• The technical description of a proposal is most likely the largest and most detailed portion of your proposal.
Goals for this session

Learn how to organize the technical narrative of a research proposal and what information must be included

Understand the importance of providing sufficient detail for a proposal to be successful

Learn the role persuasion plays in a research proposal

• State Goals
Most research proposals will include the following elements:

- Cover page
- Project summary
- Technical description, including references
- Biographical sketches of the key scientific personnel who will carry out the work
- Other sources of support
- Budget forms and budget narrative
- Supplementary documentation

Most proposals will include each of the following:

- Cover page
- Project summary
- Technical description, including references
- Biographical sketches of key scientific personnel
- Other sources of support
  - Where the key personnel get their funding for related and un-related projects
- Budget and budget narrative
- Supplementary information
The RFP will usually tell you what information to include in your technical description

Organize your narrative so that it follows the order presented in the RFP

Match the names of the section headings in your proposal to the section headings provided in the RFP—shows that all required information is included so reviewers don’t have to hunt for it

• Refer to the RFP!
• It will usually tell you what to include in your technical description
• Organize your technical description
  • To follow the order presented in the RFP
• Match names of section heading
  • To those provided in RFP
  • This will help reviewers identify information
The technical description must provide a clear, detailed, and convincing statement of the work to be undertaken and why it is important.

• The technical description is
  • Statement of the work to be undertaken
  • Why the work is important
  • Must be:
    • A clear
    • Detailed
    • Convincing
The technical description should incorporate the following elements:

- An explicit enumeration of the project’s goals and objectives
- A background and introduction (B & I) section
- A formal statement of work, including a management plan
- A description of anticipated results
- Plans for reporting, documentation, and dissemination of results
- A description of “deliverables”

The following element should be incorporated in the technical description:

- An explicit list of the project’s
  - Goals and objectives
- A background and information (B&I) section
- A formal statement of work
  - Including a management plan
- A description of anticipated results
  - Will want to state all possible results
    - Including applications
- Plans for
  - Reporting
  - Documentation
  - Dissemination of results
  - Reviewers will be interested to hear how the results will be shared with the larger scientific community
- A description of the “deliverables”
  - The tangible results
A well-rounded presentation of the scientific literature relevant to the proposed work is a crucial part of the background and introduction section. It gives confidence to reviewers and funders that you have a firm grasp of the problem, that you know what the obstacles are likely to be, and that you can successfully overcome them. Don’t neglect to include pertinent findings from other groups; reviewers don’t like to see their own relevant publications ignored!

- Background and introduction section should include:
  - Presentation of current scientific literature
    - Relevant to the proposed work
    - This will convince reviewers
      - You have a firm grasp on the problem
      - You understand the latest trends
      - You know the potential obstacles and
        - You are able to overcome them
  - Do not ignore pertinent results from other groups
  - Reviewers appreciate citations of relevant work, especially their own

- Note that one of the reviewers’ common criticisms is the absence of the current literature citations and a description of how the proposed work compares with current research conducted in the topic area.
The purpose of the B & I section is to demonstrate your understanding of your field and the work that has led up to your proposed project.

Identify previous work that has established the foundation for your proposal.

State explicitly what scientific question remains unanswered that your proposal addresses.

Explain how your project is structured to address this important question.

Make certain that the significance of your proposed work is clear.

• Purpose of Background and Information section:
  • Demonstrate understanding of your field
  • Identifies work that has led up to your proposed project

• Identify previous work which
  • Established the foundation of your proposed work
  • State any unanswered questions
    • And how your proposal addresses them

• Explicitly state why your project is suitable to address the unanswered questions
  • Clearly state the significance of your work
  • Place your project in the context of the entire field of research
Don’t confuse the significance of the problem with the significance of your proposed work

Too many proposers waste reviewers’ time explaining how important the problem is

Reviewers KNOW the problem is important; what the reviewer wants to know is to what extent your work is going to solve the problem

Funders want to support projects that have a large impact

• Do not confuse
  • The significance of the problem with
  • The significance of your proposed work
• Too many proposers spend too much effort (and space in the proposal)
  • In explaining the importance of the problem
• Reviewers already know the problem is important
  • The reviewers only want to know how you propose to solve the problem
• Funders want to support projects with the largest impact!
Don’t assume the reviewer will automatically be an expert in your narrow research specialty

Make sure reviewers understand the fine points of your project

Guide them step-by-step through the proposal with explicit, detailed explanations

Reviewers should understand the substance of your research plan from the very beginning

• Reviewers may not be an expert in your narrow research specialty
• Explain the fine points of your project
  • Do not imply information
  • Do not assume the reviewer will understand the intricacies of your work
• Guide the reviewers through the proposal
  • Step-by-step
  • Provide explicit and detailed explanations
• Reviewers should understand
  • The what hypothesis you propose to test and how you are going to do it
  • From the very beginning
Reviewers are generally skeptical about miracles

• It is not enough to simply say what you’re going to do
• You must explain HOW you are going to do it
The research design and methods section should be the longest section of the technical description

The purpose of this section is to explain how you will attack the problem to carry out your specific objectives.

Start with a brief description of your overall approach.

Describe the experiments that will be done to achieve each objective in chronological order.

• Research design and methods section
  • The longest section of the technical description
• Explain how you will carry out the objectives
• Start with a brief description
  • Of your overall approach
• Describe the experiments
  • That need to be done to achieve the objective
  • In chronological order
Respect the distinction between design and methods

The “design” is the intellectual basis for doing the experiments you propose in the order that you will do them; it is your battle plan for attacking the problem.

The “methods” are a detailed discussion of exactly what experimental techniques will be used.

Be sure you have provided sufficient detail that reviewers can evaluate your work.

• Understand and respect the distinction:
  • Design vs. Methods
  • Design
    • The intellectual basis for doing the experiments
    • In the order that you will do them
    • This is your battle plan for attacking the problem
  • Methods
    • A detailed discussion of exactly what experimental techniques will be used
    • Provide sufficient detail
      • So that reviewers can adequately evaluate your work
The “methods” section describes in detail the apparatus, facilities, computer codes, experimental techniques that will be employed.

- Emphasize unique capabilities
- Identify materials to be used and give specifications
- Describe procedures in detail
- Explain how results will be measured

If your project is theoretical, include sufficient mathematical detail to enable derivations to be reproduced and to allow numerical results to be checked.

- The “Methods” section
  - Describes in detail
    - Apparatus
    - Facilities
    - Computer codes
    - Experimental techniques that will be employed
  - You will want to:
    - Emphasize unique capabilities
    - Identify materials to be used
    - Give specifications
    - Describe procedures in detail
    - Explain the measurement of results
    - If the project is theoretical,
      - Include sufficient mathematical detail to enable
        - Derivations to be reproduced
        - To allow numerical results to be checked
Include a “data analysis” section

Specify what types of data will be recorded—what are you looking for?
Explain how the data will be analyzed
Describe any statistical tests to be performed

The absence or inadequacy of a data-analysis section is one of the most frequent criticisms made by NIH reviewers.

• Include a “data analysis” section
  • Specify what data will be recorded
  • Explain what you’re looking for
  • Explain how the data will be analyzed
  • Describe any statistical tests to be performed

• The absence or inadequacy of data analysis section is one of the most frequent criticisms made by NIH reviewers.
Discuss the potential limitations of your proposed work

Describe any technical problems that might arise

Objectively discuss alternative approaches and explain why you think your approach is most likely to solve the problem you’re addressing

• Discuss that you understand
  • The potential limitations of your proposed work
• Describe technical problems that may arise
• Discuss alternative approaches
• Explain why your approach is most likely to solve the problem
• Show the reviewers that you have an open mind but are solid in your approach
Vagueness has killed more proposals than any other flaw

Describe your project in enough detail so that a reviewer can:
Understand your approach
Accurately judge the probability of your success
Determine if the resources you request are adequate and the costs reasonable

• Make sure you describe your proposal with enough detail!
  • Vagueness has killed more proposals than any other factor
• Provide enough detail to help your reviewers
  • Understand your approach
  • Judge accurately the probability of success
  • Determine if the resources you’ve allocated are
    • Adequate
    • Cost effective
What about confidentiality?

Don’t include secret information unless it is essential for understanding the proposal

If you do include proprietary information, put a warning label on the cover page and pages containing confidential information to remind reviewers of their ethical obligations

The following paragraph(s) contain proprietary or confidential information. (Proposer) requests that this information not be released to persons outside of (funding agency), except for purposes of confidential review or evaluation.

• Do not include confidential information in your proposal
  • UNLESS It is essential for understanding the proposal
• If you do include confidential information:
  • Mark very clearly on the cover page
  • Mark very clearly on the pages including the confidential information
    • Top and bottom of pages
    • And the specific paragraphs or section
• Recommend the use of the following disclaimer:
  • The following paragraph(s) contain proprietary or confidential information. (Proposer) requests that this information not be released to persons outside of (funding agency), except for purposes of confidential review or evaluation.
Provide a detailed management plan
Identify who will oversee the project and be ultimately responsible for it

Explain how the work will be organized for maximum efficiency

If several groups are involved, explain how the work will be coordinated among them, and who is responsible for what

If your project involves an international collaboration, explain how you will exchange information and share results with your foreign partner

• Provide a detailed management plan
  • Identify key personnel
    • Who will be responsible for the project and overall progress
    • How will the work be organized for maximum efficiency
  • If several groups will be involved
    • How will the work be coordinated
    • Who will be responsible for integrating their efforts
  • If the project involves international collaboration
    • Explain how information will be exchanged
      • How often
      • By what method
        • Email
        • Exchange visits
        • Training opportunities
Provide detailed information about the people who will work on the project

Describe each person’s specific duties in detail
Explain what he or she will contribute to the project’s goals and objectives
Discuss the special qualifications each person has, and how his background and experience make him uniquely well-qualified to be successful in carrying out his assigned duties

• Provide detailed information about project personnel
  • Describe each person’s specific duties
    • Who will have what responsibility in each major task
    • How will each person contribute their skills to the success of the project
    • Why is each person specially suited to the project
      • Given their qualifications and background
• Reviewers will not want to see any more people on the project than is necessary to carry out the work
Discuss organizational capability

You want to make the funder and reviewer see that your institution is particularly well-positioned to make the proposed project a success

Briefly describe your organization, its history, its mission, and how that relates to the proposed project

Describe the organization’s strengths in terms of staff, facilities, resources, earlier collaborative efforts

Describe successes in prior research activities relevant to your project

• Discuss your organizational capability
  • Tell the reviewers why your institution is
    • Suited to carry out the proposed work
  • How does your organizations’ mission meet with the goal of the proposed project?
  • Describe your institution’s strengths
    • Why is your institution or research team special
      • State any unique
      • Facilities,
      • Qualifications, or
      • Resources
  • Describe any past successes in projects relevant to this proposed work
Present a timeline or “statement of work” for the project

Use a chart or table to show how the work will be organized and a step-by-step work plan

Describe each phase of the work and how much time it will take

Show important milestones and evaluation points

An added benefit of developing a detailed statement of work is that it helps you to anticipate more accurately how much time a project will take and what resources you need.

- Present a timeline for the statement of work
  - Show a step-by-step plan in the form of a
    - Chart
    - Table
  - Describe each phase
    - How much time each will take
    - Any special resources required for any particular phase
  - Show important milestones and evaluation points

- A detailed statement of work and timeline will help keep you organized and demonstrates your ability to carry out the project.
What are you going to do if your approach doesn’t work?

Reviewers will respect your preparation and insight into the problem if you have a contingency plan.

You should describe how you are going to monitor and assess work as the project proceeds.

What alternative approaches have you considered, and how will you implement them if necessary?

• Describe alternatives
  • Explain that if your approach does not work
    • You are prepared to put in action a contingency plan
  • Describe how you will monitor and assess the work as it proceeds
  • List alternative approaches

• Reviewers will respect your preparation and feel comfortable with your management of the project.
The technical narrative should describe expected outcomes

What concrete, quantifiable, measurable tasks will you accomplish?

How will you measure results and evaluate the success of the project?

Evaluations should occur throughout the project—not be left to the end—so that you can make adjustments and improvements as the work proceeds

• Technical Narrative should
  • Describe expect outcomes
• State how the tasks that you’ll accomplishing will be
  • Concrete
  • Quantifiable
  • Measurable
• Explain how you plan to
  • Measure the results
  • Evaluate success of the project
• Have you described the metrics for your proposed work?
• Evaluation should be scheduled during the course of the project
  • Evaluation should not be left to the end
  • This will allow you to adjust your timeline and improve your work
Western agencies expect that research results obtained in funded projects will be shared freely with other scientists to benefit the entire community

Your proposal will be viewed much more favorably if you incorporate a plan for dissemination of results

Preferred methods of dissemination are:
- Publications in English in peer-reviewed journals
- Presentations at conferences and symposia
- Establishment of an ftp site or web site to distribute electronic media (computer codes, software)
- Hosting workshops or seminars

• Notice the expectation of western funding agencies
  • Project results should be shared with the entire scientific community

• You should develop and state a concrete plan for the
  • Dissemination of research results

• Several methods include
  • Publications in English peer-reviewed journals
  • Presentations at conferences and symposia
  • Establishment of a web site or repository of electronic media
  • Hosting workshops or seminars

• Some western funding agencies determine the success of a project on how widely the results are disseminated and potential impact coming from the publication of the results
Describe the tangible “things” (the “deliverables”) that the funder will get in return for its support

Timely reporting; at a minimum you should provide annual progress reports and a final report

Raw “data”/databases
Computer codes
Collections of physical specimens
Prototype devices
Analytical services
Acknowledgment in publications

• Describe in detail the “deliverables”
  • What will the tangible results be that the funder will get in return?
• Timely progress reports
  • Progress reports allow the funder to see that work is proceeding according to plan
  • Many funders require
    • Quarterly reports
    • Annual reports
    • Final technical reports
• Some other tangible results funders may request include
  • Raw data / databases
  • Computer codes
  • Collections of physical specimens
  • Prototype devices
  • Analytical services
  • Theoretical advancements
  • Acknowledgment in publications
Address the issue of “sustainability”

Explain how you will keep the project going when your grant ends

- Seek additional grants
- License or commercialize technology that has been developed
- Make the program self-funding by selling services

No funder wants to support a program that it knows will die when the money runs out

- Sustainability is often at the root of many funding programs
- Solid proposals often describe how proposed work will
  - Allow research groups to seek additional funding
  - License or commercialize technology
  - Make the program self-funding by selling services
- Explain how the project will continue after the grant ends

- Funders are not interested in supporting a research program that will end as soon as the grant ends
- Explain how you will continue without the help of the funding agency.
A proposal is not a scientific article, it’s a sales document—it must be persuasive to be successful.

“The best proposals have two features in common: They tackle timely scientific issues and present them forcefully. Review panels are bowled over by enthusiasm and clear thinking.”

—Donna Dean, chief of the Biological and Physiological Sciences Review Section for research grants at NIH

• Write your proposal as a sales document
  • Convince the client (the funder) that they will get the best for their money
• State quote
The first “persuader” was not a businessman, he was a scientist

Nearly 2400 years ago, Aristotle articulated the principles of persuasive argument: *logos, ethos, and pathos*

Effective persuaders still base their arguments on those foundations: logic, credibility, enthusiasm

• Persuade the reviewer by having an argument that is
  • Logical
  • Credible
  • Enthusiastic
Successful proposals are persuasive

You want to convince the funder and reviewer of two things:
   The merits of your project
   Your ability to carry it out successfully

Anticipate reviewer objections and answer them in the narrative

• Successful proposals are persuasive!
• Convince the reviewers and funder of:
  • The merit of your project
  • Your ability to carry it out successfully

• Try to anticipate reviewer objections to your proposed work
• Address them in your narrative
Organize the proposal so that the reviewer can understand your logic

Identify your most important points
Marshall supporting facts and information
Arrange the key points and supporting ideas so the reader is moved incrementally through the proposal to the conclusion you want him to reach—that your project is important, feasible, in line with funder objectives, and worthy of funding

• Logical organization—in science, we persuade by logic.
  • Make the reviewer understand your logic
• Identify your most important points
• Support your arguments.
• Arrange the key points and supporting info
  • To move the reviewer through your argument
• Mention what work has been done in preparation for the project, and
• Describe specific attempts to test its assumptions on a small scale.
Add authority to your arguments

Explicitly state and justify your assumptions

Cite references to support your interpretations and document your claims

Demonstrate your understanding of the problem and your familiarity with alternative approaches

Discuss work you have done in preparation for the project and how you have tested its assumptions on a small scale

• Add authority to your arguments
  • Explicitly state and justify assumptions
  • Cite references
  • Demonstrate
    • Understanding of the problem
    • Familiarity with alternatives
  • Discuss preparations

• Citing evidence of preliminary work is a powerful tool; it demonstrates your understanding of the problem, your planning, and your commitment to the project. It often indicates to reviewers the project’s potential for success.
Anticipate reviewer objections

If others have tried to solve the problem and failed, emphasize how your approach is different and more likely to succeed.

Candidly discuss alternative approaches and explicitly explain why your approach is better.

Make sure reviewers have all the facts they need to make a positive decision.

• Anticipate reviewer objections
  • Emphasize how your approach is better than past failed attempts
  • Discuss alternatives
  • Present all the facts
Finally, remember that “facts” may be insufficient—you also persuade by enthusiasm

Enthusiasm must be realistic and grounded in reality

Reviewers are skeptical; they will be put off by overly enthusiastic plans that do not recognize the real obstacles you are likely to encounter

• Persuade by enthusiasm
  • Argument must be realistic
  • Identify real obstacles and
    • How you plan to overcome them
Add a brief “conclusions” section to your technical description

**Succinctly and persuasively, recap:**
- The importance of the work you are proposing
- How your project supports the funder’s goals
- The feasibility of your work plan
- Your team’s unique capabilities
- What you have done to prepare for success

• Add a conclusions section:
• Re-emphasize
  • Importance of work
  • How the work supports the funder’s goals
  • The feasibility
  • Your team’s unique capabilities
  • What you have done to prepare for success
Let’s review what we’ve learned…

Be clear
Be organized
Be detailed
Be positive

*Do or do not. There is no “try.”*

—Master Yoda, *Star Wars*

• State review items