Table of Contents

Overview

Professional Grant Development Workshop

Grant Training Center has been educating for winning grants since 2004. Since then, we have helped thousands of people to navigate the complex and dynamic world of grant writing. This three-day workshop is geared to help you learn how to match your proposal to the guidelines of donor agencies, and to write award-winning grants that will fund your projects.

You will learn about the world of grant procurement, be able to identify the key sections of successful proposals, and know how to demonstrate that your project exhibits the excellence and innovation that will land it on the short list. The diversity of the funding community, common stumbling blocks, and responses to various donor guidelines are all topics that will be covered in depth.

During the workshop, we will break down the strategic plan of grant writing including, but not limited to: needs statement, mission, goal, objectives, activities, evaluation, key personnel, and budgets. Each day our instructor will engage you in interactive exercises, writing, and discussions that will ensure you leave the class understanding how to research, write, and develop your specific project.

The text before you is one tool we will use to help you. The book has two primary functions: the first is to provide a series of worksheets specific to the type of grant you will be writing. The second function is to provide a step-by-step process for you to follow after the workshop is over. Please fill out these worksheets as the instructor asks; you will find that a written record will assist you in future proposal-writing endeavors. We hope that our text and worksheets will provide a series of guideposts to assist you when writing proposals long after this workshop has ended.

Lastly, a word about cell phones. We ask that you respect the instructor's time, as well as that of your fellow participants. If you must answer a call during the workshop, please leave the classroom to do so. To ensure that everyone has a great experience:

PLEASE SILENCE YOUR CELL PHONE NOW.

Overview

Workshop Goals

- Develop, prepare, and write successful NSF grant proposals
- Research and identify appropriate funding sources other than the NSF

Walk-Away Knowledge

- Identify the key elements of a grant proposal
- Effectively communicate and write each subsection of the grant, including the following:
  - Cover Letter
  - Title Page
  - Table of Contents
  - Project Summary or Abstract
  - Intellectual Merit
  - Goals
  - Objectives
  - Activities or Plan of Action
  - Timelines and Graphics
  - Broader Impacts
  - Personnel
  - Budget
  - Dissemination
  - Supporting Documentation
- Understand how to approach and write for the NSF and appropriate foundations
- Ensure an institutional buy-in for your project
- Know how to package a proposal and receive feedback from donors

Workshop Outcomes

- Understand the grant review process
- Learn to submit proposals in your area of interest
- An appreciation for effective teamwork and the benefits thereof
- Present your idea to a mock peer-review panel
- Leave with a full-content proposal outline or concept paper

Introduction

To The Grant Writing Process

Introductory Worksheet

This worksheet will guide you throughout the workshop. Your answers will evolve into an outline or concept paper, which will feed into your grant writing process.

Who are you? Who are you, as an organization?

What is your idea, problem, or question?

Why is your idea significant, important, or needed?

What directorate or funding source is appropriate for your project?

What is the match between your project and the targeted NSF grant?

Who will benefit from your research?

What is the ultimate purpose or outcome of your project?

Introduction to the Grant Writing Process

How will the goal be achieved?

How will the aims or objectives be achieved?

Who will be the PI and other personnel involved in your project?

What is your evaluation plan?

How will you know the project succeeded?

What is the timeline for your grant?

How will your project results be disseminated?

Collaboration & Networking Worksheet

Being aware of connections and potential networking opportunities can make your grant writing process easier. This worksheet will help you delve into the internal and external politics of your organization. Once you have identified potential allies, you can adjust proposal planning to make the most of this knowledge.

How can you convert your expertise into a grant request and tell the donor that you need external funds?

What internal politics do you need to consider prior to beginning the grant request?

What might be some of the external politics you should consider prior, during and after submission?

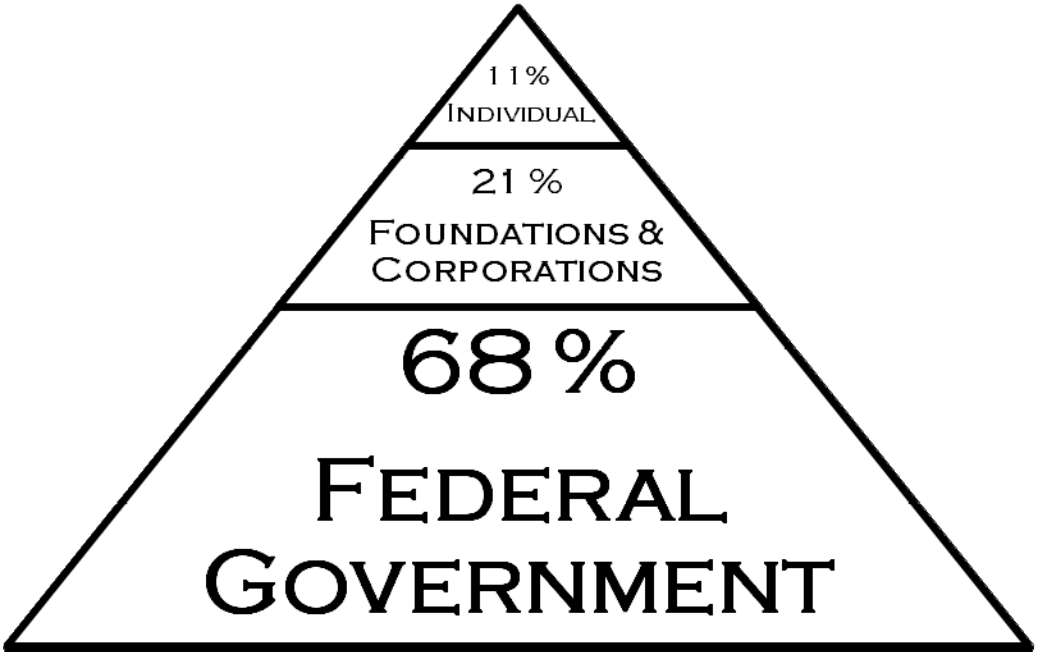
Who are some of the people you could recruit for your team or whose expertise would be helpful to seek?

Who else might be writing grants for the same funding as your team, and is it possible to combine teams or collaborate?

Where is the Money?

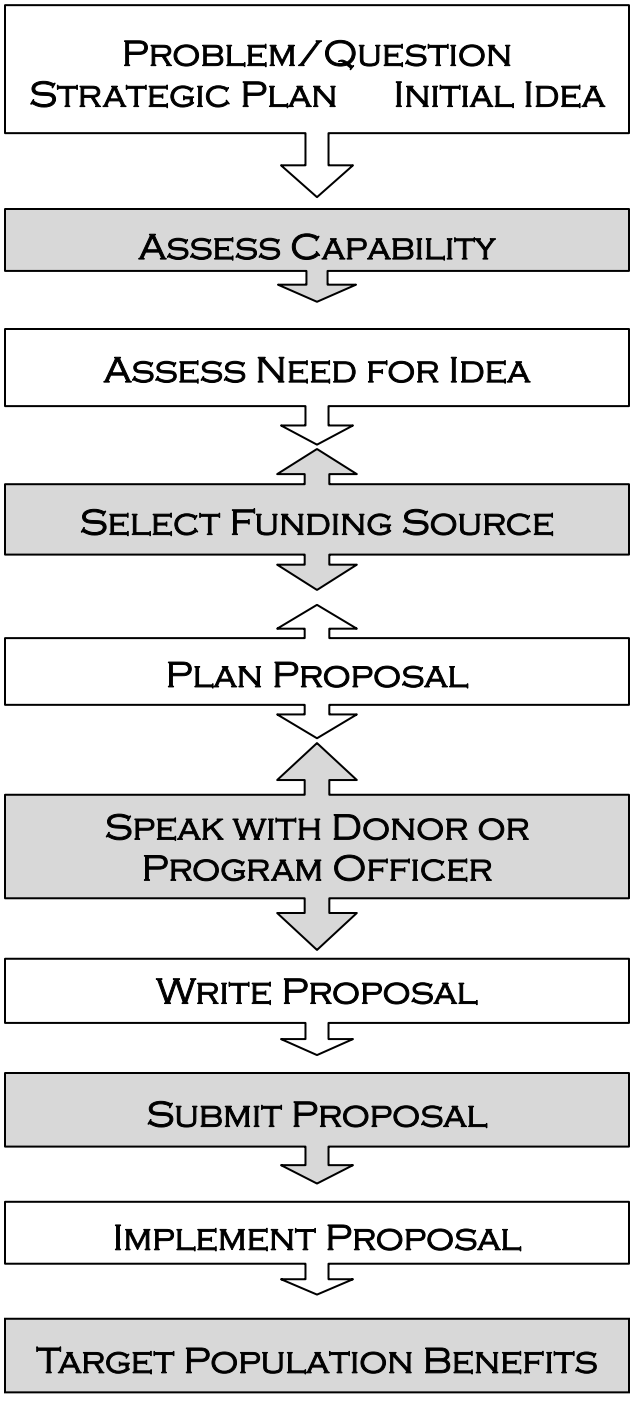
Now that you have collected some general information on the previous page, we can turn our attention to the money. Securing funds for your project or experiment is the whole point of writing your grant. Without the funding, your great idea will remain just that: an idea. So, what is your best chance of getting the award? Where is the money?

$363 Billion Awarded in 2012



An estimated 363 billion dollars was awarded in 2012. Eleven percent of the total was awarded by Individuals, about $40 billion. Twenty-one percent of the total was awarded by Foundations and Corporations, around $76 billion. By far, the largest donor was the Federal Government. With sixty-eight percent of the total, the Federal Government awarded $247 billion to grantees.

Grant Seeking Model



The diagram to the left can help you plan your writing process.

- Consider the problem or question you have in mind, an initial idea you may have talked over with coworkers, or the strategic plan of your organization.
- How will you assess the capability of your organization? Plan out who will gather information from research, interviews, bibliographies, or online databases. Build support by presenting others with a plan, asking for letters of support, putting together a proposal team, and networking with external partners.
- How might you conduct a need-for-the-idea assessment to determine what other factors will play a role in your proposal?
- Selecting your funding source, planning your proposal, and speaking with the donor or program officer may take a few iterations before you can begin writing your proposal in earnest. Do you have time allotted for these steps?
- After writing and editing, you will submit your proposal. Keep the necessary dates in mind to avoid any last-minute problems.
- How will you implement the project?
- Consider your target population and how they will benefit from the proposal.

4 Key Components

Expertise

You must start with a well-researched good idea. Investigating your idea will ensure that you are not reinventing the wheel, as well as providing you with an enriched background on the subject matter. What precedents exist that may help you gain support? What obstacles have others run into that may affect your idea?

Focus

Laying the groundwork to narrow the scope of your grant is the primary emphasis of this workshop. You will learn how to direct your or your team's energy into the proper channels for the best chance at submitting a winning proposal. The following diagram will help you generate a frame to accomplish this task.

Politics

Always a factor, the internal politics of your organization will be a key to gaining support for your idea. With regard to external politics, city and state officials can add support. Furthermore, you may have to consider any contenders for support within your organization. Are other people trying to get their ideas off the ground? Would it make sense to view them as partners instead of competitors? See the worksheet following the diagram for more details.

Strategic Planning

As the previous page illustrates, a request for funding is just one part of a larger scheme. To ensure the best chance for your proposal, the plan must be exhaustively fine-tuned with every point and its consequences considered. The diagram to the left will help you to craft an outline and a schedule that assists with and keeps you organized.

A poorly-packaged good idea will not get funded; a well-packaged mediocre idea will be successfully funded.

Grant Writing Model

In conjunction with the Introductory Worksheet, this diagram will help you to focus on a single idea or problem at a time.

IDEA, PROBLEM, QUESTION

FUNDER	WHO WILL FUND YOUR PROJECT?
ORGANIZATION MISSION RESEARCHER	WHO ARE YOU, AND WHAT IS YOUR MISSION?
MATCH	IS THERE A MATCH BETWEEN YOU AND THE FUNDER?
INTELLECTUAL MERIT	WHY DO YOU NEED THE MONEY?
GOAL OR HYPOTHESIS	WHAT IS THE ULTIMATE PURPOSE OR OUTCOME OF YOUR PROJECT?
OBJECTIVES	HOW WILL THE GOAL BE ACHIEVED OR THE HYPOTHESIS BE PROVEN?
ACTIVITIES	HOW WILL THE SPECIFIC AIMS BE ACHIEVED?
PERSONNEL	WHO WILL RUN THE PROJECT?
BROADER IMPACTS	HOW WILL YOU KNOW YOU ARE SUCCESSFUL?
BUDGET	HOW MUCH WILL EACH ACTIVITY OF THE PROJECT COST?
DISSEMINATION	HOW WILL THE RESULTS OF THE PROJECT BE PUBLISHED OR OTHERWISE DISSEMINATED?
SUSTAINABILITY	HOW WILL THE PROJECT CONTINUE ONCE THE FUNDING CEASES?

Grant Seeking

For NSF Researchers

A Word about Funding Sources

One of the most important aspects of the proposal is getting the right fit between your project and the donor. While exploring the resources presented, keep the answers to the following questions at the front of your mind:

- **Which organizations should you research?**
- **Which types of grants would best support your project?**
- **Which organizations can support the budget you have planned for your project?**

To help you find answers to the questions above, we will turn to the CD issued to you. Please insert the disk into your device now. If you do not have a CD drive, bring up the links attachment sent to you prior to the workshop.

The links and sites on the CD represent a variety of organizations and agencies. While each of them awards grants or provides useful information, not all of them will be the right fit for your project. It is imperative that your initiative and the objectives of your funder are a good match. As an example, you wouldn't research NIH grants as a funding source for your innovative and accurate Arctic weather-measuring instrument!

The resources contained on the CD and printed on the following page are simply a guide to available grant-awarding resources. Once you are familiar with some of the big names in funding, you should conduct searches on your own to find the most appropriate funding for your project. Check with your library or institution's sponsored programs office for other helpful resources.

Some of the directories and registries on the following page will be helpful for you. These organizations have created online resources, rather than printed versions. While there is still a charge to use their online resource, your library or institution may already have a login or other access code. Given the expense for a single resource, it is well worth your time to determine the resources already at your disposal.

Useful Websites

Check off the websites which may apply to your project. Research those you have marked for funding opportunities.

- ☐ Federal Government – Grants from all 26 agencies including, but not limited to: NSF, USDA, NEA,US Department of Education, NASA, NOAA, EPA, US Department of Energy, DoD, DHS, HUD, and SBA.
  www.grants.gov
- ☐ Catalog of Federal Domestic Assistance
  www.cdfa.gov
- ☐ Federal Register – The latest information about the US government
  www.federalregister.gov
- ☐ European Commission – A database for international funding
  ec.europa.eu/contracts_grants/index_en.htm
- ☐ InfoEd Global (SPIN) – Research funding database
  infoedglobal.com
- ☐ Foundation Center
  foundationcenter.org
- ☐ Community of Science (COS/Pivot) – All-inclusive search engine
  www.cos.com
- ☐ American Educational Research Association
  www.aera.net
- ☐ Graduate & Postdoctoral Extramural Support
  www.gdnet.ucla.edu/grpinst.htm
- ☐ Fundsnet Services – Fundraising directory
  www.fundsnetservices.com
- ☐ The Chronicle of Higher Education
  chronicle.com
- ☐ The Chronicle of Philanthropy
  www.philanthrophy.com

Foundation Funding

Now that you have peeked into the world of Federal Government funding, we will take a look at a few other sources for funding. Foundations have the potential to be a good fit for your project. It's possible that your project or organization may be eligible for these kinds of grants. Every organization is different, and you may find that only one or two grants will be a good fit for your project. The point is gain the necessary funding to do your preliminary research. The descriptions of grant types below will assist you in finding prospective sources for funding, depending on the type of project you have in mind.

Common Types of Grants

General Purpose & Operating Support Grants

General Purpose

If your organization receives a general purpose grant, the money can be used to support the general expenses of your organization. Almost any expense – from new filing cabinets, to the printing of flyers, to the heating bill – is eligible. Receiving a general purpose grant means the funder supports your organization’s overall mission, and trusts you to make good use of the money.

Operating Support

Receiving an operating grant means your organization can support the personnel expenses of operating your organization. Any individuals who need to be hired for the project can be paid with these funds. Winning an operating grant means the funder wants to support your personnel needs.

Program & Project Support Grants

Aside from general purpose or operating support grants, most other grants are some form of program or project support. Usually, a project grant is given to support a specific, connected set of activities, with a beginning and an end, explicit objectives, and a predetermined cost. The grant may be project-specific or restricted, and must be used for the directed purpose. In general, project grants are given to support projects related to the mission of the organization receiving the money. There are dozens of project grants. Here are some of the most common:

Planning Grants

If your organization is planning for a major new program, you may need to spend a good deal of time and money just figuring out how it will look as a finished product. Before you can even write a proposal to fund the new effort, you may want to research the needs of your constituents, consult with experts in the field, or conduct other planning activities. A planning grant supports this kind of initial project development work.

Seed Money or Start-Up Grants

A start-up grant helps a new organization or program in its first few years. The idea is to give the new effort a strong push forward, so that it can devote its energy right away to setting up programs without worrying constantly about raising money. Such grants are often for more than one year, and frequently will decrease in amount each year. For instance, a grant might be for $25,000 the first year, $15,000 the second year, and $7,000 the last year. The funder assumes that the new organization will begin to raise other funds to replace the decreasing start-up grant.

Management or Technical Assistance Grants

Unlike most project grants, a technical assistance grant does not directly support the mission-related activities of the organization. Instead, it supports the organization’s management or administration – its fund raising, marketing, and financial management, and so on. This type of grant might help hire a marketing consultant, or pay the salary for a new fund-raiser position.

Facilities and Equipment Grants

Sometimes called "bricks-and-mortar" or capital grants, these grants help an organization buy or restore a long-lasting physical asset – a building, computer, or van, for instance. The applicant organization must make the case that the new acquisition will help it serve its clients better. Funders considering this type of request will not only be interested in the applicant's current activities and financial health, but will also ask about financial and program plans for the next several years. They want to be sure that if they help an organization move into a permanent space, for example, the organization will have the resources to manage and maintain it. No funder wants to help pay for a new building, only to have it close in four years because it is too expensive for the organization to maintain.

Endowment Grants

Some nonprofit organizations have set aside money for investing and earning interest. The organization spends only the interest and keeps the original sum, or principal, untouched. Such a fund is called an endowment and is commonly found within organizations with large physical plants, such as hospitals and colleges. Periodically, organizations launch fund-raising efforts to start or add to an endowment. Like facilities and equipment grant proposals, endowment requests will prompt funders to ask hard questions about the long-term financial outlook of the applicant. The funder wants to be sure that any gift to an endowment will stay with the principal earning interest, and not be drawn out to meet annual operating costs.

Program-Related Investments (PRIs)

In addition to grants, the IRS allows foundations to make loans – called program-related investments or PRIs – to nonprofits. PRIs must be used for projects that would be eligible for grant support. They are usually made at low interest, or even no interest. Unlike grants however, PRIs must be paid back to the grant maker. PRIs are often made to organizations involved in building projects.

Proposal Letters

Even if you know that one of the grants described is the perfect fit for your project, you will still have to convince the organization or individual that your idea is the best use of their resources. The best way to get your foot in the door is to write a Proposal Letter. Often this step is required by foundations, corporations, and individuals, and the quality of the letter can make or break your chances of winning the grant.

It may take as much thought and data-gathering to write an effective Proposal Letter as it does to prepare a full proposal. Don't assume that because it is only a letter, it isn't a time-consuming and challenging task. Every document you put in front of a funder says something about your agency; make sure your documents convey the right message. Each step you take with a funder should build a relationship for the future.

While most Proposal Letters should not exceed one page, a few exceptions may be made. For instance, if your organization has received funding from Foundation X, it may behoove you to take a couple of paragraphs to remind them how helpful their previous funding has been. To help you design a great and effective Proposal Letter, the components are detailed below.

Ask for the Gift

The letter should begin with a reference to your prior contact with the funder, if any. State why you are writing the letter, as well as how much funding is required from the particular foundation.

Describe the Need

In a very abbreviated manner, tell the funder why there is a need for this project, piece of equipment, etc. Remember, this letter helps the donor understand why they should grant your project the funding for which you are asking.

Explain What You Will Do

Just as you would in a fuller proposal, provide enough detail to pique the funder's interest. Describe precisely what will take place as a result of the grant. Donors who require this step will always want to know where their money and other resources will be directed.

Provide Agency Data

Help the funder know a bit more about your organization by including your organization's mission statement, a brief description of programs offered, the number of people served, and personnel data, if appropriate. Getting to know the details of your project will help the donor understand why their funding is necessary

Include Appropriate Budget Data

You can include half-page budget in your letter request, if some aspect of your financial planning is particularly compelling. Decide if this information should be incorporated into the letter or in a separate attachment. Whichever course you choose, be sure to indicate the total cost of the project. You should only discuss future funding if the absence of this information will raise questions.

Close

As with the longer proposal, a letter proposal needs a strong concluding statement. You must remind the donor of the highlights without beating them over the head with details.

Attach Any Additional Information

The funder may need much of the same information to back up a small request as a large one. Some items which you may find useful to include are as follows: a board list, a copy of your IRS determination letter, financial documentation, and brief resumes of key staff.

Medical Research Proposal Letter Example

January 9, 2013

Foundation representative, name of the foundation, address

Dear Mr. Alfred:

I am writing to inquire if the Bristol-Myers Squibb Foundation would consider a proposal from the Department of Cardiothoracic Surgery at New York University requesting a research grant of $150,000 per year for two years, to support our research project entitled “Calcific Aortic Stenosis: Mechanisms of Calcification and Development of Biological Markers.” The ultimate purpose of our research is to improve the clinical outcomes and quality of lives of patients suffering from cardiovascular diseases; this parallels the mission of Bristol-Myers Squibb Foundation to extend and enhance human life.

After hypertension and coronary artery disease, calcific aortic stenosis (AS) is third most common cardiovascular disease in the Western world. With a prevalence of 3-9%, calcific AS is also the most frequent valvular disease and the main cause for valve replacements in patients over the age of 60. Despite the high prevalence and mortality associated with calcific AS, there is no effective medical therapy for the disease and little is known about the molecular mechanisms driving its pathogenesis. The aim of our research is therefore twofold: (1) to identify proteins in patients with calcific AS that can be used to diagnose and monitor the progression of AS, and (2) to investigate the biological mechanism by which such proteins promote calcific AS so that we can identify possible therapeutic targets.

This research is a collaborative effort between clinicians within the Department of Cardiology and basic science researchers and surgeons with the Department of Cardiothoracic Surgery at New York University. This collaboration gives us the ability to comprehensively study the disease process of AS, from its initial diagnosis by Cardiologists to its ultimate treatment by Surgeons. The union of the clinical expertise from both Cardiologists and Surgeons with the analytical proficiency of Basic Scientists makes this an exciting and innovative project that will certainly increase our understanding of the pathogenesis of AS and hopefully serve to impact its future treatment.

The Department of Cardiothoracic Surgery at New York University Medical Center is an internationally recognized program performing over 1,200 open-heart operations per year. Through the partnership between our research and clinical divisions, our Department is uniquely poised at the forefront of cardiothoracic surgery as we have the capability to both, study the molecular basis of diseases and to apply the knowledge gained through research in the development of novel clinical therapies.

Thank you for your kind consideration of our project. I will be contacting you within the next three weeks for any feedback you may have. In the meantime, please do not hesitate to contact me if you desire additional information or if you have any questions. I look forward to talking with you soon.

Sincerely,

Lawrence B. Green, M.D., FACS, FACC
Professor of Cardiothoracic Surgery

Grant Seeking & NSF

About the NSF

The NSF is organized a lot like a university; instead of departments and colleges, it has divisions and directorates. The program directors are like professors with areas of specialization which correspond to the research areas covered by their programs. The division directors are like department chairs. They oversee the broad research areas covered by the programs and deal with administrative issues. The Assistant Directors are like Deans because they lead the directorates and are responsible for the major research directions in Engineering, Physical Sciences, etc. The Director of the NSF is responsible for the overall direction of Science and Engineering Research. However, unlike a university, NSF reorganizes constantly. While this can be disconcerting, in the long run it keeps programs from stagnating and helps keep the NSF on the forefront of research.

Find out which program supports your research area; it may not be obvious. Ask your colleagues about the current program director for your research area. Find out if there are other people to whom you should speak, and what special initiatives might apply to you. The list of telephone numbers and e-mail addresses is available on the NSF web site. Listen to what the program director says. He or she will assign the reviewers and will make the final decision on your proposal.

The Process

You have a great idea for research that will change the world. Now what do you do? If your specialty falls under the science, technology, engineering, or mathematics category with an emphasis on education, your process will probably involve the following steps:

- **FastLane** – Always be sure no one else has had your idea!
- **NSF Publications** – Find and read articles by people who might decide the fate of your idea.
- **NSF Website**– Funding for your idea can only happen with an appropriate grant.

FastLane

If you are unfamiliar with the site, imagine a digital warehouse that contains records of the latest trends in funding, awards that have been granted, and applications for funding. It is the query and submission subsection of the

main NSF site. As a researcher, this site is the number one tool that sets you up for success. Type the address below into your web browser to visit the FastLane homepage:

http://www.fastlane.nsf.gov

The page lists advisories in reverse chronological order in the center of the screen. A dual menu runs across the top of the page, listing the different modules available. When researching a new project, your focus should be on the "Proposals, Awards, and Status" function. You will need to log on to continue in the process. If you do not have a login, you must be a Primary Investigator (PI) or Co-PI, a person who has submitted a proposal, or a previous grantee to gain access to the rest of the site.

NSF Publications

If the FastLane website is your number one tool for success, the NSF Publications site is surely your backup plan. Journal articles with ties to the science, technology, engineering, and mathematics worlds may be found here. Type the address below into your web browser to visit the NSF Publications homepage:

http://www.nsf.gov/publications/ods/

In the middle of the page, you will see a search bar. If you enter keywords for your project, a list of articles based upon relevance will be produced. However, you have already done the filtering of funded research. Use NSF Publications as a method to research the researchers. The list of PIs from the projects you examined earlier on FastLane has now become a list of potential reviewers. A search of NSF Publications is the best way to find out the kind of projects they have done, the types of successful research they have conducted, and their investigatory interests.

You may discover that the PI you wanted as a reviewer doesn't have the same amount of enthusiasm about your topic as you. You might find out that a PI has written so many articles about your research topic, it may be better to collaborate with him or her. The point is to find out this kind of information before you spend two months writing a proposal.

Reviewing the literature serves another purpose: enriching your knowledge base. As an example, you may have decided upon a particular Postdoctoral Mentoring Plan (PMP). Perhaps you read an article in which the PI discovered that a few adjustments to a similar PMP were necessary to make the project coalesce into something journal-worthy. Regardless, more knowledge is always a good thing when it comes to research.

NSF Website

Having researched the FastLane and NSF Publications sites, you are now ready to begin the search for an appropriate grant. Type the address below into your web browser to visit the NSF Funding page:

http://www.nsf.gov/funding/

Contact the program officer of your organization to discuss the variety of grants you feel are well-suited to your research. While speaking with the program officer, be sure to inquire about the money and time constraints of each grant discussed. You may find it helpful to contact the program officer to determine the institute's enthusiasm about your research, advice on preparing an application, getting the right fit with the institutes and study sections, and for updates on your application status. Contacting the more experienced researchers at your institution is a great method to get practical advice. Mentors are a necessity for new researchers, as they will help guide you through the process of obtaining an NSF grant.

Grant Writing

For NSF
Researchers

Writing an NSF Grant Proposal

The Basic Components of an NSF Proposal

There are nine basic components that create a solid proposal package:

- **Project Summary**
- **Project Description**
- **References Cited**
- **Biographical Sketches**
- **Budget**
- **Current & Pending Support**
- **Facilities, Equipment & Other Resources**
- **Special Information & Supplementary Documentation**
- **Appendices**

Project Summary

This section is not an Abstract. Your project's first chance to impress is limited to one page. Written in the third person and publication-ready, your project summary describes the activity that would result if your proposal were funded. It contains your stated objectives and methods to be employed. Note that you must clearly address the review criteria in separate paragraphs, but you no longer need to label them:

- **Intellectual Merit** – This portion describes how important your proposed activity is to advance knowledge and understanding within your own field and across different fields. It also acknowledges how well qualified you and your team are to conduct your project. You may comment on the quality of prior work, if it is appropriate. Your proposed activity should also suggest and explore creative and original concepts. Your project should be well conceived and organized, with sufficient access to resources. If your project meets the above points, it will be considered as having Intellectual Merit.
- **Broader Impacts** – This section describes how well your activity advances discovery and understanding while promoting teaching, training, and learning. It also portrays how well your project broadens the participation of underrepresented groups. Your project should enhance the infrastructure for research and education, such as facilities, instrumentation, networks, and partnerships. Explain how the results from your project will be disseminated broadly to enhance scientific and technological understanding. You should also describe the potential benefits of your project to society.

Project Description

This section has a firm 15-page limit. Proposals over this limit are thrown out without consideration of the project idea. Within the 15 pages, you will include these pieces:

- **Background and Motivating Rationale** – This section provides a concise summary of the current state of knowledge of the problem you are investigating. It also conveys a compelling argument for funding your project. You are convincing the reviewers to fund your project because it is transformative and needed now.
- **Hypotheses and Objectives** – At the core of every successful NSF proposal is good science; a solid conceptual framework couched in terms of mutually exclusive hypotheses, and a set of objectives or specific aims designed to test your idea. The conceptual framework (your idea) is something that you as a scientist have developed based on previous work (yours or that of others). Be sure to describe your idea in terms of innovation and creativity. You must also demonstrate that you and your team are uniquely qualified for the work involved in your project.
- **Methodology** – You will need to describe the approaches or methods you will use to test the study hypotheses. Be sure to provide sufficient detail to satisfy reviewers that you have the expertise to carry out the work. Also, you should include a basic plan to train and involve students in conducting the experiments for broader impacts.
- **Implementation Plan** – Your description will include a section on how the project will unfold. Begin with hiring of key project staff and the overall sequence of experiments to be conducted. Move to training and mentoring for broader impacts. Your data analysis and interpretation will add to your intellectual merit. Presentation, publication, and the broader dissemination of your project results are also necessary parts of the implementation plan.
- **Personnel** – You should describe the qualifications and roles the PIs and other key personnel will play in the project. The emphasis here should be on expertise needed for your project and the personnel who embody such skills, even if you repeat the information found in the bio sketches. You have to demonstrate that you and your assembled team possess the skills necessary to conduct the work.
- **Timeline** – Usually, proposals include a graphical depiction of the timing and duration of each project task, broken down over the term of the grant. Difficult tasks sometimes require task analysis or time

trials to show that the tasks can be completed in the time, and with the personnel requested. Most proposals include timelines, but not always carefully constructed or consistent with project implementation plan. Don't let your proposal land in the decline pile because you did not invest a little effort in your timeline!

- **Preliminary Data** – Surprisingly, this section can kill a proposal. Your work needs to be placed in context; if not, you will appear naïve for not citing relevant literature. Most successful proposals present prior results from NSF-funded projects within the last 5 years, and which support the investigator's hunch about what the study will find. If such information does not exist, you should at least make a convincing case (proof-of-concept) that the investment is worthwhile, based upon projects and literature. Summarize others' work with concision and clarity. If you have trouble finding this data, try to obtain some seed money to generate your own. Institutions and foundations often provide money for this; the NSF may make small proof-of-concept awards to support development of compelling ideas. If you include Preliminary Data, be sure to provide the following for each project:
  - **NSF** award number, amount and period of support
  - **Title** of project
  - **Summary** of results, including any contribution to the development of human resources in science and engineering
  - **Resulting** publications
  - **Brief** description of data, samples, physical collections and other related work products
  - **Provide** a description of the relationship of your completed work to your proposed work, if you are submitting a renewal.

Do not forget to allot room for visual aids such as: charts, graphs, maps, photographs and other materials. Your objectives should span the duration of your project and include the expected significance. The relationship to longer-term objectives, your works in progress, and work elsewhere should be described here as well. Outline your statement of work, including the broad design of activities to be undertaken. Do not leave out your plans for preservation, documentation, and sharing of the following: data, samples, physical collections, curriculum materials, and other research and education products. Concision and brevity are your friends! Lastly, it bears repeating:

You are limited to 15 pages!

References Cited

Standard bibliographic citations are required for all references cited in your proposal. Your citations are a separate document of unlimited length, and not included in the 15-page project description limit. Citations can appear in your proposal description as either numbered or author/date format. Any publications listed in Preliminary Data can be numbered, and therefore included in References Cited as a space-saving practice. If the reference material is available electronically, the website address should be included as part of the citation. Be sure to consult a style guide!

Biographical Sketches

A biographical sketch with a 2-page limit is required for each individual identified as senior project personnel. These sketches provide important supporting information on experience of the PI(s), relevant publications, broader impacts, and conflicts of interests. For all senior project personnel, list only the following information:

- **Professional Preparation** – List any undergraduate institution(s), major(s), degree and year. Then list graduate institution(s), major, degree and year. Move on to postdoctoral institution(s), area, and inclusive dates (years).
- **Appointments** – This consists of a list – in reverse chronological order – of all the individual's academic and/or professional appointments. It will begin with the current appointment.
- **Publications** – Five of your publications which are most closely related to your project, and five others. The second group need not relate to your current project, but they should be examples of your best work.
- **Synergistic Activities** – Up to five examples of activities which demonstrate broader impact in your professional and scholarly activities. For example, list any innovations in teaching and training, contributions to the science of learning, or development and/or refinement of research tools. You may also note computation methodologies and algorithms for problem-solving, or development of databases to support research and education. Be sure to include broadening participation of groups underrepresented in STEM programs, as well as service to the scientific and engineering community outside of your immediate organization.
- **Collaborators** – List any of the following persons with whom you have worked: co-editors during the preceding 24 months (on a

journal, compendium or conference proceeding); co-authors in the last 48 months (for projects, books, articles, reports, abstracts, or papers); your graduate and postdoctoral advisors (with current institutional affiliations); and thesis advisees and postdoctoral students you have sponsored during the past five years, including the total number advised or sponsored. This information is used to filter out reviewers who may have a conflict of interest.

Budget and Justification

Your proposal may request funds under any of the budget categories listed, so long as the item and amount are considered necessary, reasonable, allocable, and allowable under the applicable cost principles, NSF policy, and/or the program solicitation. Always request what is needed to conduct the research and justify every request. However, money is tight, and everyone involved in proposal review wants to make sure precious grant funds aren't wasted. If you justify every request, you will alleviate any fears that money will be wasted. Program Officers want to fund grants; the more they fund the better. A higher program funding rate looks good for everyone involved. If your budget request is large – say, larger than the average award size for the program – then your budget will likely get more scrutiny.

Reviewers generally don't pay a too much attention to budgets. As a rule, the NSF is far more interested in the innovation and creativity of a project than the cost. Sometimes items mentioned in proposal raise red flags, drawing reviewers' attention to the budget. Be careful to make sure that requested items are appropriately budgeted in your proposal.

The major cost categories are as follows:

- **Salaries and Wages** – Note that salary compensation for senior project personnel is limited to two months per year, whether during the academic year or summer.
- **Travel** – These items should be organized by destination and cost for airfare, lodging, per diem, etc.
- **Equipment** – The NSF defines equipment as an item of property that has an acquisition cost of $5,000 or more (unless the organization has established lower levels), and an expected service life of more than one year. Institutions sometimes use lower cost thresholds.
- **Participant Support** – This section includes costs of transportation, per diem, stipends and other related costs for participants or trainees

(but not employees) in connection with NSF-sponsored conferences, meetings, symposia, training activities and workshops. You can use these funds to support undergraduate student participants in research training programs.

- **Other Direct Costs** – Some examples are materials and supplies, publication, consultant services, computer services, sub-awards, and other.
- **Facilities and Administrative Costs** – This is also known as the F&A or Indirect Costs section. You can funnel the equipment that falls short of the $5000 threshold into this category, as well as some off-campus costs. Typically, you cannot use these funds for Participant Support.

Prepare a budget for each year of support requested. A cumulative budget will be automatically generated by the system. A budget justification of up to three pages should also be included. Be sure to describe in detail the basis for the items included in the cost estimates, and the need for the items in relation to the proposed activities. As an example, salaries should be justified with a description of the role and responsibilities each person has with regard to the scope of work.

Current and Pending Support

All current project support – no matter the source – must be listed. This includes all Federal, State, local, and/or foreign government agencies, public or private foundations, and industrial or other commercial organizations. This information is necessary for each PI and other senior personnel, even if no salary will be paid. Additionally, you must include your proposed grant. Each listing should contain the following information:

- **Grant Title** – Be sure to give the NSF the correct title. This is not the place to have a typographical error.
- **Funding Amount** – The total award sum for each project must be disclosed, even if the project is currently funded by the NSF. Keep in mind that the reviewers will not simply dismiss your project due to it being well-supported by other organizations.
- **Source** – The name of the individual, organization, or agency must be attached to the grant funds they have or will award.
- **Dates** – The time allotted for funding coverage can assist the NSF in determining when funds may become necessary to your project.

- **PI's Commitment of Effort** – The number of person-months per year devoted to each project helps the review panel determine how engaged the PI will be in each project.

Facilities, Equipment and Other Resources

You should include an aggregated description of the resources that your organization will provide for your project, should it be funded. The information you provide in this section will be used to assess the adequacy of your available organizational resources to perform the proposed research. Reviewers will be asked to evaluate the information during the merit review process, and the relevant NSF Program Officer reviews it for programmatic and technical sufficiency. Be sure that you do not overstate the resources available for your project. Your budget exists to cover the cost of facilities and equipment that your organization cannot currently provide.

Special Information & Supplementary Documentation

Include in this section any letters of commitment which document your intended collaborative efforts. You should also place the information about the use of human subjects, recombinant DNA, hazardous materials, or vertebrate animals in this section. If you have authorization for work in foreign countries, it would be a good idea to include that paperwork in this section. You should not include letters of support unless required by the program solicitation, as reviewers are under no obligation to review them. However, if the program solicitation does call for letters of support, be sure to follow the given format.

Do not forget that you can submit positive or negative requests for reviewers for your project. You are invited to suggest names of up to 12 persons you believe are especially well qualified to review the proposal. Of equal advantage is your ability to identify persons you would prefer not review the proposal, and list these people by name. The suggestions may serve as one source in the reviewer selection process at the Program Officer's discretion. Submission of such names is optional, but do not hesitate to use this opportunity if necessary. The NSF ensures that reviewers have no conflicts of interest with the proposal, before the review process begins.

Now we will turn our attention to two significant portions of your project proposal's Special Information & Supplementary Documentation section:

- **Postdoctoral Mentoring Plan (PMP)** – This is not a requirement, just a very strong recommendation. Your PMP is restricted to 1 page.
- **Data Management Plan (DMP)** – This plan is required for all successful NSF awards. Your DMP is restricted to 2 pages.

First, we will address the PMP. You may recall that the training of a new generation of STEM-educated people is central to the NSF mission. This training encompasses mentoring of postdoctoral researchers. Postdoctoral researchers provide an invaluable service to more established researchers; they run labs and oversee the work of students. Established researchers have a responsibility to ensure that postdoctoral researchers gain the experience necessary to become established researchers themselves.

If you are requesting support for a postdoctoral study, you must include – in no more than one page as a supplementary document – a description of the mentoring activities that will be provided for such individuals. Examples of these activities include career counseling, training in preparation of grant proposals, publications and presentations, guidance on ways to improve teaching and mentoring skills, how to collaborate effectively with other researchers, and training in responsible professional practices. Proposals missing the requisite mentoring plan will be returned without review.

Now we will address the DMP. You should submit a DMP, even if no data will be produced in the course of your project. Simply include a statement to the effect of "No data are expected to be produced from this project." In collaborative proposals or proposals involving sub-awards, the lead PI is responsible for assuring data storage and access. The NSF definition of data includes both original data (observations, measurements etc.) and metadata (experimental protocols, software code for statistical analysis, etc.).

The NSF recognizes that each area of science may have its own definition of what constitutes data. The management of data and the accepted norms are changing as different disciplines of science increasingly collaborate. Your DMP should be appropriate for the data being generated, and reflect the best practices and standards in the area of research being proposed.

Your DMP should describe how you and your team will manage and disseminate data generated by the project. The detail should be sufficient to enable evaluation of the plan (and past performance, if any) during the merit review process. You will need to consider many factors, such as the following:

- **Data Type** – Your DMP should spell out what kinds of data will be collected, the standards you will employ, and how long will data be stored. Physical data will need a different type of storage and archiving plan than digital format data. If your data storage involves physical facilities and/or cyber resources, you will need to include the procedure for housing and preserving the data. This topic meshes with your data dissemination plan, as well.
- **Data Obligations** – To write a good DMP, you will need to think about the rights and obligations of your team with regard to the data. Have you considered what to do if someone leaves your project before it has finished? The implementation of your DMP will be monitored through the annual and final report process, as well as during evaluation of subsequent proposals. Data management must be reported in subsequent proposals by you and your team under the Preliminary Data section. Take this requirement seriously.
- **Dissemination & Storage** – Your plan for dissemination and verification of the results of your project should be thoughtful and realistic. The format you will use to make the data available to others should take your community standards into consideration, and include any metadata produced. The archival location of the data should be one of your primary concerns. Institutions are investing in Data Management and/or Storage infrastructure to help researchers meet this requirement. Be sure to consult with technology services personnel at your institution. You will only want to use established, accessible professional data-storage infrastructure. Even then, ensure your digital project data are backed-up and mirrored at other sites, if possible.

In summary, to write a successful research proposal, remember to:

1. Write in plain language with concision.

Use simple language, not jargon or advanced technical or medical terms.

2. State your objectives plainly and simply.

Describe what you are going to do in detail to achieve your goals.

3. Present a clear plan for carrying out research, including spelling out your methodology and resources.

If you cannot answer how you will implement your plan after reading through this section, you will need to do a rewrite.

4. Pick a good topic and address your innovation directly.

Be sure that you have answered the following questions: What is new or different about my project? What will I contribute to the existing knowledge or add to the literature?

5. State the following in your plan of operation:

- This is what I will do.
- This is how I will do it.
- This is what I have done.
- This is what is being done now.

6. NEVER complain about lack of resources, and keep your descriptions of available resources short.

Discuss: Laboratory space and needed equipment; clinical professionals, environment, and support; animal space, feeding, and health care; computer numbers and capabilities; office equipment can persuade readiness sometimes; and list anything else that might help.

7. Set realistic and reasonable timelines.

8. Let senior colleagues review your proposal before you submit.

9. Remember that the review process is only SINGLE blind.

10. Resubmit if you are not funded the first time, but be sure to apply the advice given in the reviews when revising.

Persistence pays off. Few people get funded the first time.

11. Speak directly to the issue of fit in your proposal.

12. Add a senior collaborator as co-PI or consultant.

13. Talk to your program director in advance.

14. Work on something you are excited about!

15. DO NOT submit duplicate proposals for different programs.

You will only succeed in irritating the reviewers and having funding denied.

16. Only submit your best work!

After Submission

All proposals arrive at NSF electronically - mostly through **fastlane.nsf.gov** and occasionally through **research.gov**. The proposals are routed based on the program announcement number or the NSF division given by the PI. Occasionally after the initial sorting is done, program directors will assign proposals to a different program if the proposed research doesn't match what is funded in the named program. Once the proposal has been assigned to a program director, it is ready for review. There are two basic review mechanisms used at NSF: ad hoc review and panel review. Both are single-blind peer-review mechanisms; the reviewers know who the PI is, but the PI does not know who the reviewers are.

Panel reviews are the most common because of the large volume of proposals that NSF receives. Here's the math: Most reviewers will write reviews for about 3 proposals per year. If 150 proposals are submitted to a program, at least 900 review requests must be sent out (6 reviewers per proposal). And that's just for one program, if all the reviewers agree to the work. All the other programs are working with the same numbers – and the expertise of many reviewers overlaps several programs.

Panel Review: For a panel review, the program director selects 10 to 15 experts in a field and asks them review a set of related proposals. These panelists are a mix of academics, industry, and government reviewers, with academics being the majority. Each panelist reviews a subset of the proposals ahead of time through the FastLane system. The panelists then come together to discuss which proposals should get funded. Most reviewers find it easier to rank a set of proposals than to write a detailed review of each proposal. The reviews from a panel are often not as detailed as those from an ad hoc review, but they tend to be more directed. If one reviewer completely misses the point of a proposal, this will come out during the panel discussion. This results in fewer out-in-left-field reviews from panels than from ad hoc review. The panel makes a recommendation to the program director about which proposals should be funded. He or she can accept the recommendation or not, at his or her discretion.

Ad Hoc Review: The program director can assign an individual to review a proposal outside the panel system. This may happen when the expertise of a panel does not cover a particular aspect of a proposal. Ad hoc reviews

may also be used when a proposal arrives outside the normal funding cycle. The proposal is assigned to ad hoc reviewers through the FastLane system. The reviewer is given about three weeks to review the proposal.

The program director reviews the proposal, the panel recommendation, and any ad hoc reviews, then makes a decision to fund or decline the proposal. The program directors are supposed to exercise judgment. For example, a reviewer might appear to be a perfect match for a proposal, but when the review comes in, it may be obvious that the PI's work conflicts with the reviewers work, and the reviewer is biased.

Often the decision to fund involves deciding whether to fund the proposal at the full or a reduced amount. The program director makes the decision based on the program budget, the proposals that have been funded, and the pending proposals. The program director completes a form to support his or her decision. The proposal goes to the division director who must concur with the decision for it to be official. You are notified by email once the decision is final. If your proposal is funded, the NSF grants office deals with all the paperwork required to make a grant.

A grant from NSF goes to the institution, not to the PI. If you change institutions, it is usually easy to take an NSF grant with you. However, you must negotiate the arrangements with your current and future institution. NSF will not intervene in these negotiations. Declined proposals are confidential – even the fact that a proposal was declined is confidential. For grants, the titles, abstracts, PIs, and funding amounts are public information, but the proposal itself is confidential.

Being a Panelist or Reviewer

Remember that for every proposal you submit, five or six of your peers take the time to read it, write a review, and travel to DC to discuss it. Panels tend to be composed of senior faculty who will be asked to write letters for your promotion and tenure case. They are also the people who are on program committees and editorial boards. Only submit your best work! If you are invited to be on a panel, you should accept if possible. Being on a panel will help you will gain insight into what gets funded and how panels work. The peer review system only works if you understand that with every proposal you submit, you incur a debt of six proposals to review.

Workbook

For NSF
Researchers

How to Use This Workbook

Before you begin answering the questions on the next several pages, please note that your responses will direct your proposal's path. Therefore, give the responses that you feel are best suited to this task. Many of you will find that you must consult with your organization before completing some of the pages. Some of you may face a decision point between writing about an entirely new project or rewriting a previously unsuccessful proposal. No matter which path lies before you, remember that you can always print another copy of the workbook from your Resource CD.

Questions to Generate Project Ideas

Begin the exercise for your research proposal by articulating your thoughts concerning a problem or need you have noticed. Consider the following questions while filling in your responses below: What do you want to do, and how do you see yourself carrying out your ideas? Are your objectives and expectations in line with those of your organization?

What problem or need am I addressing?

What is your hypothesis or problem statement?

What are your research questions?

Why is the problem important and interesting?

What is the ultimate purpose of your research/applied research?

What actions will you take, and how will they lead to a solution for your problem?

What resources will you need to complete the research (equipment, graduate students, facilities, and access to the industry)?

How will your project improve integration of research and education?

What will you know at the conclusion of the project that we don't know now?

What are some of the priority areas and systems that will be affected by or involved in your project?

How will your project improve demographics and diversity among students within STEM career paths?

How will your project broaden participation, especially for underrepresented groups of people?

What international collaborations, if any, will your project include?

How will your results be measured and evaluated?

How will the results from your evaluations be disseminated?

Questions to Ask & Answer about Your Idea

The questions below are imperative to gaining both internal and external support for your proposal. Your idea must be able to persuade and compel others to lend their manpower, financial resources, and/or time to your project. Keep this in mind when answering the following questions.

Why is your idea unique?

Why is your idea timely?

Why is your idea urgent?

Why is your idea compelling?

If your idea is funded and the project implemented, how will this project capitalize on your organization's strengths?

If your idea is funded and the project implemented, how will this project help overcome some of your organization's weaknesses?

Building Intellectual Merit

This worksheet will help you to add intellectual merit to your project. The more detailed your answers, the stronger your project summary will be.

How will the proposed activity advance knowledge and understanding within its own field or across different fields?

How well qualified is the proposer (individual or team) to conduct the project?

To what extent does the proposed activity suggest and explore creative, original, or potentially transformative concepts?

How well conceived and organized is the proposed activity?

Is there sufficient access to resources?

Considering Broader Impacts

The answers you provide here will ensure that you have thought over the broader impacts of your project. Further, the questions will help you generate alternative and innovative approaches to your project.

Describe how the activity will advance discovery and understanding, while promoting teaching, training, and learning.

Describe how the proposed activity broadens participation of underrepresented groups (e.g., gender, ethnicity, disability, geographic, etc.) in your project.

How will your project enhance the infrastructure for research and education, such as facilities, instrumentation, networks, and partnerships?

Describe your plan for disseminating results broadly to enhance scientific and technological understanding.

What may be the benefits of the proposed activity to society?

Crafting Your Project Description

You should address the following questions to ensure that your project description is clear, comprehensive, and compelling. The answers you provide will flesh out your project for the review panel.

How will your statement of work convey your message with clarity and concision?

If you are going to include visual materials, how will you incorporate them within the 15-page limit?

Discuss the relationship of your project to longer-term goals of the Primary Investigator.

How will you incorporate your outline for the general plan of work?

How will you include plans for preservation, documentation, and sharing of data, physical collections, curriculum materials, and other related research and educational products within the 15-page limit?

Hypotheses

Hypotheses require investigators to predict an answer to a research question based on knowledge of the field, logical analysis, and/or anecdotal observations. Not all NSF proposals will require this step; however, you may wish to include a hypothesis to assure the review panel that your project is grounded in the scientific method.

State your initial hypotheses.

List the general relationships implied by your hypotheses.

1._____is related to_____

2._____is related to_____

3._____is related to_____

Identify specific alternative relationships or explanations, which would serve as competing or rival hypotheses, if possible.

1.

2.

3.

Write your revised hypotheses, considering specific competing alternatives to the hypothesized relationships (if applicable).

Motivating Rationale

The following questions are designed to make you think about why and how your project merits the time and funding of the NSF. Further, the answers will help the *review panels* understand why your project is worth their time and funding.

What makes your project compelling?

What national, international, regional, state, or local problem will your project help overcome?

What evidence will you present to make panels vote yes for your project?

What educational, engineering, or biotechnology need will your project meet or resolve?

How will the reviewers be convinced that your project is reasonable and practical?

Describe the case you will build to demonstrate that the training or research for your project is scarce.

Search for Related Work

What prior research exists for your topic? Use this worksheet to help organize your thoughts and help build your literature review.

List questions you hope are already answered by previous research, followed by the likely source of information (not necessary with journals).

1.

2.

3.

4.

5.

List relevant theories or models, followed by the likely source of information.

1.

2.

3.

4.

5.

List any other useful background information and the likely source.

1.

2.

3.

4.

Outcome Objectives

Use this worksheet to verify that your project's outcome objectives will convey the appropriate information to the review panel. If necessary, revise your objectives in the space provided under each question.

Do your outcome objectives describe what will change and when? If not, revise.

Do your outcome objectives demonstrate the direction the changes will take? If not, revise.

Do your outcome objectives tell the reviewer how many changes will occur? If not, revise.

Do your outcome objectives define how changes will be measured? If not, revise.

Developing Your Methodology

This worksheet will help you flesh out your project design. The more detail you can provide, the better your project description will be.

Describe how you will select the project focus.

Discuss whether you will divide the activities according to the project focus.

Explain what will happen at each phase using a narrative, list, flow chart, or diagram.

Describe how data will be gathered, and by whom.

Data Collection Forms

Use the space below to sketch forms you will use to record the data of the study. Alternatively, you may list and describe the forms below, and then attach specimens at a later date.

Reporting of Results

Use the space below to sketch summary data tables and/or graphs which you would expect to use in presenting your results. You may include simulated results of the kind you hope to find.

Plan of Work

Design and analysis are two sides of the same inferential coin. Always seek competent consultation from a statistician during the analysis phase, or your conclusions may not be usable or interpretable.

List the people whose expertise in statistical analysis may be useful.

List the demographic variables which describe characteristics of subjects such as age, sex, race, previous hospitalizations, etc.

List the variables of the study under the control of the investigator, such as type of instruction given, educational tools, etc., to which the investigator can assign subjects.

List the outcome variables or effects potentially related to or caused by those listed above, such as adherence to instructions, speed of completion, or client satisfaction.

Discussions, Interpretations, or Conclusions

No workbook exercises are included for this phase of your study. Instead we suggest that you maintain a notebook or fieldwork journal to capture anecdotes, remarks of subjects, comments by others involved in the project, or any other facts or ideas which might help to make sense out of the phenomena under study. The serendipity of an alert and curious researcher leads to insightful interpretations and fruitful new hypotheses.

Project Personnel

No workbook exercises are included for this phase of your study. Instead we suggest that you consider the questions below when putting together your team. List the names of persons you might wish to include on your team under each question.

Who are the people most qualified to conduct your study?

What skills do they possess or what research have they conducted that makes them uniquely qualified for your study?

Developing Your Budget

Your proposal may request any amount in funding, so long as the item and amount are considered necessary, reasonable, allocable, and allowable. Still, keep in mind that a large-budgeted project will receive more scrutiny than others. Be sure to request what you need to conduct the research, and justify every item. This worksheet will help you plan for your budget.

Itemize the following expenditures your project might need, followed by a brief justification of each.

Personnel:

Travel:

Equipment (usually $5000 or more each, and several years of service):

Participant support (per diem, stipends, and other costs for trainees, and/or participants):

Cost of educational activities associated with research, where appropriate:

Other direct costs (sub-award, consultant, computer services, publication costs):

Other indirect costs (equipment under the threshold of $5000, etc.)

Disclosure of Current & Pending Support

The NSF requires that all proposals include a report of **all current and pending funds from any donor for each investigator**. While your project will not be declined due to sufficient funds from other sources, it could be significantly delayed due to insufficient disclosure of the current and pending funds. The following questions will help you track funding.

List the grant awards you and anyone on your team currently receive, followed by the donor and amount.

List the proposals you and anyone on your team have submitted (but are still under review), followed by the donor and the amount.

Collaboration & External Contacts

External support stems from getting others interested in your ideas and your project. Consider contacts outside your organization, as well as coworkers who may already have an existing contact list. Think about the names generated below as contacts for Letters of Collaboration.

With which organizations or individuals can you network?

What contacts have you made, or should you make?

What upcoming meetings or conferences should you attend to meet people and talk about your project?

If your organization does not have the expertise, contacts, or resources to implement your project, what organizations might make a good partner?

Are there specific individuals you should contact in these organizations?

What advantages can your organization or project offer these outside organizations for their collaboration?

Creating Your Data Management Plan

Your Data Management Plan will describe to the panel exactly how you will make your results available to others, store your data, and/or allow for re-distribution. This worksheet will establish the plan outline for your project.

Expected Data

Describe the data, samples, physical collections, software, or other materials that will be produced over the course of your project.

Data Format

List the format in which your data or products will be stored (hard copy notebook, instrument outputs, ASCII, html, jpeg, or other formats).

Explain how your data may be converted to a more accessible format, or otherwise made available to interested parties.

What current or anticipated need do you foresee for interested parties outside of your laboratory to access your primary data?

Data Access/Sharing Practices & Policies

Describe your plans for providing general access to data, including websites maintained by your research group.

To which public databases or institutions might you contribute your data?

Policies for Re-Use & Re-Distribution

Describe your policies regarding the use of data provided via general access or sharing.

If you plan to provide data and images on your website, will the website contain disclaimers, or conditions regarding the use of the data in other publications or products? If so, describe these disclaimers and/or terms of use.

Archiving of Data

Describe how data will be archived and how preservation of access will be handled.

How will hardcopy notebooks, instrument outputs, and physical samples be safeguarded against fire or water damage?

Describe your plan to transfer digitized information to new storage media or devices as technological standards or practices change.

How will interested parties gain access to your index of where all archived data are stored?

How long will your data be retained?

Creating Your Postdoctoral Mentoring Plan

Training a new generation of scientists and engineers is central to the mission of the NSF. If your proposal will include funding to support postdoctoral researchers, you must provide a description of the mentoring activities that will be provided to these individuals. Use the questions below to generate an outline for your Postdoctoral Mentoring Plan.

How will you provide career counseling during your project?

How will you allot for training in the preparation of grant proposals?

How will you ensure training in responsible professional practices during your project?

How much autonomy will you allow for developing publications and presentations during your project?

What guidance will you offer on improving teaching techniques and mentoring skills?

How do you plan to provide teaching opportunities?

What counseling will you offer on effectively collaborating with researchers from diverse backgrounds and disciplinary areas?

Grant Section

Examples

For NSF Researchers

Finding Examples

This chapter includes examples of abstracts and project summaries. However, we do not have the space to include examples from every genre of research. To find the best examples of successful NSF proposals in your field, start with faculty at your institution with whom you are acquainted. If they have been funded by NSF, they could be a valuable resource for advice and writing tips.

We provide another source of examples on the Science & Medicine Resource CD issued to you at the beginning of the workshop. Please insert the disk into your device now. If you do not have a CD drive, bring up the links attachment sent to you prior to the workshop. Follow the steps below to access full NSF proposals:

- From the main directory of the CD, click on Sample Proposals
- Any of the titles that begin with "NSF" will be helpful

The most recent examples are "Georeferencing US Fish Collections" and "Machine Learning in Taxonomic Research." Many different genres of research are represented by the examples included in this subsection of the CD. These are full proposals that contain the pieces listed in the Grant Writing section of this text. Remember that they can provide guidelines for phrasing and concision, but that every project is different. Within a particular directorate or program, thousands of proposals could be submitted without overlap or duplication. Therefore, do not assume that the style of one proposal will suit your project, even if you are applying to the same directorate. Moreover, do not be afraid to adapt the style of a proposal outside of your genre – if you feel it will suit your project.

Judging Criteria

NSF Judging Criteria

- **Intellectual Merit:** The Intellectual Merit criterion encompasses the potential to advance knowledge
- **Broader Impacts:** The Broader Impacts criterion encompasses the potential to benefit society and contribute to the achievement of specific, desired societal outcomes.

The following elements should be considered in the review for both criteria:

- What is the potential for the proposed activity to:
  - Advance knowledge and understanding within its own field or across different fields (Intellectual Merit)
  - Benefit society or advance desired societal outcomes (Broader Impacts)?
- To what extent do the proposed activities suggest and explore creative, original, or potentially transformative concepts?
- Is the plan for carrying out the proposed activities well-reasoned, well-organized, and based on a sound rationale? Does the plan incorporate a mechanism to assess success?
- How well qualified is the individual, team, or organization to conduct the proposed activities?
- Are there adequate resources available to the PI (either at the home organization or through collaborations) to carry out the proposed activities?

NSF Abstract Example #1

NSF Program: Ecosystem Studies
Awarded Amount to Date: $1,170,000.00
Program Reference Code: 1181, 9169, 9229, EGCH

Abstract 1256985: This research is structured around a novel conceptual framework for how nitrogen (N) cycling in boreal bogs changes as a function of both time-since-fire and experimentally augmented N. Bog sites of different ages (time since the most recent fire) will receive elevated N inputs in simulated rainfall. New insights will be gained into: the importance of biological N2-fixation as a newly recognized major input of N into these bogs; the role of Sphagnum mosses, which cover the bog surface and are the major contributors to ongoing peat accumulation, as the gatekeepers of newly acquired N from either N2-fixation or rain and snow; and the linkages between N inputs and the ability of bogs to sequester both N and carbon (C) in the accumulating peat.

Boreal peatlands cover only 3-4% of the Earth's land surface, yet store 25-30% of the world's soil C and 9-16% of the world's soil N in peat. Peatlands represent an ongoing net sink for atmospheric carbon dioxide. Bogs of western Canada persist at the dry end of the climatic gradient across which peatlands exist, and hence are especially sensitive to ongoing climate changes that include increasing temperature, as well as increasing wildfire frequency and severity. Further, in western Canada, atmospheric N deposition historically has been low, but is increasing because of N emissions from oil sands development in northern Alberta. Clarifying the linkages between N and C cycling in western Canadian bogs will enhance the ability to predict how N and C storage in peat may be influenced by ongoing climate change. The research will support graduate and undergraduate thesis students; the PIs will teach a Peatland Ecology course at the Meanook Biological Research Station, Alberta, Canada, in years 2 and 4 of the project.

NSF Abstract Example #2

NSF Program: Chemical Oceanography
Awarded Amount to Date: $192,697.00
Program Reference Code: 9198, EGCH

Abstract 1232760: Scientists from Wright State University and Woods Hole Oceanographic Institution will participate in the 2013 GEOTRACES cruise to the Eastern Tropical South Pacific (ETSP). Seawater samples collected during this transect from Peru to Tahiti will be analyzed for total mercury (Hg), monomethylmercury (CH3Hg+), dimethylmercury ((CH3) 2Hg), and elemental Hg (Hg0) to construct high-resolution vertical and horizontal sections. In addition to filtered seawater samples, the scientists will also analyze suspended particles for total Hg and CH3Hg+, as well as rain and aerosol samples for Hg species and dissolved and particulate thiols, such as cysteine and glutathione.

The cruise track extends from the upwelling region off Peru, to an expansive oxygen minimum zone (OMZ), followed by the hydrothermal vent fields of the East Pacific Rise, and finally into the highly oligotrophic waters near Tahiti. These different oceanographic features will allow the researchers to determine their influence on the inputs and cycling of Hg in the ocean. Specifically, they plan to assess whether (1) continental margins off Peru are a significant source of Hg, CH3Hg+, and (CH3)2Hg; (2) the OMZ sustains the highest levels of methylated Hg in the ocean; (3) hydrothermal systems are important sources of total and methylated Hg?; and (4) the large gradient in productivity along this track impact the vertical distribution of this element, its bioavailability, and its speciation.

In terms of broader impacts, this research may have societal benefits in helping to understand the source of methylmercury in the ocean which bioaccumulates in fish and poses a hazard to those who eat seafood. In an effort to improve science education, the proponent from Wright State University and his graduate student plan to involve a class of 7th graders at Bellbrook Middle School in the Dayton area in their research experiences at sea via classroom visits, a blog, and interacting with them during the cruise. One graduate student and one undergraduate student from Wright State University would be supported and trained as part of this project.

NSF Abstract Example #3

NSF Program: Research in Networking Technology & Systems
Awarded Amount to Date: $137,995.00
Program Reference Code: 7916

Abstract 1258331: This project will develop a series of lab exercises comprising a senior-level undergraduate or introductory graduate lab course on fundamental design issues of wireless networks and technologies. Over the course of this lab sequence, students will practice designing, implementing and running wireless experiments using the GENI wireless testbed infrastructure. These labs enable student to learn wireless networks protocols and technologies by working with real systems and evaluating wireless schemes in real conditions, instead of relying on the 'protected' environment of software simulations.

Through building protocols on a real platform, students will understand the challenges in the design of wireless systems and the approaches and techniques that are used today, and will become familiar with open research issues in the wireless field. They will learn how to resolve realistic issues and how to design algorithms that work in practical situations.

The outcome of the project will be a set of materials (including a lab manual, disk images, experiment scripts, software, and slides) that can be used by academic institutions throughout the US, together with the integrated GENI wireless facilities, to supplement traditional courses on wireless networks with a hands-on lab component. All data generated as part of the proposed effort will be electronically disseminated using the portal of the WiTEST Lab in NYU-Poly and on the GENI.net website. Developed software and results of the lab development will be made available in the open-source format and will be free for academic use. Educational materials will be announced on the web site and will be shared with academic colleagues upon request.

NSF Summary Example #1

Summary: Social Networks in the Lab and in the Field
My research agenda focuses on the economics of social networks and is centered around three related questions: conceptual, positive and normative. First, how does social distance affect players' other-regarding preferences? Second, how does social distance affect outcomes through social learning? Third, how do social networks affect the allocation of resources?
In all of my projects, I first compile an extensive social network database of a particular community (Wesleyan and Harvard undergraduates, residents of shanty- towns of Lima, Peru). In the first project, I propose to use a sequence of modified dictator games to analyze how other-regarding preferences depend on social distance between players and apply a calibrated model to predict play in team games.
In the second project, I plan to conduct three health-related field experiments. At Harvard I expand a social network database to include incoming freshmen who are known to gain about 15 pounds of body weight in their first year. By providing randomized financial incentives to join athletic clubs I create a random variation in caloric intake to estimate the effects on roommates and friends. In a parallel study on flu vaccinations at Harvard I look at the role of social learning on the decision to get a flu shot. At Wesleyan, I am working with the university-run grocery store to provide randomized price discounts for healthy snacks. Through information treatments and advertising I can identify whether friends affect healthy eating.
My third project on cronyism uses a combination of lab and field experiments to analyze how efficiently social networks allocate resources. In an ongoing micro- finance project clients have to find `sponsors' with a pre-determined credit line to co-sign their loans. I am analyzing how a decrease in the interest rate affects the allocation of scarce credit lines.
Finally, I am using original census form to build a micro-database documenting Harlem's (NYC) transition from a white upper-class neighborhood into an African- American ghetto to estimate the effects of social interactions.

Intellectual Merit
Recent research on altruism has demonstrated pronounced heterogeneity in player types and social networks are a natural and measurable source of an important part of this heterogeneity. The effects of networks on resource allocation emphasize a negative aspect of social network unlike most of the literature which stresses reductions in transaction costs.
Obesity is a growing health problem in the US and there is ample anecdotal evidence that young people want to make a favorable impression on their peers. Social networks can therefore amplify investments in health education.

Broader Impact
I have been conducting web-based lab experiments for the past two years and the specialized server software is now being used by other researchers and will be freely made available on the web. Moreover, my coauthors and I have trained five research assistants in Argentina and Peru during the past 5 years to conduct lab and field experiments. I am also closely working with Harvard and Wesleyan health services who are looking to improve their health education.

NSF Summary Example #2

Summary: Georeferencing US Fish Populations

In 2004, NSF awarded a collaborative grant to the University of Kansas and Tulane University to build a community information infrastructure for natural history collections using distributed fish collection databases as a test case. The result of the project is Fishnet2 (http://www.fishnet2.net/), a cache-based system for serving fish collection data to researchers. Tulane's role in the project was to design a collaborative georeferencing system that could harvest locality data from collections using the DiGIR 2 protocol, georeference the locality data using GEOLocate, and performed similarity matching of collections locations to make the verification process more accurate and efficient. The GEOLocate development team created a georeferencing server to retrieve locality data from DiGIR providers. The team then modified GEOLocate so that the software could retrieve locality information from the georeferencing server. The team also developed a web portal for participant management and query, and mapping of collection data.

Intellectual Merit

In this collaborative project, we propose to use GEOLocate's Community Georeferencing system to collaboratively georeference the estimated 0.8 million currently ungeoreferenced fish collection locality records in U.S. fish collections (250,000 localities in all). We also propose to add several new data providers to the Fishnet2 network. The added data providers will increase the number of localities in need of georeferencing to 2 million records. Polygons will be used to describe georeferencing uncertainty, and will be compared to the more traditional approach of point-radii. Results from this analysis will be used to guide future georeferencing projects. The collaboration involves 12 institutions. Data from the new Fishnet2 data providers will first be added to the network and cleaned to make data in the various geographic fields consistent. To accomplish the georeferencing task, we have divided the world into 12 regions each with roughly equal numbers of collection localities and assigned regions to each institution. Georeferencing technicians at each of the collaborating institutions will receive training on use of the community georeferencing software. Collaborative georeferencing will commence in the third quarter of Year 1 on the project and will continue for 18 months. In the final year of the project, georeferenced data will be repatriated to data providers for incorporation into their databases. Experiments in crowd sourcing will also be performed on subset of the georeferencing work for Tulane's region as an education and outreach activity involving high school students and Tulane undergraduates.

Broader Impacts

Georeferencing natural history collection data is a critical step in a progression that starts with digitizing collection records, continues through databasing and networking, and ultimately gives researchers access to the vast specimen and data resources of natural history museums. It allows them to use natural history data to address important scientific and societal needs such as conservation, environmental restoration, and preparing for global climate change. This project will expand the Fishnet2 data network to 4 million georeferenced records, 2 million of which will be georeferenced within the project. The resource of georeferenced locality records provided by this project will serve several purposes, beyond its usefulness to the fish collection community. It can be used for georeferencing collections of other groups of organisms, especially aquatic organisms, which may have been sampled at the same or similar access points or at the same time as some of the fishes. We will provide a compiled gazetteer of georeferenced localities for future CSBR and ADBC digitization projects. This project will also serve the fish collection community as a resource for cleaning taxonomic data, thanks to the map visualization of data it supports. Mapping collection occurrences will make it easier for experts to check records and identify errors, resulting in more taxonomically accurate data. The education and outreach activity will target underrepresented minorities from New Orleans area high schools in an effort to increase minority participation in natural history collection based research.

NSF Summary Example #3

Summary: Workshops to Establish a Stable North America Reference Frame for EarthScope

The Plate Boundary Observatory (PBO) component of EarthScope will use the science of geodesy to measure the slow deformations in the Earth's crust that are driven by plate tectonics and magmatism. Specifically, the Global Positioning System (GPS) will be used to measure the movements of approximately 1000 points spanning the North America-Pacific plate boundary. These motions must be defined relative to a terrestrial reference frame. Such a frame requires the definition of its Cartesian coordinate axes (including origin, orientation, and scale) and the evolution of these axes in time, as well as precise models of the dynamic Earth. The motions of the Earth's surface due to tectonic processes the region spanning the North America-Pacific plate boundary (the focus of PBO) are most naturally expressed with respect to the stable interiors of either the North America or Pacific plates. A standard reference frame will therefore make it easier to interpret the geodetic data in terms of where the total budget of relative plate motion is being accommodated (for example, how much deformation can be inferred to be offshore?), and how deeply the plate boundary dynamics penetrate into the plate interior (is the Rio Grande Rift in New Mexico still active?). It will also provide a common frame by which to compare results from different analysis groups.

For these reasons, UNAVCO formed the Stable North American Reference Frame (SNARF) working group to define the reference frame to be used for PBO. A series of 4 small NSF EarthScope workshops have so far been held over a two -year funded period (Jan 2004-Dec 2005; P.I.s Larson and Davis) to develop SNARF and to educate the community. The SNARF working group is comprised of ~16 geodesists with expertise in developing and testing reference frames. The SNARF working group has significant links to developers of the International Terrestrial Reference Frame (ITRF) and the national geodetic surveys of the U.S. (NGS) and Canada (NRCan), who have committed experts to collaborate with the university research community toward this effort.

Now 1.5 years into the project, an initial reference frame has been developed and publically released (at the 2005 UNAVCO Meeting). The goal of this proposal is to continue research to improve and further develop SNARF, with the eventual goal of handing off operational and regular maintenance to the joint auspices of the US and Canadian national geodetic surveys, as part of their joint remit to maintain the "North American Datum". We request that EarthScope support the travel of the SNARF meeting participants and the costs of renting meeting rooms over the next two years (Jan 2006 - Dec 2007). The research of the SNARF Working Group is based on a volunteer effort and would come at no cost to this grant. UNAVCO Inc. would absorb the cost of logistical and web-based support within its regular funded activities for community support.

In terms of science benefits to EarthScope, the accurate realization of the terrestrial reference frame in terms of scientific models (rather than arbitrary convention) will add significant interpretive value to measured station motions. SNARF will provide a common framework for comparison of geodetic data and geophysical models. Defining a stable frame at the sub-millimeter level requires adequate characterization of Earth deformation processes across the "stable plate interior," a region that by definition is relatively unaffected by plate boundary process. This plate interior provides a stable platform from which to view plate boundary deformation. Despite its name, the stable plate interior actually deforms very slowly in a complex way due to phenomena such as glacial isostatic adjustment and other mantle-scale processes, coupled to a heterogeneous lithosphere which is occasionally host to large intra-plate earthquakes. Until recently, such slow intra-plate processes have been ignored in the underlying models of reference frames. The SNARF WG will address the many aspects of what is required to realize a N.A. frame with sub-mm stability, including required observations, kinematic characterization, dynamic models, possible inferences from seismic anisotropy, reference frame theory, and also on limiting factors that control the level of stability that might be achieved in the foreseeable future.

In terms of broad impacts, the outcome of the SNARF workshops will be a published series of incrementally improved reference frames that accurately define the precise coordinates and time evolution of a set of stations representing "stable North America," thus enabling the broad scientific community to realize a common, accurate reference frame for their own research purposes. The SNARF Working Group will provide tools and products for performing model calculations and model-data comparisons in the EarthScope reference frame. The EarthScope initiative will significantly broaden the community using geodetic techniques to study the Pacific-North American plate boundary. Therefore the SNARF working group will not only develop an accurate and stable reference frame, but will also properly describe the use of that reference frame to this larger scientific community. This has been achieved by special sessions at AGU meetings, and at SNARF forums at UNAVCO meetings, where future users were informed of developments by the working group, and feedback from the scientific community was encouraged. Educational information on using the frame correctly will be made available online. From a national perspective, the SNARF research product will become the US and Canadian national reference frame "NAREF" (North American Reference Frame) to supercede the current definition of the North American Datum (NAD83). This will have profound implications for the US geospatial infrastructure, and all governmental and commercial enterprises who depend on it.

Plan of Work

For NSF
Researchers

Defining Your Goal & Objectives

For your proposal to come together, begin using the information from the worksheets you completed earlier in the workshop. To help you tighten down your project, review the definitions below. Think about how these terms are represented in the examples that follow.

Goal or Hypothesis: The purpose of your project or program.

Objectives: These are the methods you will use to accomplish your goal. They should be specific, measurable, achievable, realistic, and time-bound.

Grant Design

On the following page, you will find a blank hypothesis and objectives chart. Each objective has three activities with space allotted to describe the details. When filling in the chart, consider the way your objectives refer back to your hypothesis. Also note how each activity directly impacts the success of the parent specific aim.

The Grant Design Chart is one approach to understanding the overall structure of your proposal. The Logic Model on page 82 is another way to see the big picture. The charts and examples within this section are tools to help you establish your plan of work. None of them are requirements for your proposal. Instead, you should view them as methods of organization with different perspectives. Some focus on particular sections, while other charts help you to view the overall structure of your proposal.

Grant Design Chart

Hypothesis:							
Objectives	Activities	Begin/End Dates	Personnel	Outcomes			Broader Impacts
				Short	Mid	Long	
A.	A-1:						
	A-2:						
	A-3:						
B.	B-1:						
	B-2:						
	B-3:						
C:	C-1:						
	C-2:						
	C-3:						
D:	D-1:						
	D-2:						
	D-3:						

Plan of Work for NSF Researchers

Timelines & Graphics

Your timeline is a realistic assessment of the time needed to meet your goals. Answering the questions below will help you create yours.

How long do you need to achieve your goals and why?

Outline the time it will take you to achieve your goal.

Why did you decide on the above timeline?

What is the timeline for spending the funds?

If you use graphics to describe the timeline, sketch the form the visual aid will take in your proposal.

Gantt Charts

Gantt charts are graphic representations of a project's timeline. They portray the scope of a project, which allows you and your personnel to view the proposal writing and planning process as a whole. Since Gantt charts provide an overall perspective, decision-makers can understand how changes to one section affect the whole. Using this timeline tool is an easy and straightforward way to track tasks, responsibility, and due dates from inception to conclusion.

When using a Gantt chart, be sure that your timeline is realistic. Your chart can help you successfully plan your proposal writing process, but it is only as good as the information that you put into it. For instance, it is best to design your project to fall within the grantor's funding cycle. A Gantt chart can help you determine the appropriate amount of lead time necessary to make such a scenario occur.

Many project management tools may be found online. One free version that facilitates online collaboration via the cloud is found at:

www.gantter.com

The site hosts a free, web-based project management tool with project templates for scheduling, and the capacity to save to either Google Drive or the Gantter cloud. Some other benefits are:

- Gantter requires nothing but a web browser. Simply go to the website and select the “Start Now” button to begin project planning.
- Your Google Drive items can be integrated. You can save and open schedules, share schedules with other users, and collaborate with those users in real time.
- Microsoft Project files can be imported or exported for ease of data transfer.
- The project schedule tool creates Gantter Project Schedules directly from inside of Google Drive after installing an extension.
- The site provides 11 languages for collaboration world-wide.

Sample Gantt Chart

Stage 1 – Defining and Understanding the Problem –Budget Feasibility Study

WEEKS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Defining & Understanding the Problem																	
Problem Definition																	
Preliminary Analysis																	
Objectives	::::																
Feasibility Study	////																
System Modeling	- - -																
Planning & Defining of Solutions																	
Storyboard																	
Data Dictionary																	
Algorithms																	
Structured Diagrams				::::													
Syntax Descriptions					////	////											
Structured walkthrough							////										
Screen Diagrams																	
Implementing Solutions																	
Development Diary																	
Developing the Solution																	
Documentation of Stubs & Flags							- - -	- - -									
Online Help									::::	::::							
Testing & Evaluation of Solutions																	
Test Data Dictionary																	
Checklist of Objectives																	
End User Testing & Feedback																////	
Visual User Testing & Feedback																	
Maintenance of Solution																	
Modifying the Solution																	

Plan of Work for NSF Researchers

The Logic Model

SITUATION:

PRIORITIES:

INPUTS	OUTPUTS		OUTCOMES		
	ACTIVITIES	PARTICIPATION	SHORT	MEDIUM	LONG-TERM
ASSUMPTIONS 1. 2. 3.			**EXTERNAL FACTORS** 1. 2. 3.		

Evaluation

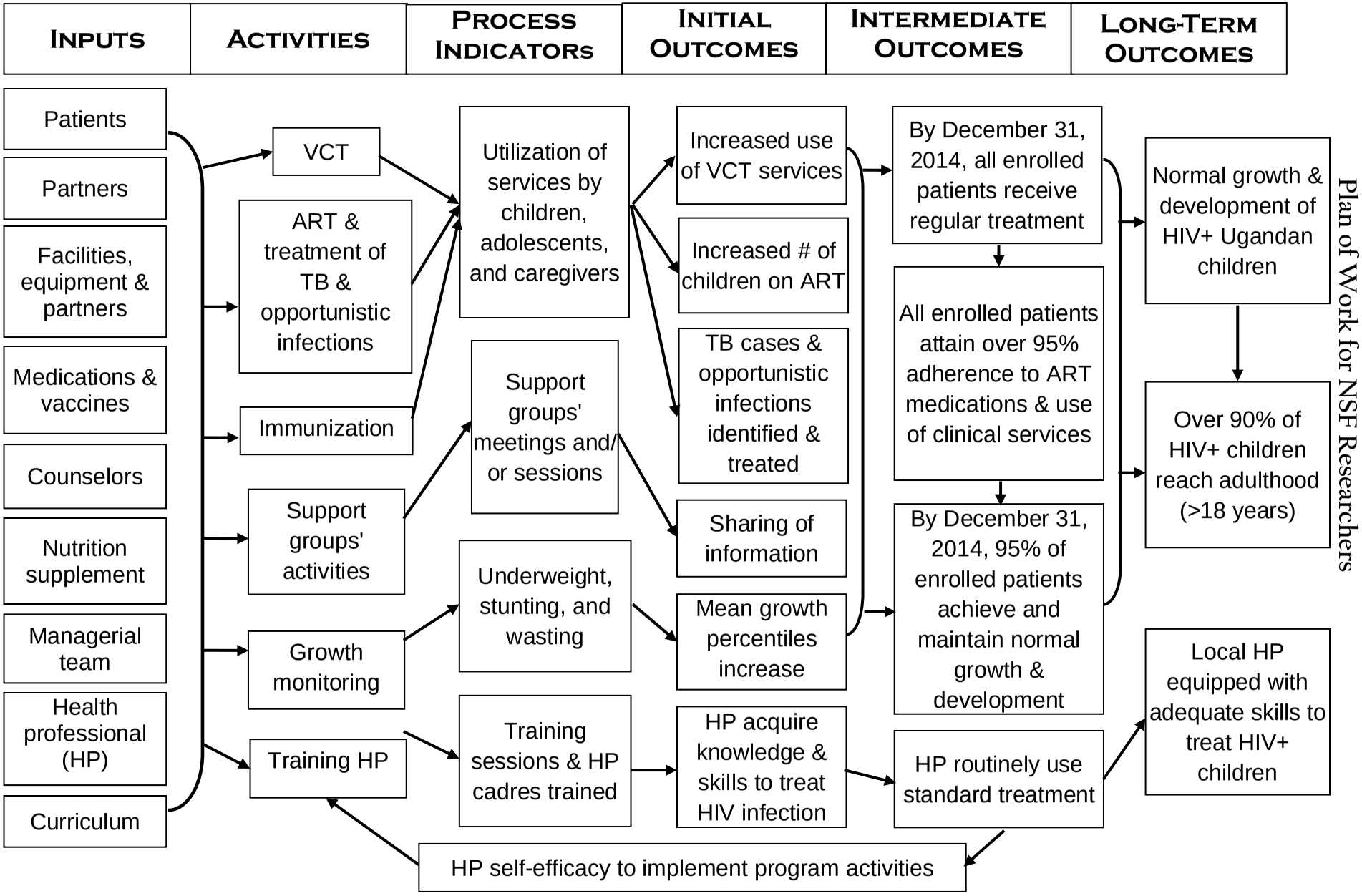
What do you want to know?

How will you know it?

NOTE: The number of boxes and design will vary depending upon your program and situation. Include arrows to show directional flows.

Logic Model Example #1

Pediatric HIV Treatment & Training Program in Uganda



Evaluation

The NSF is primarily interested in the Broader Impacts, with respect to evaluations. The Evaluation Plan Worksheet on the following page is designed to help you organize your thoughts regarding the assessment process for your project's Broader Impacts. Consider the definitions below when filling in the chart. When you begin writing this section of your proposal, remember that your directorate or program officer will be the audience, so write with him or her in mind.

Evaluation: How the project will be measured and the results given to the directorate or program officer.

Quantitative Evaluation: Hard data, such as: facts, measurements, and statistical analysis.

Qualitative Evaluation: Soft data, such as opinions, individual stories, and surveys.

Evaluation Plan Worksheet

Focus Which program or aspect of a program is being evaluated?						
Questions What do you want to know?	**Indicators & Evidence** How will you know it?	**Timing** When should you collect the data?	**Data Collection**			
			Sources Who has the information?	**Methods** How will you gather the information?	**Sample** Who will you question?	**Instruments** What tools will you use?
1.	**A.** **B.**					
2.	**A.** **B.**					
3.	**A.** **B.**					
4.	**A.** **B.**					
5.	**A.** **B.**					

Plan of Work for NSF Researchers

Budgets

Budgets vary according to donor. Be sure that you budget reflects the specifications of the RFP. Please answer the following questions in relationship to your budget.

How much do you need to accomplish your goal & objectives?

What are the budget items? (personnel, fringe benefits, equipment, space, consultants, etc.)

1.

2.

3.

4.

5.

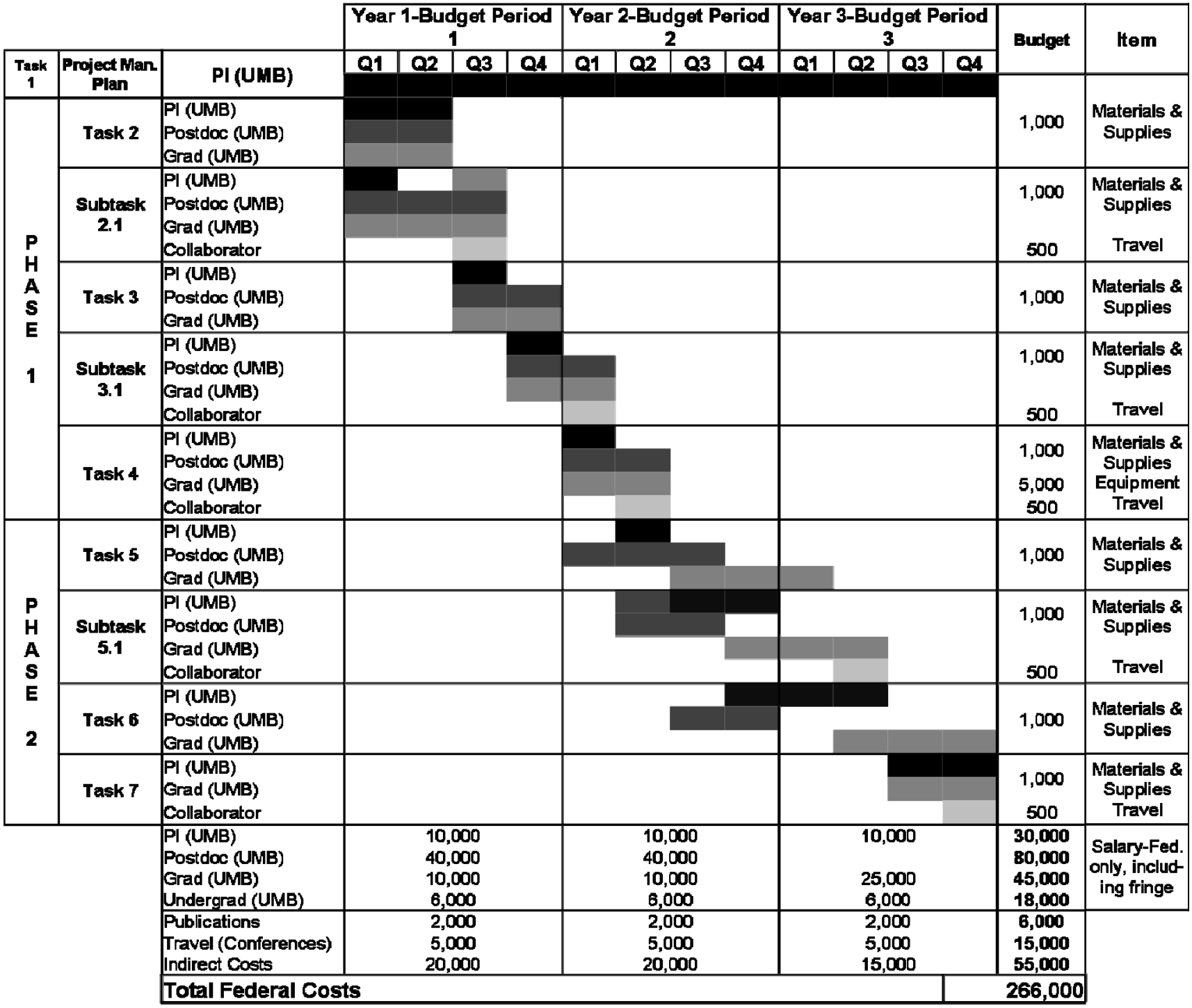
6.

7.

8.

What costs will you contribute?

How much does your institution charge (indirect costs)?



Task 1	Project Man. Plan	PI (UMB)	Year 1-Budget Period 1 Q1	Q2	Q3	Q4	Year 2-Budget Period 2 Q1	Q2	Q3	Q4	Year 3-Budget Period 3 Q1	Q2	Q3	Q4	Budget	Item
PHASE 1	Task 2	PI (UMB)													1,000	Materials & Supplies
		Postdoc (UMB)														
		Grad (UMB)														
	Subtask 2.1	PI (UMB)													1,000	Materials & Supplies
		Postdoc (UMB)														
		Grad (UMB)														
		Collaborator													500	Travel
	Task 3	PI (UMB)													1,000	Materials & Supplies
		Postdoc (UMB)														
		Grad (UMB)														
	Subtask 3.1	PI (UMB)													1,000	Materials & Supplies
		Postdoc (UMB)														
		Grad (UMB)														
		Collaborator													500	Travel
	Task 4	PI (UMB)													1,000	Materials & Supplies
		Postdoc (UMB)														
		Grad (UMB)													5,000	Equipment
		Collaborator													500	Travel
PHASE 2	Task 5	PI (UMB)													1,000	Materials & Supplies
		Postdoc (UMB)														
		Grad (UMB)														
	Subtask 5.1	PI (UMB)													1,000	Materials & Supplies
		Postdoc (UMB)														
		Grad (UMB)														
		Collaborator													500	Travel
	Task 6	PI (UMB)													1,000	Materials & Supplies
		Postdoc (UMB)														
		Grad (UMB)														
	Task 7	PI (UMB)													1,000	Materials & Supplies
		Grad (UMB)														
		Collaborator													500	Travel
		PI (UMB)		10,000				10,000				10,000			30,000	Salary-Fed. only, including fringe
		Postdoc (UMB)		40,000				40,000							80,000	
		Grad (UMB)		10,000				10,000				25,000			45,000	
		Undergrad (UMB)		6,000				6,000				6,000			18,000	
		Publications		2,000				2,000				2,000			6,000	
		Travel (Conferences)		5,000				5,000				5,000			15,000	
		Indirect Costs		20,000				20,000				15,000			55,000	
		Total Federal Costs													**266,000**	

Plan of Work for NSF Researchers