overview of approach
  - Statement of significance

Why should they care?



# **SIGNIFICANCE**

# Statement of Significance

- Motivates the reviewer to read closely.
- Establishes the framework for the study.
- Targets necessary background info.
- Leads to objectives and hypotheses.
- To be persuasive, must be consistent with
  - other sections
  - scope of project

# Identifying Significance

- Consider basic and applied uses of the data.
- Compare importance 1 year vs. 10 years after completion.
- Consider broad and narrow disciplinary point of view.
- What will the funders think is important?
- How might an impartial reader dispute your claims?



# Expressing Significance

- Describe how your study will
  - Synthesize information from several areas.
  - Advance the state of science in your field.
  - Impact other fields.
  - Enable research previously not possible.
  - Address public issues specific to the agency's mission.

# Significance Conveys

- The project is important.
  - Relates to an important human problem.
  - Fills a substantial knowledge gap.
  - Impacts theory.
- The project is interesting.
  - Addresses important areas that are unproven, controversial, or ambiguous.
  - Involves new experimental approaches, new hypotheses, new interpretations of old data.

# Contents of Significance Section

- The problem
- Relevance to agency
- What others have done
  - why insufficient
- How your approach is different
- Anticipated public impact

What is the context?



# LIT REVIEW

# Purpose of the Lit Review

- Place the research question in context.
- Explain and justify decisions made.
- Demonstrate knowledge of the field.
  - As it relates to your project
- Identify the current limits of knowledge and how your project will contribute.
- **Not** to educate the reader on the state of science.

# Lit Review Do's

- Set off main point followed by detail and support from lit.
- Critically evaluate relevant literature.
- Remain focused on issues your study will address.
- Establish what is original in your approach.
- Show how your study will help resolve important issues.
- Identify relevant publications you/your lab contributed to.

# Lit Review Don'ts

- Don't use controversial material without discussing the debate.
- Don't limit yourself to published work.
- Don't cite a reference without reading it.
- Don't make an unimportant point appear important by using multiple examples.
- Don't state that a study will be carried out "because it has never been done."

# Preliminary Data

- Understand the expectations of the agency and program.
  - Higher risk research requires more.
  - Less experienced researchers generally need more.
- Summarize the significance of your data as it relates to your project.
- Be clear who did the work – beware passive voice and the royal “we”.



What do you hope to accomplish?



# **GOALS & OBJECTIVES**

# Goals vs. Objectives vs. Tasks

- Long-term goals: What big question or need does your research address? (Your research agenda)
- Project Goals: What do you want to accomplish in this project?
- Objectives: What specific things do you have to get done to accomplish your goals?
- Tasks: How will you get those things done?

# Goals

- Long-range plans, often continuous.
- Often exceed the scope of the proposal.
- Usually do not have terminal end points that can be measured.
- Use “fuzzy” verbs
  - Understand
  - Contribute to the knowledge of...
- Short-term goals addressed within 5 years

# Objectives

- Define specific outcomes in measurable terms.
  - Identify what will be accomplished by the expenditure of grant money.
  - Describe how change will be measured.
- Specify measurement indicators and performance standards.
- Emphasize end results, not tasks or methods.
- Should not be confused with procedures of the study or problem driving the study.
- Should not be dependent upon the success of the preceding objective(s) (cascading).

# Types of Objectives

- Behavioral - A human action is anticipated.
  - 50 of the 70 children participating will learn to swim.
- Performance - A behavior will occur at an expected proficiency level.
  - 50 of the 70 children pass a basic swimming test administered by a Red Cross-certified lifeguard.
- Process - The manner in which something occurs.
  - We will document the teaching methods used, identifying those with the greatest success.
- Product - A tangible item results.
  - We will create a manual to be used in teaching swimming to this age and proficiency group.

# The Research Objective

- The research objective is a concise statement of what you intend to find out that isn't already known.
- It is usually stated in one of four forms:  
The research objective of this project is to
  - test the hypothesis  $H$ .
  - measure parameter  $P$  with accuracy  $A$ .
  - prove conjecture  $C$ .
  - apply method  $M$  from field  $Q$  to problem  $X$  in field  $R$ .

# Hypotheses

- Reflect the imagination and insight of the investigator.
- Suggest the investigator knows the field and what to look for.
- Should be directional, testable, and relate to basic mechanisms and/or a broad theoretical model.
- Research that cannot be expressed in terms of hypotheses may be viewed as nothing more than a data-gathering exercise.

# Bloom's Taxonomy

- Categorizing Levels of Abstraction
  - Knowledge
  - Comprehension
  - Application
  - Analysis
  - Synthesis
  - Evaluation
- Weak verbs: characterize, determine, understand, identify
- Stronger verbs: assess, analyze, develop, define, create, compare



What is your blueprint?



# RESEARCH PLAN

# Purpose of the Plan

- Explain the logic and conduct of the project, without describing methods.
- Persuasively justify the chosen approach.
- Articulate plans to reduce and interpret the data.
- Identify what new knowledge will be gained.
  - Clarify how it will relate to goals and objectives.
  - Discuss both expected and unexpected results.
- Acknowledge potential problems and alternatives.

# Methods

- Are the means to fulfill the objectives.
  - Details specific plan of action for each objective.
  - Identify what will be done, who will do it, how long it will take, the materials needed.
- Must be feasible given the time and support available.
- Must be appropriate and sufficient to answer hypotheses and objectives.
- Should result in critical and innovative outputs.

# Contents of Methods Section

- List procedures at beginning.
  - If not using the latest methods, indicate awareness of newer ways and explain choice.
- Include specifics if approach is unpublished or novel.
- If standard approach, simply name or cite.
- Designate who is responsible for which activities.
  - Name collaborators and summarize qualifications
- Delineate specific time frame.

# Contents of Methods Section

- Describe the sequence and interrelationship of activities and how they will fulfill objectives.
- Address logistics.
  - Access to equipment or special materials
  - Special requirements or permits
- Include a discussion of risk (why success is probable).
- Mention limitations that may affect interpretation.
- Identify what you will do if you get negative results or an approach doesn't pan out.
  - Include a decision tree.

# Critique of Methods Section

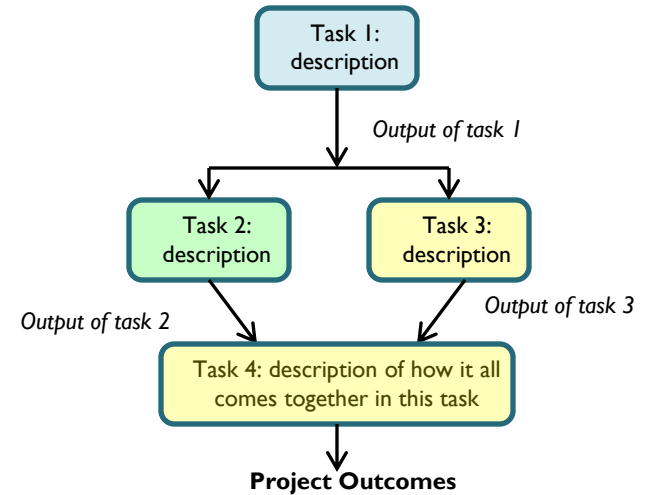
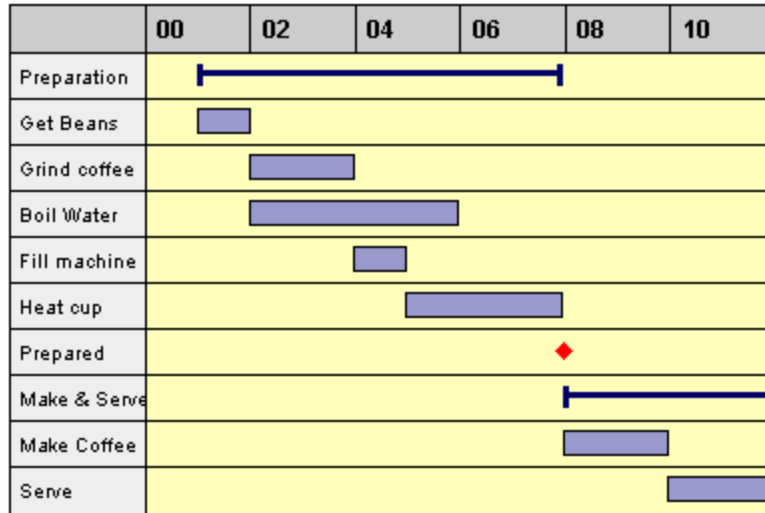
- Are these the correct and best methods for the specific questions?
- Are the methods proven and properly cited?
- Do the methods have any particular limitations that might affect the interpretation of results?
- Are the investigators competent in the use of all these techniques?

# Project Schedule

- Reiterate major objectives and specific tasks in same order presented in plan.
- Show that your project is well thought out and properly scoped.
- Graphical representation of the duration of project tasks over time.
  - Start and complete times of each task
  - Education, outreach, and management activities
  - Personnel and resources
  - Milestones

# Example Flow Charts and Schedules

GANTT chart with Summary and Milestone



	Year 1	Year 2	Year 3	Year 4	Year 5
<b>Objective 1: Development of the hoosits</b>					
Integration and calibration	█	█			
Optimization of frumpits measurement methodology			█		
<b>Objective 2: Assess XYZ</b>					
XYZ spectroscopy	█	█	█	█	█
MOA microscopy	█	█			
ABC testing		█	█		
Pandax studies			█	█	█
<b>Objective 3: Integrate hoosits with XYZ</b>					
Instrument integration		█			
Instrument testing			█	█	█
Demonstration				█	█



What's in a name?



# TITLES

# Titles Should Be

- Original
- Written in plain language
  - Keywords that help classify the proposal
  - Results-driven rather than descriptive words
- Use active verbs that point to the outcome of the research
- Clear, concise, and meaningful
  - Too descriptive may appear narrow
  - Too broad may appear unachievable
- Viewed as a work in progress

# Titles Include

- Dependent and independent variables
  - summarize under general rubric
- Performance component represented by criterion task
  - summarize into single categorical term
- Treatment to be administered
- Model underlying the study

# Titles Include

- Purpose of the study (can be implied)
  - *Study of relationship*: “Anthropometrics, Swimming Speed, and Shoulder-Girdle Strength”
  - *Study of differences*: “Anthropometrics and Shoulder-Girdle Strength of Fast and Slow Swimmers.”
- Any unusual contribution of the study
  - *Length or magnitude*: “Longitudinal Analysis of Human Short-Term Memory from Age 20 to Age 80”
  - *Creative method*: “Hand Preference in Telephone Use as a Measure of Limb Dominance and Laterality”
  - *Unique sampling technique*: “Intelligence of Children Whose Parents Own Personal Computers.”
  - *Unusual measurement site*: “Perceptual Judgment in a Weightless Environment: Report from the Space Shuttle.”

# Elements to Exclude

- Population, research design, instrumentation (unless they represent a substantial departure from similar studies)
- Eliminate redundancies
  - Aspects of
  - Comments on
  - Study of
  - Investigation of
  - Inquiry into
  - An Analysis of

# Writing Your Title

- List all appropriate elements and weave them into various permutations.
- Rework your title to clarify, shorten, make more precise
- Ask yourself
  - Is it understandable?
  - Is it easy to guess the content of the proposal based on the title?
  - Would a few word changes make it more interesting or effective to a non-specialist?

The challenge of concision



# **PROJECT SUMMARY**

# Purpose of Project Summaries

- Determine which panel will review
- Grab the reviewer's interest and generate enthusiasm
- Frame the goals and scope of your study
- Identify the need for and innovative features of the research and expected outcomes
- Demonstrate importance of the work
- Show you have what it takes



# Your Assumptions

- The reviewer is bored from reading dull proposals
- The reviewer has already read more good proposals than can be funded
- Your audience is non-technical
- Your proposal will be funded

# Project Summaries Answer

- What is your research objective?
- What is your approach?
- How will the results be evaluated?
- How does the proposed project relate to the sponsor's interests?
- Why is your contribution important to your research community?
- Why should you, rather than someone else, do this project?
- If successful, what will be the benefit to society? What difference will the project make to: your university, your students, your discipline, the state, the nation, etc.?

What will it cost?



# **BUILDING A BUDGET**

# Cost Criteria

- Reasonable – what a prudent person would do (withstand public scrutiny)
- Allocable – incurred solely to advance the project (or to a reasonable proportion)
- Allowable – consistently treated as a direct cost, not specifically excluded

# Direct Costs

- **Salaries, wages, fringe benefits** for PI, Co-PI, Post Doc, grad & undergrad students, technicians, etc.
- **Travel Expenses** (transportation, lodging, meals, registration fee) for conferences, workshops, fieldwork
- **Supplies** – laboratory, photographic, animal care, chemicals, educational/instructional
- **Contractual** – support services, outside lab and analysis fees, printing, packaging, handling, rental fees, shipping, training, testing

# Direct Costs

- **Subaward** – portion of budget for cost of project activities carried out by others at another institution or agency
- **Equipment** – Typically items over \$5,000 (laboratory, office, medical, audio-visual)
- **Consultant** costs for consultant or guest speaker (non-employee)
- **Tuition Remission** for graduate students

# Indirect Costs (F&A)

- University operating expenditures incurred for common objectives which are not allocated to a specific project.
  - Facilities such as research labs, equipment, offices
  - Administrative services such as purchasing, personnel, accounting, pre-award services, post-award project management, maintenance
  - Utilities, postage, general office supplies
- Institutions have negotiated rates for federal granting agencies.

Are the costs necessary?



# JUSTIFICATION



# Budget Justification

- Identifies your costs and explains the need for them.
- Answers any questions a reviewer may have about how you calculated your costs.
- Indicates base salaries and any yearly increases.
- Should reflect the objectives of the project.
- Is read and evaluated by reviewers.

# Salaries and Wages

- Provide enough detail to make it clear why each person is necessary to the project and exactly what his/her contribution will be.
  - P. Plum, PhD (PI: 20% effort) is Assistant Professor of x in the department of y at z. She has extensive experience in a. Dr. Plum will be responsible for...
  - TBN, MS (Research Assistant: 49% effort) will work with x on y. In Year 1, this RA will concentrate on z...

# Description of Duties

- Weak: "Dr. Johnson will analyze all data associated with the investigation."
- Strong: "Dr. Johnson will be responsible for statistical analyses of data collected in experiments 1-3 which are directly tied to specific aims 3 and 4. Dr. Johnson will also be responsible for day-to-day project planning, coordination with experts in partnering institutions, writing all progress reports, and supervising the graduate student."

# Travel

- Provide information about
  - purpose of the trip
  - duration
  - points of departure and destinations
  - number of travelers
  - costs per traveler
    - registration fees, air fare, meals, lodging, etc.
  - how you estimated the costs
    - past trips, state rates, quotations, etc.
- Identify foreign and domestic travel as separate items.

# Materials and Supplies

- Provide a list of the general types of expendable materials and supplies required.
- You do not have to provide an exhaustive list or show catalog numbers or other documentation
- Provide sufficient detail to demonstrate
  - you have anticipated the materials needs
  - there is adequate justification for the amount requested
- A carefully detailed supply budget helps convince reviewers you are capable of directing the project

# Consultants

- Be sure that the daily rate does not exceed the maximum allowed by the funding agency, and provide justification for the rate.
- If travel and subsistence costs are not factored into the daily rate, these should be justified separately.

# Subaward

- Justification for a subaward budget should come from the subaward partner(s).
- You may want to include one or two sentences describing why the work cannot be done at your institution and why you chose the partner(s) you did (a pre-existing collaborative relationship, proximity to campus, availability of necessary instrumentation and/or expertise, etc.).

# Budget Justification Tips

- Be sure everything in your budget is referenced in the proposal and everything in your proposal that would incur cost is explained in the justification.
- Follow the same order as in the budget so reviewers can easily compare the two documents.
- The more "unusual" the request, the more justification necessary.
  - Equipment purchases (especially personal computers), foreign travel, and administrative costs always need special justification.



# Budget Justification Tips

- Don't "give them something to cut."
- Don't try to give the agency a bargain.
- Too many 000s look like the numbers were pulled out of thin air.
- The budget is not how much money you want, it's how much the project costs.
- Double-check what expenses the sponsor will and will not allow, as these differ from sponsor to sponsor.
- A budget is based on a "good faith estimate." It can be renegotiated.

Is your plan persuasive?



**PULLING IT ALL  
TOGETHER**

# Capture and Keep Attention

- Organize
  - Offer road maps to keep reader headed in the right direction
- Highlight
  - Don't bury critical information
  - Don't emphasize ideas that are less important
- Funnel
  - From the big picture to research specifics
- Focus
  - Avoid information that detracts from or dilutes your message
  - Avoid repeating yourself

# Consider Your Audience

Reviewers have:

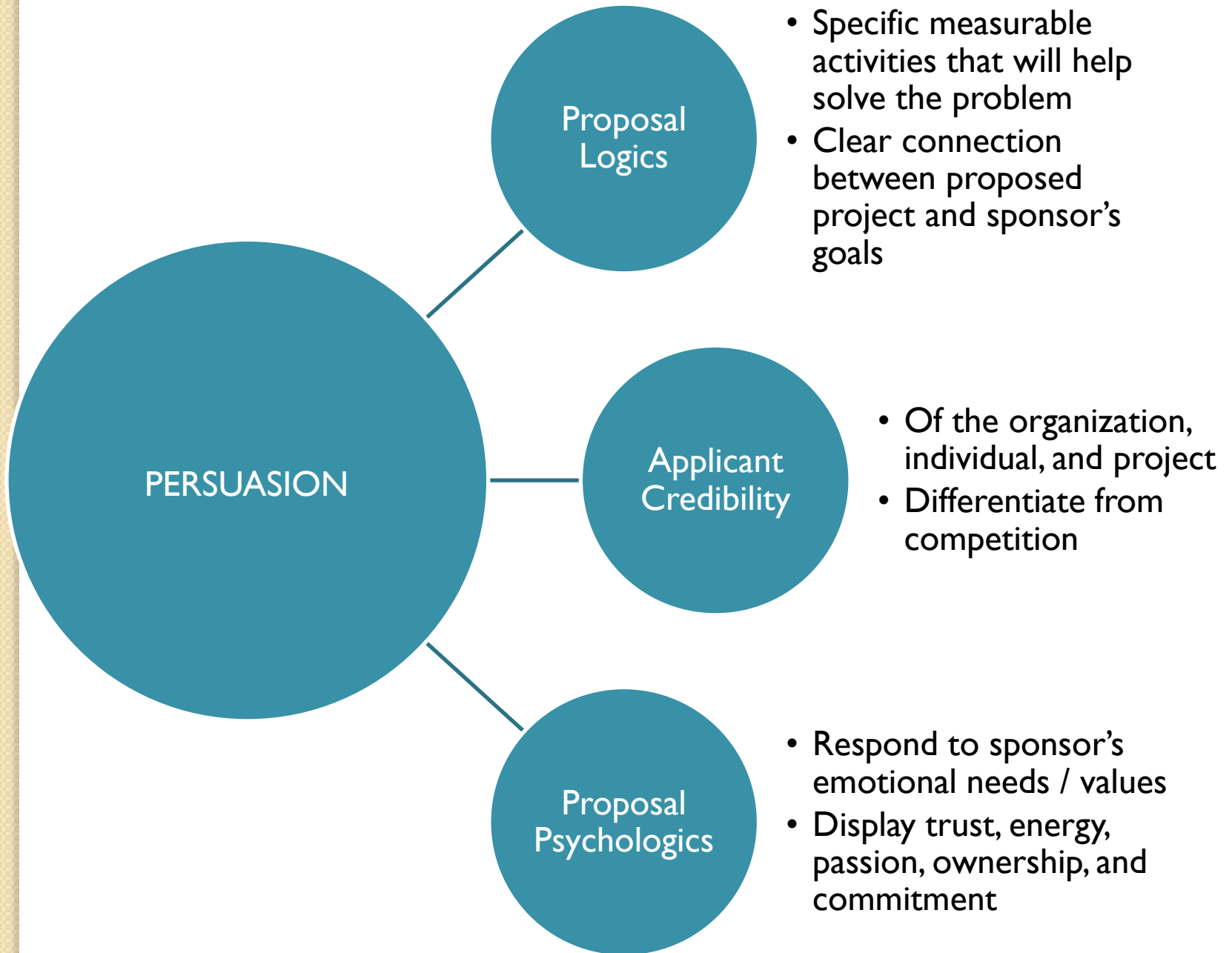
- Many proposals to review
  - Ten or more from several areas
- Limited time for your proposal
  - 20 minutes for first read
- Different experiences in review process
  - Veterans to novices
- Different levels of knowledge in field
  - Experts to outsiders

# Reader-friendly Writing

- Don't sacrifice white space to cram in more text.
- Use headings to signal what will follow
  - Different headings signal new grouping
- Each point should follow logically from the previous one
  - Paragraphs herald the beginning of a new thought
- The content of each sentence, paragraph, or section should be as complete as possible.
  - Don't make reader search for material
- Consider including a key to abbreviations at the beginning of the proposal

# Aristotle's Rhetorical Triangle

- The persuasiveness of any communication is shaped by
  - Logos – a clear, logical message
  - Ethos – credibility, legitimacy, and authority of the speaker
  - Pathos – eliciting empathy by stirring the emotions, values, and imagination of the audience



What not to do.



# POTENTIAL PITFALLS



# Return Without Review

- Inappropriate for funding by the agency
- Not responsive to program announcement/solicitation
- Doesn't meet specific requirements such as deadline, length, formatting, etc.
- Submitted with insufficient lead time before the project is to begin
- Submitted after receiving a “not invited” response to a pre-proposal
- Duplicate of a proposal already under review or already awarded
- Not substantially revised after previously reviewed and declined

# Mechanical Problems

- Document not legible, logical, and reader friendly
- Poor page space planning
  - Too much text devoted to complex details or prior work
  - Inadequate attention to proposed new effort
- Poor quality of writing
  - Grandiose claims
  - Convoluted reasoning
  - Excessive repetition
  - Grammatical errors

# Methodological Problems

- Completely traditional approach with nothing unusual, intriguing, or clever
  - Incremental vs. innovative
- Proposed method unsuited to the purpose of the research
  - Unacceptable scientific rationale
- Overly ambitious given available time and resources
- Unclear in describing elements of the study
  - Problem not clearly articulated
  - Unfocused research plan
    - Many unrelated subtasks
  - Insufficient experimental detail

# Personnel Problems

- Literature review reveals limited knowledge of the territory
- Proposed study appears to be beyond PI's training, experience, ability, and resources
- No evidence of relationship with or support from essential collaborators
- The PI took highly partisan positions on issues and became vulnerable to reviewers' bias

# Cost-Benefit Problems

- Not an agency priority for this year
- Budget unrealistic in terms of estimated need for equipment, supplies, and personnel
- Project cost appears greater than any possible benefit to be derived
- Uncertainty about future directions
  - What is the theoretical or practical benefit that extends beyond the project?
  - How will you use the project to continue work in this area?

# Top Reasons for Rejection

- The problem is not of sufficient importance or is unlikely to produce any new or useful information
- Approach
  - The proposed methods are unsuited to the stated objectives.
  - The description of the approach is too nebulous, diffuse, and lacking in clarity to permit adequate evaluation.
- The investigator does not have adequate experience or training for this research.

# Overall strategies

- Remember the cornerstones of good research
  - Important questions
  - The best and most appropriate methods
  - Appropriate analysis and application of results
  - Synthesis and timely dissemination of results
- Promise success through
  - Clarity of presentation
  - Sharp focus on important problem
  - Clearly defined experimental model
  - A few specific, testable hypotheses

If at first you don't succeed...



# **MANAGING FAILURE**



# Rejection Happens

- 75-90% of proposals are rejected
- Very few first applications are funded
- Re-submissions do succeed
  1. 8%
  2. 28%
  3. 47%
- Rejections offer a learning opportunity
  - Study reviewer comments carefully
    - Reviewers are not always wrong

# Analyzing the Reviews

- Did the reviewers have particular concerns that you can address?
- Were the reviewers confused or unclear about your project?
- Were the reviewers unimpressed by the significance or novelty of your research idea?
- Were the reviewers generally favorable, with no clear issues brought up?
- Did the project topic not fit the program?
- Be careful about chasing one comment by one reviewer – look at the Panel Summary

# Call the Program Officer

- Be nice!
- Ask for clarification of reviewer comments
- Ask for advice
  - Should you resubmit?
  - Should you apply to a different program?
  - What would strengthen your proposal?

# Should You Revise and Resubmit?

- Re-assess your time and commitment
- Decide if the project is still relevant and important
- Consider your options
  - Resubmit next year to the same program
  - Resubmit next year to a different program
  - Use next year to revamp your project, generate preliminary data, and resubmit the following year
  - Revamp and submit to a different agency
  - Start again with an entirely new idea
- Volunteer to be a reviewer

# Why Become a Reviewer?

- Stay abreast of the science and priorities in your field
- Connect with scientific colleagues
  - Collaboration
  - Inspiration
- Learn what distinguishes a good proposal from a bad one.



# CONTACT INFORMATION

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