Tips for Developing Successful Technical Proposals—Goals and Objectives

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•One key to a successful proposal:
  •Clearly identifying and articulating Goals and Objectives
    •Ask yourself: What do you want to come from this proposal and what will the impact be?
Goals for this session

Learn how to formulate a problem statement for a proposal

Learn the difference between goals and objectives ("aims" to NIH)

Learn how to use the problem statement, goals, and objectives to create the intellectual framework of your proposal

State Goals
The essence of a successful proposal is the key idea that underlies it

The idea must be important, i.e. it must address a significant problem
The idea must be amenable to rigorous investigation by the researchers, with the resources available to them, in the time allotted for the work
Funders love creativity and innovation, but they must be rooted in reality; unique approaches must be backed by enough solid prior work to make the risk of a new approach worth taking

• The essence of a successful proposal is the key idea that underlies it
  • The idea must be important
    • It must address a significant problem
    • Do not leave your reviewer saying: “So what!”
  • The idea must be amenable to rigorous investigation
    • With resources available or that can be acquired
    • Within certain time frame
  • Be creative and innovative
    • BUT be realistic
    • Unique approaches must be rooted in solid prior work
The problem statement—the underlying motivation for the work—is a question that has been left unanswered by prior work.

“An accurate method to calculate the gravitational waveform emitted by the coalescence and merger of binary black hole systems is needed for gravitational wave detectors now being deployed, such as LIGO” is an example of a problem statement.

• The problem statement:
  • Is the underlying motivation for the work
  • Should be an unanswered question or societal problem

• Provide example from slide
A proposal should start out with a goal—the long-term outcome related to the problem statement that the work is aiming to achieve

“A new computational method, pseudospectral collocation, will be investigated to model gravitational waveforms” is an example of a goal statement

The goal should be significant (address an important problem), innovative (novel concepts, approaches, or methods), and testable

• The proposal should start out with a goal:
  • The long-term outcome related to the problem statement
    • This is what the project is trying to achieve/accomplish
• Provide example
• The goal should be:
  • Significant (address an important problem)
  • Innovative (novel concepts, approaches or methods)
  • Testable
You must show how your project fits into the larger goals of science

Suppose you want to write a proposal to obtain funds to analyze observational data

That project alone may be insufficient to gain funding, unless you can show how your discoveries will contribute to the solution of a larger problem, such as determining whether the observations can lead to detectable signals for a new satellite observatory

• You must SHOW
  • How your project fits into the larger goals of science
• Provide example:
Articulating the goal will help you decide on objectives

What do you need to establish or discover to move toward your goal?
What experiments do you need to do?
What calculations do you need to make?
What data do you need to obtain?
What tests or analyses must you do of the data?

• Articulating the goal
  • Will help you decide on objectives
    • What do you need to establish or discover to move toward your goal?
    • What experiments are needed?
    • What calculations are needed?
    • What data is required?
    • What tests or analyses need to be performed?
The project “objectives” are the specific steps you propose to take to move toward your goal

For example, one objective for the gravitational waveform project would be to determine if the spin rate of observed pulsars can lead to detectable signals for LIGO

Articulating the objectives defines the activities you must undertake, and hence the statement of work, for your proposal

• The project objectives are
  • Specific steps you propose to take toward your goal
• State example from slide:
  • Articulating the objectives defines the activity
  • And hence the statement of work
Your objectives should be concise and specific

Practice writing your objectives in single sentences of no more than 25 words each—it will sharpen your thinking

Be specific—don’t say you will “study” something, say you will “measure its lifetime using single-molecule fluorescence”

Avoid vague language that leaves the reviewer uncertain about what exactly you propose to do

• Your objectives should be concise and specific
  • Practice writing your objectives
    • Single sentences
    • No more than 25 words each
    • This will help sharpen your thinking
  • Be specific!
    • Don’t say you will “study” something
    • Say you will “measure its lifetime using single-molecule fluorescence”
    • State how you will study it
  • Avoid vague language
    • That may leave the reviewer uncertain about what exactly you propose to do
Your objectives must be SMART

- **Specific**
- **Measurable**
- **Articulated**
- **Realistic**
- **Timely**

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How many objectives should you have in your proposal?

Most experts recommend three to four, depending on the scope and duration of the proposed project.

The number of objectives you have should be driven by your goal and the questions you are seeking to answer.

Do not propose more objectives than you can reasonably do; reviewers will conclude that you are inexperienced and unlikely to succeed in any of them.

• How many objective should you have?
  • 3-4, as recommended by most experts
  • Depending on the scope and duration of the project

• The number of objectives should
  • Be driven by your goal
  • Answer the questions you pose

• Do not propose more objectives than is possible
  • The list of objectives must be reasonable
  • If you do, reviewers will conclude you are inexperienced and
  • Will be convinced that you will not succeed
Your objectives should be the first thing you write

Circulate a draft to your colleagues and your foreign partner and ask for feedback

Are the objectives SMART?
Will completing the objectives allow you to realize your goal?
If you start out with weak, vague objectives, you cannot prepare a good proposal, and you will have wasted time, effort, and opportunity

• The objectives should be the first thing you write
  • Ask a colleague or foreign partner
    • To review the draft
    • Provide feedback
  • Are the objectives SMART?
  • Ask yourself:
    • Will completing the objectives allow you to realize your goal?
• If the objectives are weak and vague
  • Your proposal will suffer
  • You will have wasted time and effort of
    • Your research team
    • Your collaborators
Once you have settled on your objectives, write down what resources you will need to meet them

Resources are people, equipment, facilities, materials and supplies, services, and time

Make two lists—the resources you already have, and the ones you’ll have to buy

You’ll need both lists to prepare the proposal budget and budget narrative

• Once you settle on the objectives,
  • Write down the resources you’ll need to meet them
    • Resources
    • People
    • Equipment
    • Facilities
    • Materials and supplies
    • Services
    • Time
      • Your research team
      • Your collaborators

• Make two lists
  • Resources you already have
  • Resources you’ll need to acquire
  • Both lists will be required to draft your budget and budget narrative
Let’s review what we’ve learned…

✓ Goals are testable; objectives are measurable

✓ The goals and objectives for a proposal should be written first

✓ Proposers should remember to make their objectives SMART

✓ Proposers should not include more objectives in a proposal than they can possibly do; they will destroy their credibility with the reviewers