The Craft of Grant Writing

Texas A&M University
Office of Proposal Development

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Toolkits

The Office of Proposal Development is in the process of preparing a set of toolkits focused on a variety of specialized topics relevant to the project development and proposal preparation process, as well as on specific funding agencies. These toolkits will be made available on the web in the near future.

Preface

This first version of a ***Craft of Grant Writing Workbook*** was developed and continues to be refined by the Office of Proposal Development (OPD), a division of the Office of the Vice President for Research at Texas A&M University. It addresses both the stepwise process of proposal development and writing and the strategies for enhancing the competitiveness of research and educational proposals submitted to federal agencies and foundations.

Various sections of the workbook were prepared by different lead authors within OPD, but all sections were developed through OPD team discussions, reviews, and extensive revisions to ensure that each workbook section represents an accumulation of expertise based upon the entire group's varied experiences in developing and writing proposals to federal agencies and foundations over a range of research and educational domains.

The first version of the workbook was used in OPD's one-day ***Craft of Proposal Writing Seminars*** on the A&M campus in August 2005. Following these workshops, a revised version of the workbook was developed and used for similar workshops given at all A&M System universities during the fall semester, and subsequently in all OPD presentations, seminars, and workshops on various topics. OPD is asking all who use the workbook in seminars and workshops to help improve its content by completing an evaluation survey. The surveys will be used to make improvements and revisions that better reflect the needs of faculty and others across the University and System for assistance in enhancing the competitiveness of their proposals.

OPD particularly thanks the many faculty and staff across the A&M campus and at various System institutions for their support and feedback not only on the workbook itself, but also for the insights they have offered during development of presentations, seminars, and workshops, on a wide range of research and educational topics that enhance proposal competitiveness. OPD also thanks those in the Office of the Vice President for Research who have contributed to this effort by participation in OPD presentations, seminars, and workshops, including Drs. Fuller Bazer, Jim Calvin, Dick Ewing, Rick Giardino (and the TAMU System Pathways Graduate Deans), Jan Hughes, Chuck Kennicutt, and Bob Webb. OPD also acknowledges the assistance of Ms. Tami Sayko and Drs. Lee Peddicord, Leo Sayavedra, and Mary Sherwood of the A&M System in developing the knowledge base incorporated in the workbook.

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Overview of the Office of Proposal Development

OPD is a grant writing office designed to support Texas A&M faculty in the development and writing of large and small research grants to federal agencies and foundations. OPD has a particular focus on support of center-level initiatives, multidisciplinary and interdisciplinary research teams, research affinity groups, new and junior faculty research, diversity in the research enterprise, and long-term proposal planning for competitive projects and proposal development. OPD helps develop partnership initiatives across A&M colleges, departments, centers, and interdisciplinary groups, as well as throughout the A&M System universities, including the Health Science Center and its four components. OPD also works with faculty groups developing proposals that meet the long-term institutional research and educational priorities of the university and the Texas A&M University System, including undergraduate research, Pathways to the Doctorate, and diversity objectives related to students and faculty.

OPD staff offer faculty a comprehensive range of skill sets and experience related to proposal development and writing, proposal strategic planning, identification of funding opportunities, knowledge of funding agency culture and investment priorities, and a range of successful research and education models that can enhance proposal competitiveness. These skills are supported by the staff's disciplinary backgrounds in engineering and physical sciences; earth, ecological, and environmental sciences; health and biomedical sciences; social/behavioral sciences; and the humanities.

OPD has extensive staff expertise in the development and writing of proposals to major federal agencies, particularly for those focused on basic research, e.g., the National Science Foundation and the National Institutes of Health, as well as for the mission-driven research agencies such as DOD, ED, EPA, NOAA, and USDA. Several OPD staff members have experience working as researchers in engineering, earth sciences, and health and biomedical sciences, or have held engineering or scientific positions in industry where the development and writing of research and/or technical proposals were significant components of their responsibilities. Other OPD staff members have extensive experience working in proposal development, editing, production, and management positions at foundations, private industry, publishing, and at Texas A&M.

OPD efforts have centered upon providing direct support for proposal development activities and on developing a greatly expanded training program in order to help new faculty, faculty expanding into new program areas, and graduate students to acquire the necessary skills and knowledge to write more competitive proposals. OPD offers faculty a 15-year perspective on competitive proposal models and proposal planning strategies based on the successful development and writing of more than $120 million in proposals funded at Texas A&M University or across the Texas A&M University System in both research and education over the past 15 years. OPD staff have served on these proposals as sole or principal authors, key members on proposal strategic development and writing teams, or in other capacities to enhance proposal competitiveness through experience and disciplinary-driven proposal strategic planning expertise, with a focus on positioning researchers for center-level funding.

Getting Started

Proposal writing is a craft, and like any other craft, it can be mastered with time, knowledge, and practice. The purpose of this workbook is to serve as a guide to best practices for each step of the project planning and proposal development process. The workbook can be read in its entirety, or specific chapters can be consulted on an as-needed basis. In addition, toolkit sections following the chapters provide topical and agency-specific information and web links.

Understand the Importance of Good Grantsmanship

At the core of any competitive grant application – no matter what the field of endeavor – is a great idea, one based on strong scholarship and/or excellent science, and one that is fresh, innovative, and significant. Such ideas may fill gaps in the existing knowledge base, thereby advancing scholarship in the field, or may address important needs or lead to the development of useful applications. In a highly competitive grant environment, however, it takes more than a good idea to be successful in obtaining a grant award. After all, the majority of grant competitors also have good ideas. To make a grant application as compelling and competitive as possible, a good idea *plus* good grantsmanship are essential.

> ### Reminder!
>
> *To make a grant application as compelling and competitive as possible, a good idea plus good grantsmanship are essential.*

A successful proposal represents the accumulation of marginal advantage gained from a series of decisions made during each step of the project planning and proposal development process. Each of these steps will be discussed in depth in subsequent chapters of this workbook:

- **Assessing readiness.** Before preparing a grant application, the investigator should determine – as objectively as possible – not only that a compelling idea is being developed, but that the qualifications, resources, and preliminary data required to be competitive are also in place. Competitive applications exhibit strength in all of these areas.

- **Identifying funding opportunities.** Before preparing a grant application, the investigator should identify the kind of funding mechanism required (i.e., to conduct a full-scale research project, to gather preliminary data, to purchase equipment, to obtain a fellowship, etc.). Competitive applications include requests only for allowable funds.

- **Analyzing the funding agency.** Before preparing a grant application, the investigator should research the target funding agency to gather information on its mission, strategic plan, and investment priorities. Competitive applications closely align with and support the agency's goals and objectives.

- **Reading the proposal solicitation.** The investigator should read the proposal solicitation carefully and in its entirety to garner as much information as possible about the kind and scope of research the program will support and to identify specific proposal requirements. Competitive applications fully address all of the solicitation's requirements, and do so in the order and manner requested.

- **Understanding the review process.** The investigator should learn as much as possible about the reviewers, the review process, and the review criteria being used to evaluate an application. Competitive applications fully address all review criteria.

- **Drafting the application.** The pages of a grant application are the only means of communicating a proposed idea to reviewers. Therefore, it is critical that the investigator communicate his or her idea in the most organized, logical, and understandable manner possible. After all, if reviewers have difficulty understanding the proposed idea, they will be unlikely – and perhaps even unable – to advocate on the investigator's behalf during the review. Competitive applications communicate ideas clearly and convey passion, excitement, and commitment to the proposed project.

> **Reminder!**
>
> *The successful proposal represents the accumulation of marginal advantage gained from a series of decisions made during the project planning and proposal development process.*

Set Aside Ample Time to Prepare a Grant Application

Crafting a competitive application – one that presents a great idea and supports the presentation of that idea with good grantsmanship – can require a significant investment of time. At the outset, **lead time** is needed to identify, refine, and assess the proposed idea. In short, the investigator needs time to think – to reflect on the idea, consider it from every angle, allow related ideas to surface, synthesize these ideas, and, finally, bring everything into sharp focus. This is a highly iterative process, and one that should not be rushed. Attempting to do so by playing the role of the "midnight warrior" and feverishly cranking out a proposal the week before it is due rarely results in success. Lead time is also needed to identify appropriate funding opportunities, obtain and analyze background information on the target agency, download application forms, become familiar with the application instructions, and identify potential collaborators. A significant amount of **work time** is needed to draft the application, have the application vetted by colleagues, revise and edit the text, and request and obtain supplementary materials such as letters of support. And, finally, **wrap-up time** is needed to route the application and budget and to upload the proposal (if submitting electronically) or photocopy and mail it (if submitting a hard copy). Setting aside ample time for all of these activities greatly enhances an investigator's ability to prepare a robust and mature proposal and increases the likelihood of funding.

Create a Proposal Production Schedule

During project planning and proposal development, investigators quickly discover that preparing a proposal is a fairly complex undertaking, often requiring that they juggle a number of tasks at any given time. Therefore, investigators often find it beneficial to prepare a proposal production schedule that lists all proposal tasks and assigns firm due dates for each of those tasks. A **sample proposal production schedule** is provided on the following page. When completing this schedule, investigators should strive to anticipate potential glitches (e.g., computer crashes, etc.) and build at least a bit of leeway into the schedule so that, should such a glitch occur, they will still have time to complete and submit the application.

Proposal Production Schedule

Month: _____

✓	Task	Week of					Week of					Week of					Week of				

Assessing Readiness

When an investigator is especially passionate about a research project, he or she may find it tempting to begin drafting the grant application right away. However, preparing an application requires a significant investment of time. The competitiveness of a proposal will be enhanced when the investigator takes the time up front to assess his or her readiness before proceeding. If all the elements of a competitive application are in place – a great idea, along with the appropriate qualifications, resources, and preliminary data to support that idea – the researcher may proceed with confidence. On the other hand, if any of these elements is lacking, certain steps can be taken – such as refining the idea, seeking additional training, securing needed resources, or gathering additional preliminary data – to increase the proposal's competitiveness, whether for the current grant cycle or a subsequent cycle. Assessment of readiness should involve consideration of three things: the research idea, the competition, and the investigator him- or herself.

> **Reminder!**
>
> *When assessing readiness to submit a grant application, investigators need to be objective about whether they have the time, resources, and commitment to prepare a truly competitive application.*

Assess the Idea

When assessing an idea, the investigator should first determine whether or not it is a truly good one – that it is based on strong scholarship and/or excellent science, and that it is fresh, innovative, and significant. It is important to understand that a good idea, in and of itself, does not necessarily merit funding. To merit funding, the idea must be closely aligned with and supportive of the agency's mission, strategic plan, and investment priorities. At a minimum, making this determination requires obtaining and analyzing background information on the target funding agency to determine whether or not the research idea is a good "match" for the agency, which results in a more competitive application.

To further verify that the idea is a good one and that it will be a good match for the agency, it is helpful to discuss it with trusted colleagues, especially those who have been successful in obtaining funding from the target agency and/or who have served as program managers or reviewers for that agency. Such colleagues will not only be able to help strengthen the research idea by sharing their insights, but also by calling attention to any issues that may raise red flags for reviewers, thereby giving the investigator the opportunity to address these issues before submitting the application.

It is also useful to contact the agency's program manager to discuss the research idea. In fact, it is essential to do so – and to do so as early in the project planning and proposal development process as possible. More than anyone else, the program manager will be able to confirm whether or not a proposed research project will be a good match for the agency. If it is, the program manager can provide guidance in refining the idea, addressing program hot buttons, and developing an appropriate scope of work, project period, and budget. If it is not, the program manager can often help identify another program within the same agency – and sometimes even within another agency – that would provide a better home for the proposed project.

> **Reminder!**
>
> *It is essential to contact the program manager as early in the project planning and proposal development process as possible to confirm that the proposed research project is a good match for the program.*

Assess the Competition

Before submitting a grant application, it is important to find out whether or not the target funding agency has already funded a research project that is identical or very similar to the project being proposed. If it has, it is unlikely that it will fund another such project. After all, even very large federal agencies and well-endowed private foundations have a finite number of grant dollars to go around. Therefore, program managers typically prefer to support a diverse portfolio of grants that address a wide range of issues in a given field of research rather than to support a project whose goals duplicate that of a previously funded project.

It is generally quite easy to determine which projects an agency has funded. Indeed, most federal agencies and a surprising number of private foundations maintain award databases that investigators can search online. Conducting such a search is well worth the time and effort required. On the most basic level, search results will enable an investigator to determine whether or not the idea for a proposed research project has already been funded. On a more sophisticated level, such a search can help detect funding patterns and priorities. Analyzing these can help an investigator determine whether or not the target funding agency's program managers and reviewers will be likely to view the proposed research project as one that will complement – and perhaps even enhance – the agency's current portfolio of grants.

Search results can also enable an investigator to glean a significant amount of information about funded grants. Most award database records include the name of the principal investigator, the title of the project, and the abstract of the project, as well as the project period and the award amount. An investigator can analyze the abstract, project period, and award amount to better gauge the standard scope of work of the agency's average funded project, which can in turn help in developing a project that is appropriate in scope, rather than one that will be considered under- or (more commonly) over-ambitious. Analysis of this information can also help the investigator identify well-accepted and/or preferred approaches, which can indicate the best practices to incorporate into a research project.

> **Reminder!**
>
> *It is helpful to contact the principal investigators of funded projects and ask if they would be willing to take a few moments to discuss their project and proposal strategies that they believe helped them become successful in obtaining funding.*

While gaining access to the abstract, project period, and award amount of funded projects is useful, so, too, is having access to the principal investigator's name. It is important to try to contact the principal investigators of similar projects and ask if they would be willing to take a few moments to discuss their project and perhaps particular proposal strategies that they believe helped them become successful in obtaining funding. Most will be willing – and even excited – to discuss their projects, and many will share their proposal strategies or even send a copy of their proposal and review comments. The insights gained from such a contact can provide a significant competitive advantage when preparing a grant application.

Search Award Databases

Links to the funded awards databases for some of the top sponsors of research at Texas A&M University appear below. Lists of funded awards for other sponsors can be found by searching those sponsors' web sites and/or searching Google or Yahoo.

Computer Retrieval of Information on Scientific Projects (CRISP)
Funded awards database .... http://crisp.cit.nih.gov/

Includes award information on all grants funded through the Public Health Service (i.e., through AHRQ, CDC, FDA, HRSA, NIH, and SAMSHA).

National Science Foundation (NSF)
Funded awards database .... http://www.nsf.gov/awardsearch/index.jsp

Includes award information on all grants funded through NSF.

Current Research Information System (CRIS)
Funded awards database .... http://cris.crees.usda.gov/

Includes award information on all grants funded through the U.S. Department of Agriculture (i.e., through BRAG, NRI, and SBIR).

Department of Education (ED)
Funded awards database http://wdcrobcolp01.ed.gov/CFAPPS/grantaward/start.cfm

Includes award information on all grants funded through the U.S. Department of Education.

Assess the Principal Investigator and/or Project Team

Because virtually every funding agency's review criteria include an assessment of the applicant's qualifications, it is also important for an investigator to determine – as objectively as possible – whether or not he or she possesses the qualifications, resources, and preliminary data sufficient to manage and conduct the proposed project.

Qualifications – The role of principal investigator requires the experience to manage the proposed research project, as well as the education, training, and expertise to carry out the project. After analyzing the target funding agency, program, and solicitation, an investigator may determine that he or she does, in fact, possess all of the necessary qualifications. However, if the project is especially complex or interdisciplinary, the investigator may realize that he or she lacks certain qualifications to carry out one or more project tasks. In these

instances, the investigator may need to consider recruiting colleagues who can bring these qualifications to the project and serve as co-investigators.

Resources – The investigator must demonstrate to reviewers that he or she has the resources required to manage and conduct the proposed project. On the most basic level, resources include such tangible items as office and laboratory space, equipment and instrumentation, computers and printers, materials and supplies, and start-up funds or other sources of institutional support. On a more sophisticated level, however, resources include more intangible things, such as the research environment where the work will be conducted. Therefore, it is also important to describe access to intellectual capital – that is, to colleagues, faculty research groups, invited speaker and seminar series, etc. – since program managers and reviewers understand that an intellectually stimulating environment helps encourage exciting research.

Preliminary Data – Unless an investigator is planning to submit a grant application to a program that is specifically designed to fund preliminary studies, the investigator must demonstrate to reviewers that both the quantity and quality of his or her preliminary data indicate that the proposed research project is likely to be successful. If preliminary data in either published or unpublished form are not available, the program manager will likely recommend that the investigator postpone submitting the grant application until preliminary research has been completed and/or published.

Time – When assessing readiness to prepare a grant application, an investigator may realize that despite having a great idea, along with the qualifications, resources, and preliminary data required to support that idea, there is simply not enough time to prepare an application and/or to conduct the proposed research project should it be funded. In some instances, an investigator may be able to create the time needed by rearranging a schedule, streamlining work habits, or even delegating some responsibilities. In others, even these modifications may not allow the necessary time. In these instances, it is advisable to postpone preparation of an application to a later grant cycle when more time is available to prepare a truly competitive application.

CHAPTER 3

Identifying Internal Funding Opportunities

The Texas A&M University Office of the Vice President for Research offers a number of internal funding programs. Some of these programs provide funds to travel to meet with a program manager, to plan an interdisciplinary program, to gather preliminary data, or to conduct a small research project. All of these programs are designed to increase the submission of proposals to external sponsors:

- Travel Award Program
- Program to Enhance Scholarly and Creative Activities
- Proposal Planning Grant: Preliminary Studies Program
- Proposal Planning Grant: Interdisciplinary Program
- Proposal Consultation Award

Get Connected!

To learn more about internal funding opportunities, obtain a schedule of upcoming application deadlines, or download application forms, visit the Office of Sponsored Projects web page at http://vpr.tamu.edu/osp.html.

Travel Award Program

This program covers travel expenses associated with research proposal development activities, and is designed to increase submissions of proposals to external funding agencies. Before application to this program can be made, there should be strong evidence from the potential sponsor that the trip will be productive and substantially increase the possibility of securing funding. Normally, this program is designed for domestic purposes.

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Eligibility ............................. Tenured and tenure-track faculty and research scientists
Maximum Award ................. $1,500
Deadline ............................. 5:00 p.m. on the first Friday of each month
Learn More .......................... http://vpr.tamu.edu/osp/TAPRFP.htm
```

Program to Enhance Scholarly and Creative Activities

This program supports scholarly and creative activities primarily in the humanities, arts, and other disciplines in which there are fewer opportunities available for federal funding. A variety of activities are eligible for support, including travel to collections and libraries to evaluate original documents.

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Eligibility ............................. Tenured and tenure-track faculty
Maximum Award ................. $10,000
Deadline ............................. Yearly; submission deadlines are posted on the website
Learn More .......................... http://vpr.tamu.edu/osp/sca.html
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Proposal Planning Grant: Preliminary Studies Program

This grant supports the collection and/or analysis of preliminary data needed to develop research proposals in the social and behavioral sciences, education, and the humanities that will be submitted to external funding agencies.

Eligibility .... Tenured and tenure-track faculty
Maximum Award .... $15,000 (exclusive of required college/departmental match)
Deadline .... Yearly; submission deadlines are posted on the website
Learn More .... http://vpr.tamu.edu/osp/prelimstudies.html

Proposal Planning Grant: Interdisciplinary Program

This grant supports activities leading to the submission of innovative, interdisciplinary research proposals – including program and center proposals – in the social and behavioral sciences, education, and the humanities that will be submitted to external funding agencies. Research areas that are already strong on campus and that are composed of several investigators working on a common theme, but not necessarily overlapping projects, are targeted.

Eligibility .... Tenured and tenure-track faculty
Maximum Award .... $15,000 (exclusive of required college/departmental match)
Deadline .... Yearly; submission deadlines are posted on the website
Learn More .... http://vpr.tamu.edu/osp/interdiscstudies.html

Proposal Consultation Award

This award pays for consultation on drafts of research proposals prior to their submission to external funding agencies. It is designed to increase the funding success of proposals for research in the disciplines of social and behavioral sciences, education, and the humanities. The maximum award amount is $1,500. The award amount will vary based on the anticipated dollar amount of the external proposal. The award will pay one or more stipends not to exceed $1,000 per consultant to scholars who are highly qualified to provide substantive feedback, including concrete suggestions for proposal improvement, on drafts of proposals. The consultation is expected to occur during the final phases of proposal preparation so that consultants will have adequate time to react to one or more drafts of the proposal. Thus, the proposal submission date should be no less than 30 days or more than 120 days from the date of submission of this request for funding.

Eligibility .... Tenured and tenure-track faculty
Maximum Award .... $1,500 (exclusive of required college/departmental match)
Deadline .... Any time
Learn More .... http://vpr.tamu.edu/osp/consultationawardprogram.html

Identifying Research Funding Opportunities

The goal of this section is to help the individual researcher become self-directed and self-sufficient in the use of a range of internet tools and search protocols for the identification of funding opportunities on the internet. Self-directed searches of funding agency web sites, combined with the complementary use of Google, Yahoo, or other search tools, are highly effective and efficient ways of identifying research and educational funding opportunities. Individual researchers have the most substantive and nuanced understanding of their research interests, directions, and capacities, and therefore it is most productive if the searches for research opportunities are primarily filtered through their own perspectives.

Federal agencies funding basic, applied, and applications-based research, education, and other university-centered initiatives have developed very robust and well-organized web sites to facilitate the search for funding opportunities. These are often complemented by subscription-based electronically distributed funding alerts, newsletters, and research reports from the agency targeting new funding opportunities, upcoming funding opportunities, and other information related to the research funding and the long-term investment priorities of a particular agency.

Defining the Funding Search Process

Prior to the funding opportunities search process, it is helpful to:

- Define a general disciplinary domain of interest (e.g., science, social sciences, humanities, education, health and biomedical sciences, engineering);

- Characterize the nature of the research interests (basic, applied, applications); and

- Identify a subset of federal funding agencies (or foundations) whose mission, strategic plan, and investment priorities are aligned with these specific research interests.

This subset of funding agencies then becomes the focus of the preliminary search for funding opportunities, a process that may go through several search iterations until the researcher converges on a reasonable alignment of research interests with possible funding sources.

This search for funding opportunities can be further refined by developing funding search skills that allow the researcher to:

- Identify research opportunities that have regular grant cycles within a particularly agency (e.g., NIH and NSF have regular grant cycles of specific research programs that remain open for many years);

- Identify new research opportunities and investment directions at funding agencies; and

- Expand the base of potential research funding sources.

Major Funding Agencies for Texas A&M University

Major federal agency sponsors of research across at Texas A&M University include Health and Human Services (includes National Institutes of Health), Department of Defense, National Science Foundation, National Aeronautics and Space Administration, Department of Agriculture, Department of Education, and the Department of Energy, among others listed below.

Funding Agency	URL Funding Opportunities
National Science Foundation	http://www.nsf.gov/funding/
Health & Human Services (HHS) NIH Grants & Funding HHS GrantsNet	http://www.dhhs.gov/grants/index.shtml http://grants2.nih.gov/grants/index.cfm http://www.hhs.gov/grantsnet/grantinfo.htm
National Aeronautics and Space Administration	http://nspires.nasaprs.com/external/
Environmental Protection Agency	http://www.epa.gov/ogd/competition/open_awards.htm

U. S. Department of Defense
  ▪ DARPA
  ▪ Army Research Office
  ▪ Naval Research Office
  ▪ Air Force Research Office
	http://www.darpa.mil/baa/
	http://www.aro.ncren.net/research/index.htm
	http://www.onr.navy.mil/default.asp
	http://www.afosr.af.mil/oppts/afrfund.htm#Research

U.S. Department of Agriculture/CSREES	http://www.csrees.usda.gov/qlinks/research.html
U.S. Department of Education	http://www.ed.gov/index.jhtml

Compilations and Directories of Funding Agencies

Many sites nationally maintain exhaustive directories of funding agency and foundation web sites searchable for funding opportunities. A few are listed in the table below:

Listings of Federal and Foundation Funding	
UC-Berkeley	http://www.spo.berkeley.edu/Links/Fed.html
Duke University	http://www.ors.duke.edu/find/sponsors/federal.html
Johns Hopkins University	http://jhuresearch.jhu.edu/funding.htm#agency
LSU Libraries Federal Agencies Directory	http://www.lib.lsu.edu/gov/fedgov.html
Stanford School of Medicine	http://med.stanford.edu/rmg/funding/sponsor.html

Daily Grant Opportunities

On a daily basis, federal research agencies post new grant opportunities on the Grants.gov web site, described below, which also provides information about signing up for daily e-mail funding alerts. Grants.gov is one of the best single portals to finding funding opportunities at federal agencies by allowing access to more than 900 grant programs offered by the 26 Federal grant-making agencies.

Grants.gov
▪ Home page: http://www.grants.gov
▪ To receive automated funding alerts tailored to your research interests, visit http://www.grants.gov/Find#receive.
▪ Select one of four automated funding alert options: "Selected Notices Based on Funding Opportunity Number," "Selected Agencies and Categories of Funding Activities," "Selected Interest and Eligibility Groups," or "All Grants Notices."

Federal Program Funding Information	
FedBizOpps.gov is the single government point-of-entry (GPE) for Federal government procurement opportunities over $25,000.	http://www.fedbizopps.gov/
Federal Register is the daily publication for rules, proposed rules, and notices of Federal agencies and organizations, as well as executive orders and other presidential documents.	http://fr.cos.com/
Catalog of Federal Domestic Assistance gives access to a database of all Federal programs.	http://12.46.245.173/cfda/cfda.html
Federal Acquisition Jumpstation	http://prod.nais.nasa.gov/pub/fedproc/home.html

Foundation and Corporate Funding

The Foundation Center provides information on identify funding from national and regional foundations. The list provided at the following URL includes links to the 100 largest U.S. grantmaking foundations ranked by the market value of their assets, based on the most current audited financial data in the Foundation Center's database as of October 1, 2005:

- http://fdncenter.org/research/trends_analysis/top100assets.html

Links to corporate foundations are available at:

- http://fdncenter.org/funders/grantmaker/gws_corp/corp.html

Electronic Funding Alert Services/ E-mail Alerts

E-mail alert services allow the researcher to subscribe to daily and weekly automated listings of current funding opportunities by funding agencies. Funding alerts often allow the researcher to limit the search to selected criteria related to research areas and programs. Examples are provided below:

MyNSF, National Science Foundation
- http://www.nsf.gov/mynsf/
- MyNSF, formerly the Custom News Service, allows you to receive notifications about new content posted on the NSF website. Notification can be received via email or RSS.

NIH National Institutes of Health Listserv
- http://grants.nih.gov/grants/guide/listserv.htm
- Each week (usually on Friday afternoon), the NIH transmits an e-mail with table of contents information for that week's issue of the NIH Guide, via the NIH LISTSERV. The table of contents includes a link to the Current NIH Guide Weekly Publication as well as links to each NIH Guide RFA, PA, and Notice published for that week.

NIH National Human Genome Research Institute
- http://list.nih.gov/cgi-bin/wa?SUBED1=nhgribulletin-l&A=1
- This screen allows you to join or leave the NHGRIBULLETIN-L list. To confirm your identity and prevent third parties from subscribing you to the list against your will, an e-mail message with a confirmation code will be sent to the address you specify in the form. Simply wait for this message to arrive, then follow the instructions to confirm the operation.

Centers for Disease Control and Prevention
- The Centers for Disease Control and Prevention (CDC) allows users to subscribe to several mailing lists via the CDC World Wide Web site.
- To subscribe, go to http://www.cdc.gov/subscribe.html and fill out the on-line form.

GrantsNet
- http://www.grantsnet.org/funding_news_alert.cfm
- GrantsNet is a one-stop resource to find funds for training in the sciences and undergraduate science education. Through the support of HHMI and AAAS, this service is completely free.

National Aeronautics and Space Administration
- http://research.hq.nasa.gov/subs.cfm
- Once you are registered for this service you can receive email notification of the release of research announcements pertaining to any or all of NASA offices.

National Center for Environmental Research, Environmental Protection Agency
- http://cfpub.epa.gov/ncer_list/elists/
- Use this page to subscribe or unsubscribe to the NCER e-mail mailing list. NCER periodically sends out emails to subscribers announcing new grant and/or funding opportunities or highlight new documents in specific subject areas.

U.S. Dept. of Education, EDINFO
- http://listserv.ed.gov/cgi-bin/wa?A1=ind05&L=edinfo
- Information from and about the U.S. Department of Education publications, funding opportunities and more.

NEH Connect, National Endowment for the Humanities
- http://www.neh.gov/news/nehconnect.html
- Stay connected to the humanities with NEH Connect! Each month NEH Connect! delivers the latest news, projects, upcoming events, and grant deadlines from NEH.

RFP Bulletin, Foundation Center
- http://fdncenter.org/pnd/rfp/index.jhtml
- http://fdncenter.org/

Department of Energy
- DOE Pulse, a bimonthy newsletter, highlights work being done at the Department of Energy's national laboratories. Each issue includes research highlights, updates on collaborations among laboratories, and profiles of individual researchers.
- To subscribe, go to http://www.ornl.gov/news/pulse/pulse_home.htm.

Department of Justice
- JUST INFO, sponsored by the U.S. Department of Justice National Criminal Justice Reference Service (NCJRS), is a biweekly e-mail newsletter that reports on a wide variety of criminal justice topics.
- To subscribe, send a message to listproc@aspensys.com. In the body of the message, type: subscribe JUSTINFO <your full name>.

National Institute for Standards and Technology
- NIST Update is a bimonthly report that highlights research, activities and services at National Institute for Standards and Technology.
- To begin receiving e-mail copies, sign up at http://www.nist.gov/public_affairs/mailform.htm

National Cooperative Highway Research Program
- Transit Cooperative Research Program and the National Cooperative Highway Research Program
- To register to receive e-mail notification that Requests for Proposals have been published on the NCHRP and TCRP Homepage, complete the form on web at http://www4.nas.edu/trb/crpmail.nsf/registration.

Leveraging the Internet in the Search for Funding

Leveraging the internet in the search for funding opportunities is an effective and efficient way to ensure exhaustive funding searches across all disciplinary domains of interest. In addition to the funding information available directly from federal agency and foundation web sites, universities nationally have created some excellent and very comprehensive public domain web sites focused on identifying research funding opportunities by discipline, due dates, URL links to program guidelines, and related information. The following are examples of many excellent sites in the public domain that continuously track, update and compile lists of funding opportunities across all academic disciplines.

Duke University Funding Alert Newsletter
- http://www.ors.duke.edu/find/index.html
- http://www.ors.duke.edu/find/announce/alert/current/index.html
- Arts and humanities; community development; curriculum development; environmental and life sciences; funding news; graduate funding; health sciences; international opportunities; multidisciplinary; physical sciences and engineering; postdoctoral funding; social sciences.

The University of Iowa, Funding Opportunities Bulletin
- http://research.uiowa.edu/grantTrack/grantbulletin.php
- Arts and humanities; biological sciences; international; multidisciplinary; physical and mathematical sciences; social sciences.

Iowa State University Funding Opportunities by Due Date
- http://www.vpresearch.iastate.edu/OSP/FundingOpportunities.html
- http://www.vpresearch.iastate.edu/OSP/Maillogs.html

Other university sites offer excellent compilations of funding resources targeted to a specific interest area; for example, the below sites at Cornell University, Michigan State University, and Duke University are excellent sources of national (not institution-specific) funding information for graduate fellowship support.

The Cornell University Graduate School Fellowship Database
- http://cuinfo.cornell.edu/Student/GRFN/
- The Cornell University Graduate School Fellowship Database primarily lists fellowships from non-Cornell sources. Anyone interested in consulting the database is welcome to do so.

Michigan State University Graduate Fellowship Listings
- http://www.lib.msu.edu/harris23/grants/3gradinf.htm
- Michigan State University provides links to fellowship funding lists in more than 40 different academic disciplines.

Duke University Fellowships and Grants for Graduate Students
- http://www.ors.duke.edu/find/student/grad/index.html
- The Duke site is organized around fellowship funding in five board academic areas, including multidisciplinary, humanities and social sciences, sciences, and international opportunities.

Other university sites offer excellent links to categories of funding opportunities especially of interest to university researchers, as at the Berkeley and University of Massachusetts sites.

The University of California at Berkeley
- http://www.spo.berkeley.edu/funding.html
- Links to table of programs, profiles, and URLs for researchers seeking funding in the following areas: Faculty individual prizes and awards, equipment grants, new and young faculty grants, travel grants, women and minorities grants, and postdoctoral funding in the biosciences.

University of Massachusetts New Faculty Research Funding
- http://www.umass.edu/research/ogca/funding/newfacultydisc.html
- This site offers an excellent, comprehensive compilation of federal agency and foundation research awards targeting tenure track faculty in the following areas: Agriculture and food science, arts and humanities, cancer, chemical sciences, computer and information science, education, engineering, environmental science, health and medical, history, mathematics, neuroscience, nursing, physical and life sciences, religion, social and behavioral sciences, and science education.

The Doreen B. Townsend Center for the Humanities, UC Berkeley
- http://townsendcenter.berkeley.edu/postdocs.shtml
- This is excellent listing of national Postdoctoral fellowships in the humanities organized in a table of URLs.

URLs for Targeted Funding Opportunities	
Environmental Emphasis	http://www.environment.psu.edu/faculty/fundinglist.asp
Equipment Grants	http://www.spo.berkeley.edu/Fund/equipment.html http://www.columbia.edu/cu/opg/fund/fedequip.pdf http://www.research.buffalo.edu/spa/instrumentation.htm
Faculty Prizes & Awards	http://www.spo.berkeley.edu/Links/Fed.html http://research.uth.tmc.edu/awards.htm http://www.msu.edu/~biomed/awards/
New & Junior Faculty Grants	http://www.spo.berkeley.edu/Fund/newfaculty.html http://www.umass.edu/research/ogca/funding/newfacultydisc.html http://www.columbia.edu/cu/opg/fund/newinvest-1105.pdf http://www.physics.harvard.edu/grants.htm http://www.unh.edu/osr/funding/support/young_pi.pdf http://www.sfsu.edu/~ptf/docs/NewInvestigatorAwards.pdf http://grants.nih.gov/grants/new_investigators/index.htm http://www.columbia.edu/cu/opg/fund/newinvest-1102.pdf
Post doc Funding, Biological Sciences	http://www.spo.berkeley.edu/Fund/biopostdoc.html
Post doc Funding, Humanities	http://www.spo.berkeley.edu/Fund/hpostdoc.html
Post doc Funding, Social Sciences	http://www.spo.berkeley.edu/Fund/socpostdoc.html
Travel Grants	http://www.spo.berkeley.edu/Fund/newfaculty.html
Women & Minority Grants	http://www.spo.berkeley.edu/Fund/womenminority.html

Google Is Your Best Friend!

Google and Yahoo searches, particularly done in tandem to take advantage of the two different search algorithms, offer a very robust complement to known web sites containing funding opportunities information. In many cases, a modified question used as the search text string will identify sites helpful in the search for funding opportunities, help narrow the focus of the search, and in many cases identify funding sources unknown to the researcher. The search text may be as simple as "funding undergraduate research," "funding graduate fellowships," "research funding alerts."

Funding Opportunities and Information Management

Over time, the researcher may become awash in information related to funding opportunities, funding alert subscription services, program information, and the like. Developing an organizational structure to manage all this information becomes important. For example, identification of research funding opportunities for various programs within very large agencies is expedited considerable by compiling a range of very targeted URLs within a particular agency, something especially helpful at an agency such as NIH with a $28 billion research budget. Moreover, a researcher may be conducting research in areas funded by several federal agencies, as well as foundations; this information needs to be easily accessible on a continuous basis without difficulty.

Early in this process it might be helpful to set up email folders for daily and weekly email alert notifications from various agencies, something that over time becomes an important funding opportunities resource file for the researcher since the alerts typically contain information by program name, synopsis, and URL, and most often represent programs with due dates that recur annually or semi-annually, or on some other reasonable predictive schedule. Another useful organizational tool is to create a "Hotlink Table of URLs" to serve as a single document visible on the "desktop" containing funding agency URLs, multiple URLs within the agency, and other web sources that can be leveraged in developing a very comprehensive funding opportunities listing very nicely tailored to the individual researcher.

Community of Science (COS)

The paid subscription access only Community of Science (http://www.cos.com/) lists funding opportunities across all academic disciplines, including those for national and international programs and for some private funding sources. To receive COS automated funding alerts tailored to specific research interests, investigators must be registered with the Community of Science.

To register, visit the COS home page at http://www.cos.com/, click on the "Join" button, and enter the requested information to create a profile. After creating a profile, there is an option to sign up for automated funding alerts. To do this, log on to the "COS Workbench" page, then go to the "View Your Funding Alerts" section of the page and click on the "Add an Alert" link. This is a link to the search interface, where searches can be created using the funding alert fields. All information from the subscription-only COS is readily and easily available from the public domain sites detailed in this section.

Analyzing
Funding Agencies

Analyzing, backgrounding, and understanding the mission, strategic plan, investment priorities, and culture of a funding agency often provides important information that will enhance the competitiveness of a proposal. Competitiveness depends, in part, on a series of well-informed decision points made throughout the writing of a proposal related to arguing the merit of the research and culminating in a well-integrated document that convinces the reviewers to recommend funding. Competitive advantage represents an accumulation of many small, marginal advantages gained at decision points throughout the project and proposal development and writing process. Knowledge about a funding agency helps the applicant make good decisions throughout the entire proposal development and writing process by better understanding the relationship of the research to the broader context of the funding agency's mission, strategic plan, and research investment priorities. Knowledge about an agency often helps the applicant frame and sustain better agency-specific arguments throughout the proposal.

Many research programs funded by federal agencies or some private foundations grow out of an evolving consensus among the national research community of future directions in certain topic areas that in turn get translated into funding opportunities at the agencies, or incorporated into agency strategic plans. Often, educational programs, e.g., curriculum reform, come about from the same process. It is not uncommon, for example, for reports of the National Academies, the American Association for the Advancement of Science, or similar scientific associations to significantly influence funding directions at one or more agencies. Understanding the origins and underpinnings that help frame the rationale for new research funding opportunities is an important factor in competitive positioning.

Moreover, researching a funding agency on the internet allows the applicant to better understand its internal decision making process. In turn, improved understanding allows the applicant to make better internal decisions as the proposal is being developed and written.

Analysis of the funding agency helps the applicant better understand several key elements common to every competitive proposal:

- Who is the audience (e.g., agency, program officers, and reviewers) and what is the best way to address them?

- What is a fundable idea and how is it best characterized within the context of the agency research investment priorities?

- How are claims of research uniqueness and innovation best supported in the proposal text and reflective of agency strategic research plans?

- How does the applicant best communicate his or her passion, excitement, commitment, and capacity to perform the proposed research to review panels?

Analysis of funding agencies will help the applicant understand that agencies are not passive funders of research programs that are disconnected from a long-term research agenda. Research agencies see themselves as leaders in a national dialogue on research issues and directions, and as a key players in defining and driving the national research agenda. Moreover, funding agencies fund those projects that fall within the scope of their mission. This can be a source of frustration to some applicants, who may believe that a good idea alone will merit funding regardless of how connected it is to a particular agency's investment priorities. However, agencies fund only very good ideas that are clearly developed and tightly linked to their mission, vision, and strategic plan.

A strong proposal allows the funding agency to form a partnership with the submitting institution and principal investigator that will help carry out the agency's vision, mission, and strategic goals. The applicant must understand the nature of this partnership and the expectations of the funding agency, both during proposal development and throughout a funded project. Much of this information can be derived from analysis of background information gathered on the funding agency related to a range of topics, likely including the following:

- Mission
- Culture
- Strategic plan
- Investment priorities
- Language
- Management

- Organizational chart
- Program officers
- Reports, publications
- Leadership speeches
- Public testimony
- Review criteria

- Review process
- Review panels
- Project abstracts
- Funded projects
- Funded researchers

It is important to differentiate between and among various funding agencies by mission, strategic plan, investment priorities, culture, etc. For example, researchers in the social and behavioral sciences and the physical, computational, and biological sciences may have relevant research opportunities at two or more agencies, e.g., NIH, NSF, DOD, and EPA, but these agencies are very dissimilar in many ways, including the following:

- Research focus within disciplines
- Research that is basic, applied, or applications driven
- Research scope and performance time horizon
- Exploratory, open-ended research, or targeted to technology development
- Multidisciplinary or interdisciplinary
- Classified, non-classified
- Proprietary, non-proprietary
- Independent research, or dependent linkages to the agency mission, e.g., health care, education, economic development, defense

It is important for the applicant to differentiate between basic research agencies (e.g., NSF, NIH) and mission-focused agencies (e.g. DOD, NASA, USDA), as well as to differentiate between hypothesis-driven research and need- or applications driven research at the agencies. For example, agencies funding basic research would likely share the following characteristics:

- Independent agency and management
- Independent research vision, mission, and objectives
- Award criteria based on intellectual and scientific excellence
- Peer panel reviewed, ranked, and awarded by merit
- Focus on fundamental or basic research at the "frontiers of science," innovation, and creation of new knowledge
- Open ended, exploratory, long investment horizon
- Non-classified, non-proprietary

Alternatively, an analysis of mission-oriented agencies (e.g., DOD, DOE, ED, USDA) would show characteristics related to research and development that will serve the agency's immediate goals and objectives:

- Scope of work tightly defines research tasks/deliverables
- Predominately applied research for meeting near-term objectives, technology development and transfer, policy goals
- Predominately internal review by program officers
- Awards based on merit, but also on geographic distribution, political distribution, long term relationship with agency, Legislative, and Executive branch policies
- Classified and non-classified research

Analyze the Agency Mission

It is important that the applicant become knowledgeable about the mission and strategic research plan of the funding agency in order to more knowledgably embed the proposed research plan within the context of the funding agency. For example, while NSF and NIH both fund research in the biological sciences, they most often represent very different areas and topics. Sometimes the differences are clear, and in other cases more nuanced, but the distinctions are there, and the researcher needs to be aware of them.

In most cases, this information can be obtained on the internet by visiting the agency web site. Perusing the web site gives the applicant a sense of how the funding agency views itself and the role it sees itself playing in the national research enterprise. This information can be found in the agency mission statement or strategic plan, for example. In other cases, particularly with regard to private foundations, the applicant will find the annual report a source of useful information on mission and agenda. An annual report gives the applicant a profile of funded projects, award amounts, and results.

The proposal writer needs this information for several reasons, but principally because it will allow the writer to shape the proposal from its inception to conform to the agency's mission. It helps the grant writer keep the proposal process on track by reminding participants that the grant ultimately must reflect the funding agency's mission.

Analyze Agency Language and Usage

Learning to echo the language and usage of the funding agency is another factor that may enhance the overall competitiveness of a proposal. Funding agencies, like most institutions, often develop a unique phraseology to define and describe common, recurrent components of their mission and research agenda, e.g., "broader impacts" or "research and education integration" at NSF. Learning the language of the funding agency is important for writing the narrative section of a proposal, and helps in framing arguments more clearly and in better communicating them to program managers and reviewers.

Once the funding agency's language is learned, it allows the appropriate translation to occur between the language of the funding agency and that of the applicant. It often helps the clarity of the narrative text to translate the applicant's institutional language into that used by the agency program officers and reviewers. This is not an onerous or difficult task, but involves being alert to any preferred or repeated terms, usages, and meanings favored by the funding agency. Learned fluency in the use of funding agency language and usage is yet another factor that can enhance competitiveness.

CHAPTER 6

Reading the Proposal Solicitation

The Request for Proposals (RFP) – also called the Program Announcement (PA), Request for Applications (RFA), or Broad Agency Announcement (BAA) – is one common starting point of the proposal writing process. Other starting points to the proposal process include investigator-initiated (unsolicited) proposals, or white papers and quad charts common to the defense agencies.

The generic program solicitation or RFP represents an invitation by a funding agency for applicants to submit requests for funding in research areas of interest to the agency. It is used continuously throughout proposal development and writing as a reference point to ensure that an evolving proposal narrative fully addresses and accurately reflects the goals and objectives of the funding agency, including the review criteria listed in the document.

The RFP contains most of the essential information the researcher needs in order to develop and write a competitive proposal that is fully responsive to the agency's funding objectives and review criteria. It is important to note that the RFP is not a menu or smorgasbord offering the applicant a choice of addressing some research topics but not others, depending on interest, or some review criteria but not others; rather, and in almost all cases, the RFP is a non-negotiable listing of performance expectations reflecting the stated goals, objectives, and desired outcomes of the agency.

Identify the Contents of the RFP

The RFP typically includes, or references in other documents, the requirements for proposal submission, likely including many of the examples below:

- Agency research goals, objectives, and performance expectations
- Statement and scope of work
- Proposal topics to be addressed by the applicant
- Deliverables or other outcomes
- Review criteria and process
- Research plan
- Information on project key personnel, evaluation, and management
- Information on eligibility, due dates, available funding, funding limits, anticipated number of awards, performance period, proposal formatting requirements, and budget and other process requirements

Review the RFP

The RFP is not a document to skim quickly, read lightly, or read only once. The RFP defines a very detailed set of research expectations that the applicant must meet in order to be competitive for funding. It needs to be read and re-read and understood fully, both in very discrete detail and as an integrated whole. The RFP sets the direction and defines the performance parameters of every aspect of proposal development and writing. It should be read word by word; sentence by sentence; paragraph by paragraph; and page by page. Any ambiguity should be clarified by repeated readings of the RFP. If these ambiguities cannot be resolved, the applicant should call the funding agency and ask for clarification from a program officer. As much as possible, the applicant should resolve all ambiguity prior to the proposal writing process so that ideas and arguments are clearly and tightly aligned with the scope and intent of the funding agency.

A well-written RFP clearly states the funding agency's research objectives in a concise and comprehensive fashion, devoid of wordiness, repetition, and vaguely contradictory re-phasing of program requirements. However, not all RFPs are clearly written. In some cases, the funding agency itself is unclear about specific research objectives, particularly in more cutting-edge or exploratory research areas. Therefore, one should never be timid about calling a program officer for clarification. Timidity is never rewarded in the competitive grant process. Where there is ambiguity, one should keep asking questions in order to converge on clarity. Clarity about funding agency requirements as detailed in an RFP is critical to writing a successful proposal.

Understand the Role of the RFP in Proposal Organization

In addition to presenting information about an agency's research agenda and culture, the RFP provides important instructions regarding the presentation and organizational structure of a proposal. The RFP can be used to develop the structure of the proposal narrative and as a template for developing the sequence and required detail of each proposal section. Using the RFP as a proposal template during initial proposal outlining helps ensure that every RFP item is fully addressed. For example, major section headings within an RFP often have very detailed descriptive text defining the objectives of the program (e.g., goals, objectives, performance timeline, outcomes, research management, evaluation, etc.) that must be addressed in the proposal narrative. In this case, the detail in each section of the RFP, including the review criteria, can be selectively copied and pasted into the first draft of the proposal itself. This process provides initial section and subsection headings under which the applicant can draft out preliminary written responses to every requested item in the guidelines, thereby ensuring that the first draft of the proposal fully mirrors the program solicitation requirements in every way. Also, although there is a considerable variance among funding agencies on the required detail and organization of the narrative text, in many cases reviewers will expect to see the text in the same general order as the RFP and the review criteria since, for many agencies, that ordering conforms to instructions given to reviewers by the program officers overseeing the review process. Using the RFP as a guide to create a proposal outline also has the advantage of making it easier for reviewers to compare the proposal to the program guidelines and review criteria, without having to search around in a long narrative to find out if each required topic has been addressed.

As the proposal undergoes a continuous process of draft iterations, whereby ideas and arguments are more clearly defined and the details of the research plan better explicated, it may be possible to eliminate an overabundance of section headings or to meld sections. Objectives may be better integrated and refined, details synthesized, or changes made to the relational order of the text within or among sections, all in an effort to improve the overall clarity of the narrative. This process of refinement can be done with the certainty that if the text undergoes any organizational permutations in subsequent drafts, it will still remain fully responsive to the solicitation. Required topics will be fully preserved, if not the original linearity.

Address the Review Criteria in the RFP

The description of review criteria is an especially important part of the RFP. A competitive proposal must clearly address each review criterion, and the proposal should be structured so that these discussions are easy for reviewers to find. Subject headings, graphics, bullets, and bolded statements using language similar to that used in the RFP can all be used to make the reviewers' jobs easier as they assess how well the proposal meets review criteria.

Read Material Referenced in the RFP

If the RFP refers to any publications, reports, or workshops, it is important to read those materials, analyze how that work has influenced the agency's vision of the program, and cite those publications in the proposal in a way that illustrates that the applicant has read and absorbed the ideas behind those publications. For example, RFAs issued by the Department of Education often refer to online resources available from the National Center for Education Statistics as a means of communicating a particular program's strategy and/or objectives. Similarly, the National Academies' report on the status of undergraduate education in the biological sciences, *BIO2010: Transforming Undergraduate Education for Future Research Biologists* (2003), has been referred to in both NSF and NIH program solicitations.

CHAPTER 7

Understanding the Review Process

When evaluating a grant application, reviewers will not only consider the quality of the ideas, but also the extent to which the application addresses the funding agency's review criteria. Therefore, it is important to identify these review criteria, understand exactly how the agency defines them, and determine the relative weight (if any) that the agency assigns to each of them. This information can then be used to develop an application that clearly addresses these criteria and that is much more competitive.

Table 1 below provides links to the descriptions of the specific review criteria and basic review processes for each of the top seven sponsors of research at Texas A&M University.

Table 1.
Links to Descriptions of Agency Review Criteria and Review Process
of the Top Seven Sponsors of Research at Texas A&M University.

#	Description of Review Criteria and Review Process	Relevant Section	Web Link
1	**DHHS (NIH)**		
	Center for Scientific Review	→	http://cms.csr.nih.gov/
	NIH review criteria	→	http://www.niaid.nih.gov/ncn/grants/basics/basics_b3.htm
	NIH peer review process	→	http://cms.csr.nih.gov/AboutCSR/OverviewofPeerReviewProcess.htm
	NIH review groups	→	http://cms.csr.nih.gov/PeerReviewMeetings/CSRIRGDescription/
	NIH study section rosters	→	http://www.csr.nih.gov/Committees/rosterindex.asp
2	**NSF**		
	NSF review process, criteria	Sec. 3	http://www.nsf.gov/pubs/gpg/nsf04_23/3.jsp
3	**DOD**		
	AFOSR review process, criteria	Sec. 2.14	http://www.afosr.af.mil/pdfs/proguide.PDF
	ARO review process, criteria	Sec. 3	http://www.aro.army.mil/research/arl/arobaa06a.pdf
	DARPA review process, criteria	→	http://www.darpa.mil/body/information/proposal.html
	ONR review process, criteria	Sec. 5	http://www.onr.navy.mil/02/baa/docs/baa_05_024.pdf
4	**USDA**		
	NRI review process, criteria	→	http://www.csrees.usda.gov/funding/nri/pdfs/nri_review_guidelines.pdf
5	**NASA**		
	NASA review process, criteria	App. C	http://www.hq.nasa.gov/office/procurement/nraguidebook/proposer2005.doc
6	**DOE**		
	DOE review process, criteria	→	http://www.sc.doe.gov/grants/process.html
7	**ED**		
	ED review process, criteria	Sec. 5	http://www.ed.gov/fund/grant/about/grantmaking/pt504.html

Identify the Review Criteria

Most agencies publish their standard review criteria on their web pages and/or in their proposal preparation guides. However, it is important to note that some agencies assign additional review criteria to some of their special programs; these criteria will be delineated in the proposal solicitation, so it is also important to read this document.

Understand the Review Process

The review process varies – sometimes significantly – from one agency to the next. The review process may include a peer review, where outside experts from related fields are invited to review the proposal; an internal review, where agency personnel evaluate the proposal; or a combination of both. However, most agency review processes share some common features. At most agencies, for instance, an application will first undergo a **merit review** and, depending upon the results, an **administrative review**.

> **Reminder!**
>
> *Most agencies subject applications to both a merit review and an administrative review. During the merit review, reviewers will evaluate the quality of the proposed research project and the degree to which it meets the agency's review criteria.*

The review process begins when the application is received. The application will be logged into a tracking system, checked for completeness, routed to the appropriate division, and then to the appropriate program, where it will subsequently be forwarded to independent reviewers and/or to a review panel. Review panels vary in size, but will include experts from the various disciplines represented in the program. The independent reviewers and/or review panel will conduct a merit review of the application to evaluate the quality of the proposed research project and the degree to which it addresses the agency's mission and meets the agency's review criteria.

While the chair of the review panel will give all members of the panel access to all of the applications earmarked for that panel's review, he or she will seldom ask all panel members to review every proposal in detail. More typically, the chair will assign a primary and sometimes a secondary and/or tertiary reviewer to each application. The primary reviewer is typically the individual whose field of research is most closely related to the applicant's own. The reviewers will be asked to provide written reviews within a specified length of time. At NSF, for example, most program managers request a complete review within 90 days of when they send the application out to reviewers. In the case of a review panel, reviewers will evaluate the applications assigned to them, and then mail or e-mail their reviews to the chair of the review panel and/or travel to the agency's headquarters to meet as a panel. During the panel meeting, the chair of the review panel will typically ask the primary reviewer to present his or her review to the rest of the panel, and will then give other members of the panel a chance to provide additional comments. When all members of the review panel who want to provide comments have had an opportunity to do so, the chair of the panel will typically ask the members of the panel to rank the applications and/or identify which ones are meritorious, i.e., worthy of funding.

After the review panel adjourns, some agencies mail or e-mail the individual review comments – and sometimes a summary of the comments and a rank or priority score – to the applicant. This information can oftentimes provide a very good sense of whether or not the application is likely to be funded.

Applications recommended for funding then typically undergo an administrative review to ensure that all agency requirements have been met and to allocate funds to the project. After this process is finalized, the award notification is sent, the contract is negotiated, and, finally, the contract is signed by all official agency and university representatives. Campus grant and contract administrators will lead the principal investigator through these negotiations.

Know the Reviewers

While it is important to identify the review criteria and to understand the review process, it is equally important to identify – as much as possible – who the reviewers will be. Knowing the reviewers' scientific and/or scholarly background enables the applicant to ensure that the proposal is written at the appropriate level, provides the appropriate background information, and addresses the reviewers' priorities and concerns. Some agencies set up standing review panels that include reviewers from a mix of disciplines, with some reviewers (especially at the mission agencies) being researchers who are full-time employees of the agency, others being researchers who have agreed to serve on a review panel for a designated period of time, and still others being researchers who have agreed to serve on a review panel on an *ad hoc* basis when a program manager determines that the regular review panel lacks the particular expertise required to properly evaluate an application. Agencies may also set up review panels to evaluate proposals to a specific program, or they may depend on mail reviews from *ad hoc* reviewers.

For the most part, those applying to larger agencies can count on independent reviewers having backgrounds related to the applicant's research focus. In this case, the reviewers are the applicant's peers, i.e., people who review their journal article submissions and attend the same scientific and scholarly meetings. However, while the reviewers will have expertise in the applicant's field, it is quite probable that only one or two of these reviewers will possess expertise in the applicant's sub-discipline. This is especially true on panels charged with reviewing multidisciplinary and cross-cutting proposals, such as those prepared to establish centers or programs; indeed, these panels will likely include at least some reviewers who are from completely different disciplines. Therefore, it is extremely important that the applicant write the proposal at a level that enables *all* reviewers to understand the important points, even though they may not understand all the discipline-specific details.

Some agencies post rosters of review panels on their web pages. These rosters not only list the names of the reviewers, as would be expected, but also designate the period of time that each reviewer will serve on a panel. This information can be used to gain a competitive advantage. With the names of the reviewers in hand, the applicant can look up and read reviewers' recent publications and thereby identify their field of expertise, gain insight into their research interests, and determine the extent to which their interests align with the applicant's own. This knowledge can help the applicant assess the likelihood that the proposed research project will be well received. If it is determined that the majority of reviewers will be likely to view the project favorably, the applicant can proceed with confidence. However, if that is not the case, the applicant can consider either submitting the application to another program or agency or submitting it at a later time.

> **Reminder!**
>
> *If reviewers have published articles relevant to the proposed research project, consider citing these articles in the literature review.*

Write for the Reviewers

When preparing a grant application, it sometimes easy to forget that the application will be reviewed not by a monolithic agency, but by real people. Like the applicants themselves, reviewers are smart, accomplished, and dedicated, and may be struggling to balance the time they spend on their research, teaching, service obligations with the time they spend with family, friends, and community. In short, they are extraordinarily busy people.

Because reviewers are typically given multiple proposals to review at a time while still performing their "real" jobs, it is important that the proposal include absolutely everything the reviewers will need to read, understand, and evaluate the proposed research project with ease and efficiency. To this end, it is important to synthesize key concepts and to articulate the links between the overarching goal and the specific objectives, between the specific objectives and the hypotheses, between the hypotheses and the approach, between the approach and the expected outcomes, and, finally, between the expected outcomes and the significance and broader impacts of the project. In short, it is important to present the proposed research project with absolute clarity so that all reviewers will not only be able to understand the ideas presented therein, but also will be persuaded to advocate on behalf of that particular research project. Incorporating reviewer-friendly text, formatting, and graphics greatly enhances the competitiveness of a proposal.

> ## Reminder!
>
> *It is important that the proposal include absolutely everything the reviewers will need to read, understand, and evaluate the proposed research project with ease and efficiency.*

Create Reviewer-Friendly Text

Techniques for developing reviewer-friendly text include the following:

- Divide the proposal into the required sections.
- Place the sections in the required order.
- Use parallel structure at both the sentence and section levels.
- Incorporate logical paragraph breaks.
- Open paragraphs with clear topic sentences.
- Discuss important items first.
- Avoid the use of inflated language.
- Use declarative sentences.
- Define potentially unfamiliar terms.
- Spell out acronyms and abbreviations.
- Employ appropriate style and usage.
- Use correct grammar, punctuation, and spelling.
- Run a spell-check and proofread the application.

Create Reviewer-Friendly Formatting

Techniques for developing reviewer-friendly text include the following:

- Follow page limitations for both the whole proposal and for individual sections.
- Conform to margin requirements.
- Conform to font and point size requirements.
- Incorporate headings and subheadings to provide a "roadmap" for reviewers.
- Incorporate ample white space.

Create Reviewer-Friendly Graphics

Techniques for developing reviewer-friendly text include the following:

- Make graphics large enough to be useful.
- Place graphics as close to the text they are meant to illustrate as possible.
- Refer to graphics in the text.
- Number and title all graphics.
- Prepare a caption for all graphics.
- Label axes and data points, as needed.
- Provide a legend, as needed.
- Provide color copies if color and/or color gradient are important.

Logging in the Proposal

After identifying an appropriate funding opportunity and making the decision to prepare a proposal – and well before the proposal deadline – the investigator must log in the proposal with one of the approved campus agencies to start the application process:

- **Texas A&M Research Foundation (TAMRF)**
    — Investigators should log in with TAMRF if affiliated with Texas A&M University but *not* affiliated with the the College of Agriculture and Life Sciences, the College of Engineering, or the Texas Transportation Institute.

- **Texas Agricultural Experiment Station (TAES)**
    — Investigators should log in with TAES if affiliated with the College of Agriculture and Life Sciences.

- **Texas Engineering Experiement Station (TEES)**
    — Investigators should log in with TEES if affiliated with the College of Engineering.

- **Texas Transportation Institute (TTI)**
    — Investigators should log in with TTI if affiliated with the Texas Transportation Institute.

If a proposal involves multiple investigators, it should be logged in with the principal investigator's campus agency. If there are questions about which campus agency to log in and submit a proposal through, investigators should contact their department head or college research dean for guidance.

After the proposal is logged in, the proposal administrator will enter it into a tracking system, and then download and review a copy of the proposal solicitation. Obtaining this information up front enables the proposal administrator to become familiar with the program's project and budget requirements and, in turn, to be better prepared to answer any questions the investigator may have as the proposal is being drafted. Later, when the grant application has been completed, the proposal administrator will refer to the information provided on the log-in sheet to determine which investigators and institutional officials will need to review the proposal during the routing process.

Log In with the Texas A&M Research Foundation

As soon as an investigator decides to submit a proposal to a sponsor – *and at least 10 days before the proposal is due* – he or she must log in the proposal. The log-in process is quite easy and may be completed by phone or e-mail.

Log In by Phone

1. Go to http://rf-web.tamu.edu/preaward/proposaladm.html. This web page provides a list of proposal administrators, as well as a list of the colleges/departments that each proposal administrator serves.

   Note: If there are questions about which proposal administrator to contact, call the Proposal Hotline at 979-571-9489.

2. Identify the appropriate proposal administrator.

3. Call the proposal administrator and provide the following information:

   - Sponsor name
   - Program name
   - Proposal title
   - Proposal due date
   - Name of principal investigator
   - Names of co-investigators
   - Involvement of collaborators or subawards

Log In by E-mail

1. Go to http://rf-web.tamu.edu/forms/files/Preaward/Log-insheet.pdf. This web page provides a PDF fillable file of the Texas A&M Research Foundation proposal log-in sheet. (See **Figure 1** on the following page.)

2. Save the log-in sheet to a computer file.

3. Complete the log-in sheet.

4. E-mail the log-in sheet to Log-in@rf-mail.tamu.edu.

5. An e-mail confirmation will be sent confirming that the log-in sheet was received and assigned to a proposal administrator.

Figure 1.
Texas A&M Research Foundation Proposal Log-in Sheet.

Introduction to the Drafting Process

All federal funding agencies and most private foundations provide a detailed list and description – in their proposal preparation guide and/or in their various proposal solicitations – of the information they require applicants to include in proposals. This information varies from one agency to the next, and sometimes even from one program to the next within the same agency. However, some of the most frequently requested information is listed below:

- Cover sheet
- Abstract and/or summary
- Introduction and/or specific aims and/or objectives
- Background and significance
- Literature review
- Preliminary studies
- Research and program design
- Project schedule
- References
- Biographical sketch
- Resources
- Completed, ongoing, and/or pending support
- Budget
- Budget justification
- Supplementary materials

It is important to note that not all agencies will require applicants to include all of this information in their proposals, nor will they necessarily require them to present it in this particular order or under these specific headings. For instance, some agencies might require that the background information, literature review, and preliminary studies be presented in a single section, rather than divided into three discrete sections, as has been indicated above.

Therefore, the guidance presented in this section is not meant to be prescriptive; rather, it is intended to provide researchers with an overview of some of the most common proposal elements and to offer them a distilled set of best practices that have proven useful for many applicants. In all cases, the target agency's requirements should take precedence over the guidance presented in this chapter.

CHAPTER 9A
DRAFTING THE PROPOSAL

Cover Sheet

Virtually all federal agencies and many private foundations require that applicants complete a standard cover sheet – sometimes called a face page – to accompany applications. The information provided on the cover sheet is used by agency administrators to process the application; therefore, it is important that this information be complete and accurate. The proposal administrator will assist in completion of this sheet, and in many instances will fill it out in its entirety.

The specific information required on the cover sheet will vary from one agency to the next; however, it is typical to be asked to provide details on the following:

- **Program announcement or solicitation** – Generally requires that the principal investigator indicate whether or not he or she is responding to a particular program announcement or solicitation, and if so, that the investigator provide the number and title of that program announcement or solicitation.

- **Principal investigator** – Generally requires the name, title, university affiliation, physical address, e-mail address, telephone number, and fax number of the principal investigator, as well as information on the principal investigator's educational background. Sometimes requires similar information for co-investigators.

- **Administrative official** – Generally requires the name, title, university affiliation, physical address, e-mail address, telephone number, and fax number of the administrative official to be notified when an award is made.

- **Organization** – Generally requires the name, physical address, and organization type of the applicant's organization. Sometimes requires a congressional district number (see below), entity identification number, or organization code.

- **Requested award amount** – Generally requires the requested award amount, usually for both the initial project period and the total project period.

- **Proposed project period** – Generally requires the proposed start and end dates for the project.

Note to New Investigators!

Many agencies give applicants the opportunity to indicate whether they are new investigators. Before applicants indicates that they are new investigators, it is important that they confirm exactly how their target agency defines the term "new investigator," as the definition varies from one agency to the next.

If applicants qualify as new investigators, it is to their advantage to indicate this on the application cover sheet, for many program managers try to develop portfolios with grants led by a balance of new, junior, and senior investigators.

- **Human subjects and vertebrate animals** – Generally requires an indication of whether or not the proposed research project requires the use of human subjects and/or vertebrate animals and, if so, often requires additional information, such as the human subjects assurance number and/or the animal welfare assurance number.

- **Signatures** – Requires that the principal investigator and an authorized organizational representative provide original signatures to certify that appropriate procedures will be followed in the conduct of the proposed research project.

Commonly Requested Cover Sheet Information

Congressional Districts

College Station	31st
Corpus Christi	27th
Dallas (BCD)	30th
Galveston	9th
Houston (IBT)	25th
Prairie View	14th

Texas Districts

	House:	Senate:
College Station	14th	5th
Corpus Christi	32nd	20th
Dallas (BCD)	108th	23rd
Galveston	23rd	11th
Houston (IBT)	134th	13th
Prairie View	15th	5th

DUNS Numbers

Texas A&M University	80-233-9234
Texas A&M Research Foundation	07-859-2789

Human Subjects Assurance Numbers

Texas A&M University	FWA00000092
Baylor College of Dentistry	M-1453

Animal Assurance Numbers

Texas A&M University	A-3893-01
Baylor College of Dentistry	A-3027-01
Health Science Center	A-3895-01 (Scott & White only)
Institute of Biosciences and Technology	A-4012-01

CHAPTER 9B
DRAFTING THE PROPOSAL

Abstract / Summary

Most funding agencies require that proposals include a short summary of the project. The name and exact requirements vary depending on the funding agency – NIH and NSF require a "project summary," and DoD agencies usually require a "project abstract" or "executive summary" – but the common purpose of this section is to give agency administrators and reviewers a quick, concise overview of important aspects of the proposal. The abstract or summary typically precedes the proposal narrative. It is sometimes the only section that the reviewers will read and is therefore critical to the proposal's success.

An effective proposal abstract will accomplish several things. It will provide the reviewer with an overview of the conceptual framework of the proposal, thereby offering them a "roadmap" for the rest of the proposal that will give them a clear idea of where the proposal is going and how the sections will fit together. It will also grab the reviewer's interest, communicate excitement about the project, and generate enthusiasm for that project. How this is done will depend on the goals, criteria, and priorities of the agency, the program, and the reviewer. For example, since NSF places a high value on innovation, the project summary in a proposal to NSF must clearly describe how the proposed research is innovative or ground-breaking. Likewise, since NIH gives priority to research that is relevant to human health, the project summary in a proposal to NIH must clearly describe how the new information generated from the proposed project will translate into immediate results that may relieve the burden of disease or enhance the health of the human population. Similarly, the Army Research Laboratory (ARL) is strongly tied to research that supports particular mission requirements, so a project abstract in a proposal to ARL should explain how the proposed work will support or enable specific ARL missions.

The proposal abstract or summary must accomplish the following:

- Describe clearly and concisely what the principal investigator and co-investigators plan to accomplish and, in very broad strokes, how they plan to do it.

- Explain why the proposed work is important and how it supports agency and program priorities.

- Explain why the submitters are the right people to do the job.

- Explain how the proposed work satisfies the principal evaluation criteria.

- Provide any other information specifically required by the agency and/or the program solicitation (e.g., "intellectual merit" and "broader impacts" in NSF proposals and "relevance of the research to public health" in NIH proposals).

The detail with which these points can be made will depend on the allowed length of the abstract, as well as on agency and program requirements. Guidelines for NSF and NIH are summarized below:

NSF Project Summary

The required format of the NSF project summary varies, depending on the particular program. However, unless otherwise specified in the program announcement, the requirements listed in the NSF *Grant Proposal Guide* (http://www.nsf.gov/pubs/gpg/nsf04_23/) apply:

- Adhere to a maximum length of 1 page with 1-inch margins on all sides.

- Offer a self-contained description of the proposed activity that is written in third person and that is suitable for publication.

- Provide clear and separate statements addressing both the "intellectual merit" and the "broader impacts" of the proposed activity (see below). It is important to note that NSF will return any proposal that does not specifically address these two review criteria without review.

- Be understandable, as much as possible, to a scientifically and technically literate lay reader.

Intellectual merit is defined in the NSF's *Grant Proposal Guide* as follows: "How important is the proposed activity to advancing knowledge and understanding within its own field or across different fields? How well qualified is the proposer (individual or team) to conduct the project? (If appropriate, the reviewer will comment on the quality of prior work.) To what extent does the proposed activity suggest and explore creative and original concepts? How well conceived and organized is the proposed activity? Is there sufficient access to resources?"

Broader impacts is defined in the NSF's *Grant Proposal Guide* as follows: "How well does the activity advance discovery and understanding while promoting teaching, training, and learning? How well does the proposed activity broaden the participation of underrepresented groups (e.g., gender, ethnicity, disability, geographic, etc.)? To what extent will it enhance the infrastructure for research and education, such as facilities, instrumentation, networks, and partnerships? Will the results be disseminated broadly to enhance scientific and technological understanding? What may be the benefits of the proposed activity to society?"

NIH Project Summary

The NIH project summary, referred to as the "abstract," is the second page of the proposal package that is submitted to the NIH Center for Scientific Review. It should be written as a stand-alone document. Often, this abstract is the only piece of information that all members of the study section will read other than the primary and secondary reviewers' specific comments about the proposal. Therefore, the abstract must be very well written and convey only necessary and important information.

Given the size of the formatted box, the abstract must be written concisely. The required format of the abstract may vary according to the type of funding mechanism (e.g., R01, SBIR/STTR). While the same forms may be used for different funding mechanisms, the content of the project abstract will differ. For examples of formatting differences in project abstract pages, refer to the forms website at http://grants1.nih.gov/grants/forms.htm.

The project summary for an **R01** application should accomplish the following:

- State the broad, long-term objectives and specific aims of the proposed research project.
- Reference the health relatedness of the project (i.e., relevance to the agency's mission).
- Provide a concise description of the research design and methods used.
- Describe (in two-to three-sentences) in plain, lay language, the relevance of the proposed research to public health.

The project summary for an **SBIR/STTR** application should accomplish the following:

- Identify the potential innovation.
- Describe anticipated results or outcomes.
- Explain potential commercial application.

CHAPTER 9C
DRAFTING THE PROPOSAL

Introduction/
Objectives/Specific Aims

After the abstract, project summary, or executive summary, the first part of the proposal that reviewers will see is an introductory or overview section that outlines the objectives (called the "specific aims" in NIH proposals) of the proposed project. Although the terminology used to describe this introductory section of the proposal differs among agencies, this section includes some common elements that provide reviewers with direction as they prepare to read the remainder of the proposal.

The introductory section often begins with a statement of the research problem or research question in rather broad or global terms, e.g., "There is a pressing need to study the interaction between diet and disease." This statement can be expanded upon to include the rationale behind the proposed research, explaining why anyone, particularly the reviewers, should care about the topic while bringing in more specific terms that will shape the proposed idea and that will become common terminology carried throughout the proposal, e.g., "Obesity is the number one cause of Type II diabetes, and diets high in saturated fats have been shown to cause obesity."

Next, the introductory section includes an overview that delineates the project's objectives (or specific aims), as well as the hypotheses that the applicant wishes to test and/or the critical needs that the applicant wishes to address. This overview often also describes the researchers and their qualifications, gives a brief discussion of the approach and tasks involved, and emphasizes how the various aspects of the project meet the evaluation criteria. In this way, the overview serves to mentally prepare the reviewers to understand the remainder of the proposal, for it presents them with the basic structure and main objectives up front, thereby making it much easier for them to read and review the proposal. The overview also gives the applicant an opportunity to hook the reviewers early with an exciting idea and helps the applicant avoid the common mistake of allowing the most important points of the proposed project to become buried in the middle of the narrative behind several pages of background material, where reviewers may miss them or lose interest before reading to that part of the proposal.

For NSF and NIH proposals, the introduction offers the applicant the opportunity to state how the approach being proposed for the research project is novel and unique to the field, and how results from the research will benefit society in some critical manner, e.g., "By using a transgenic mouse with a deletion of the newly discovered XXY gene, for the first time we can directly assess the effect of various fatty diets on body growth and hormonal secretions. This knowledge will provide a wealth of physiological information that can be immediately extrapolated to the human population for the control of obesity and thus a reduction in Type II diabetes."

For larger, multi-investigator proposals, the introduction also offers the applicant the opportunity to provide a roadmap to the entire proposal by laying out in detail how all of the elements of the proposed project impact the question being asked, and how project results will benefit society in general. For these kinds of proposals, the process of writing the introduction can also be used during development of the proposal to pin down and synthesize the ideas of the proposal team. By circulating drafts of the introduction among the proposal team, the principal investigator can ensure that everyone is in agreement on the larger concepts, goals, and objectives (or specific aims) of the proposal, thereby avoiding disconnects that can easily develop when each member of the team is working on different sections of the proposal in isolation.

Background and Significance

The background section offers the applicant the opportunity to summarize the relevant background information about a particular problem or issue that is being addressed by the proposed research project. The significance section allows the applicant to reflect on the importance of the proposed research project in filling some gap in knowledge that is critical to moving the field forward, meeting an important need, or developing an important application. The background and significance sections are typically combined, but for clarity, can be separated by subheadings.

When providing background information, the objective is not to provide an exhaustive summary of research in the field, but rather to highlight key elements and critically evaluate the information that is directly relevant to the current proposal and its goals and objectives (or specific aims). In this section, applicants can provide a context for the proposed research project, leading the reviewer to draw conclusions about the field. At this point the significance section flows directly from the background.

When explaining the significance of the proposed topic, the applicant needs to clarify how the proposed project will fill the gaps in knowledge within the field. Depending on the applicant's target agency, the applicant may need to provide a justification for proposing basic science research in a research field that is moving towards identifying mechanisms or providing a more detailed analysis of a specific phenomenon. While funding agencies such as NSF want to see an increase in basic research, other funding agencies such as NIH want to see a more practical application of their dollars to research that moves from "bench top to bedside" with rapidity. In this case, applications to NIH requesting funding to conduct descriptive research projects with the long-term but not immediate goal of applying the results to a clinical problem or disease may be viewed less favorably. Therefore, the significance section may be the best place to fully justify the necessity of addressing such basic science research, especially if the applicant has already established in the background section that no such basic science exists (or that the available literature is contradictory or scanty) in the current literature within this field.

Literature Review

Literature reviews primarily serve the purpose of demonstrating that the proposal writer has a solid, comprehensive grasp of historical and current research in a given discipline or topic area. A well-written proposal can also use the literature review to identify existing gaps in the knowledge base, providing an opportunity to directly link proposed research goals and objectives to those documented gaps.

There are several ways to approach a literature review. The review may be structured chronologically, from earlier research published in a given area to the most recent. Alternatively, the review may be organized by topic – that is, what kinds of research have been conducted in research topic "A," followed by a summary of research about topic "B." Continuing this example, the applicant could then stress the significance of the currently proposed research based upon documented gaps in the "A" and "B" areas, or by showing that the proposed research will build upon the complementary research conducted to date in areas "A" and "B." Literature reviews, when well crafted, can be a useful tool to help the applicant demonstrate why the proposed research is innovative, and to reveal the applicant's excitement and sense of purpose for the research being proposed.

Cite Relevant Research

Literature reviews should focus upon *relevant* publications that address the specific research being proposed. A proposal reviewer will not be impressed by a padded bibliography. However, if there are seminal, well-known publications directly related to the proposed research area, these should be cited to demonstrate that the applicant has a comprehensive understanding of the subject matter. The applicant can ask colleagues or mentors who are familiar with the topic of research to look over the bibliography section to check for any obvious omissions.

If the applicant has access to the roster of review panel members, a good strategy is to review publications of the reviewers to see if any of their research is relevant to the proposed research topic. The applicant may wish to cite the reviewers' publications if they are clearly linked to the proposed research.

Call Attention to Collaborative Publications

If an applicant is working in collaboration with multiple investigators, it is beneficial to demonstrate that real, existing collaborations have been established among the investigators. If the principal investigator and co-principal investigator(s) have co-authored publications,

these should always be mentioned in the literature review. When preparing the bibliography, such citations can be emphasized by placing the collaborators' names in boldface or placing an asterisk or similar symbol to the left of the bibliographic citation.

During final editing and proofreading, all citations in the literature review should be double-checked against those listed in the bibliography to ensure that the bibliography is complete.

CHAPTER 9F
DRAFTING THE PROPOSAL

Preliminary Studies

The preliminary studies section – sometimes called "preliminary results" or "preliminary data" – offers the applicant an opportunity to discuss the results of previously conducted experiments or studies that are relevant to the proposed research project. The overarching goal of the preliminary studies section is to demonstrate to reviewers that the applicant is well prepared to conduct the proposed research and is likely to succeed in doing so.

The preliminary studies section allows the applicant to accomplish the following:

- Provide an account of preliminary studies pertinent to the application.

- Establish that the applicant has the experience and competence to pursue the proposed project.

- Establish the applicant's proficiency at the methods and techniques that will be used in the current proposal.

- Justify the appropriateness of applying a specific method, technique, or model to the question or issue posed by the current proposal.

- Highlight collaborative efforts (especially if those same collaborators are co-investigators on the current proposal) or demonstrate the availability of specific equipment for the current proposal.

Depending on the type of proposal being prepared and funding agency being targeted, the preliminary studies section may be very long (including results based on a researcher's career of successful proposals) or very short (demonstrating the application of specific techniques or methods, or a new model system). The amount of preliminary data expected in a proposal varies widely by funding agency and by discipline, and is often not explicitly stated in the proposal preparation guide or proposal solicitation. Applicants can develop an understanding of the amount of preliminary data expected by a particular agency and/or program by discussing this with the program manager, speaking with previous reviewers of proposals to that agency and/or program, and talking to researchers who were previously funded by that or similar programs, as well as by reading successful proposals to the agency and/or program of interest.

If the results of previous experiments are outlined in the preliminary studies, there should be sufficient detail in terms of the rationale for the experiment, the variables manipulated, the outcome of the experiment (including tables or graphs), and the interpretation of the outcome. The text should highlight the procedural elements of previous experiments that are relevant to the proposed research project to demonstrate that the applicant is adept at designing, conducting, and interpreting the outcome of similar experiments. Applicants

should make note of problems with the experiment or its interpretation, and should show how that led them to rethink the conceptual or procedural aspects of the current proposal. Here is an example:

> "In this experiment, we gave the rats free access to water containing alcohol for 6 months in order to test our hypothesis about the long-term effects of alcohol consumption on changes in brain anatomy; however, the rats consumed very little of the water containing alcohol. Therefore, we could not objectively test our hypothesis about long-term drinking and brain damage. Consequently, in the current proposal, we plan to use a different method of administering alcohol to the rats so that we can adequately test our proposed hypothesis."

CHAPTER 9G
DRAFTING THE PROPOSAL

Research and Program Design

The research and program design section of the proposal contains all of the relevant details about the approach used to address the goals and objectives (or specific aims) of the proposed research project. Naturally, the actual content of this section will differ depending on the targeted funding agency and even the type of funding mechanism within each funding agency. For example, in an NIH R01 proposal, this section would contain a very detailed description of each experiment, including the number/type of subject participants, the independent and dependent variables, and the expected outcome of the experiment. On the other hand, in an NSF CAREER proposal, this section would contain more specific details presented about Year 1 and 2 research activities, with a less detailed description of the research approach and methodology. However, there are some common elements that should be included in any research and program design section.

Because the research and program design section often includes complex and highly technical data, the applicant should strive to ensure that this critical section is well organized and easy for reviewers to read and understand. Key features of the research and program plan should be easy to find; bullets, tables, flowcharts, and other graphics can all be effective tools for making important points stand out and for helping reviewers to understand the overall logic and organization of the program plan. As in all sections of the proposal, the action plan should clearly and explicitly address the evaluation criteria, pointing out and explaining how program elements address particular evaluation criteria. If there are multiple elements within the proposal (e.g., different themes, programmatic areas, various investigators), each section should be written in a similar voice and follow a consistent organizational pattern.

Statement of the Problem / Issue – At the beginning of the research and program design section, the applicant should state the purpose of the proposed research project, e.g., to test a hypothesis, to address a critical need, to construct a specific model, to create a commodity or consumable. If the purpose of the proposal has been discussed in detail in previous sections, a simple, concise restatement of the purpose is appropriate here.

Action Plan – The research and program design section should include an action plan that describes the methods that will be used to achieve the goal of testing the hypothesis, addressing the critical need, etc. Again, depending on the funding agency and the type of program, this section may be very detail-oriented. Each action, experiment, or task should be explicitly linked to one or more of the goals, objectives, and outcomes listed in previous sections of the proposal. In general, more specific terminology should be used in place of more general terms; e.g., "characterize" and "investigate" are general terms that reviewers often consider too vague, whereas statements that describe specifically what characteristics or properties will be measured using which techniques are much more informative and reassure reviewers that the applicant has a clear idea of precisely what he or she will do to achieve the stated objectives.

Potential Pitfalls – The research and program design section should address potential pitfalls: What problems may occur in interpreting the outcome? Are there multiple interpretations of the result possible? How generally applicable will the results be? Is there a potential "show-stopper" that could undermine the research plan, and how would the investigator deal with it if it arises? Any unanswered questions that may surface in the reviewers' minds related to the probability of success of the proposed research project will greatly reduce the chance that they will recommend funding; it is therefore critically important to anticipate potential questions and answer them in the research narrative.

Interpretation – How will the result or outcome tie into the original overall goal of the proposal? What new knowledge will be gained by performing this action or addressing this question or issue, and how will that relate to the original objective (or specific aim)? This is perhaps one of the most poorly addressed areas in the research and program design section of many proposals, yet its importance cannot be overstated. If the applicant does not know how the results will give meaning to the overall goals, then why should the reviewer have to think about it? A well-developed interpretation and understanding of the result shows the reviewer that the applicant is taking a forward-thinking approach to the proposal process.

Other Considerations – The research and program design section of the proposal is often the most involved; use of graphics, bullets, flow charts, or tables can make it easier for reviewers to find the most important points and can enhance the overall logic and flow of the research and program design.

Project Schedule

When evaluating a grant application, reviewers will not only consider the quality of the scholarship and/or science underlying the proposed research project, but also the investigator's ability to manage the project should it be funded. Reviewers will make this evaluation not only by considering the description of the applicant's research plan, but also by verifying that the applicant's project schedule aligns with and supports that plan. To this end, a project schedule serves as a persuasive document that assures reviewers that the applicant has carefully considered and planned all aspects of the proposed project.

> ## Reminder!
>
> *If a multi-year research project is being proposed, particularly for a career or young investigator award, reviewers will generally expect to see a highly detailed schedule for the first year of the project, as well as a solid overview for subsequent years of the project.*

A well crafted project schedule reiterates the major research objectives (or specific aims) described in the research plan, then presents these objectives – along with the specific tasks required to meet them – in the same order in which they were presented in the plan. Depending on the nature of the proposed project, these tasks will not only include research experiments, but also education and outreach activities and grant management requirements, such as preparing progress reports and attending agency and/or program meetings. In addition, a good project schedule identifies the projected start and end dates for each of these tasks so that reviewers can easily determine whether or not a realistic amount of time has been allocated for each task.

A sample project schedule is provided on the following page. While a project schedule may take any number of forms, the Gantt chart format used in this sample is particularly helpful to reviewers, for it provides a graphical representation of the duration of project tasks against the progression of time, thereby enabling reviewers to see how the project will unfold and assuring them that a clear plan has been developed with which to monitor a project's progress.

Project Objectives and Tasks	Year 1				Year 2				Year 3			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Conduct Specific Aim 1	■	■	■	■	■	■						
Study 1.1 – Integrin targets	░	░	░	░	░							
Study 1.2 – Adhesion		░	░									
Study 1.3 – Cytoskeletal signals					░	░						
Conduct Specific Aim 2					■	■	■	■	■			
Study 2.1 – Conceptus and activation					░	░	░					
Study 2.2 – Attachment and activation						░	░	░				
Conduct Specific Aim 3						■	■	■	■	■	■	■
Study 3.1 – Survival and attachment						░	░		░			
Study 3.2 – Gene expression								░		░	░	░
Submit Progress and Final Reports				■				■				■

References

When evaluating a grant application, reviewers will not only consider the relevance of the research cited, but also whether or not that research is as current as possible. Reviewers will make this evaluation by considering the review of the literature and the description of the research plan in conjunction with the list of publications cited. Because reviewers occasionally want or need to obtain a copy of a publication that has been cited, it is important that the applicant verify that he or she has provided references for *all* publications cited in the text of the grant application and that the bibliographic citations for those references are complete and accurate.

Use the Appropriate Bibliographic Style

The target funding agency's proposal preparation guide and/or proposal solicitation should be consulted to determine whether or not the agency requires – or even recommends – that citations be formatted according to a particular bibliographic style. If it does, the applicant should use the required or recommended style. If it does not, the applicant should follow the style most commonly used for peer-reviewed journals in his or her discipline.

Identify Major Style Manuals

Major style manuals for peer-reviewed publications include those listed below:

1. American Psychological Association. *Publication Manual of the American Psychological Association.* 5th ed. Washington, DC: American Psychological Association, 2001.

2. Flanagin, Annette, et al. *American Medical Association Manual of Style: A Guide for Authors and Editors.* 9th ed. Philadelphia: Lippincott Williams and Wilkins, 1997.

3. Gibaldi, Joseph. *MLA Style Manual and Guide to Scholarly Publishing.* 2nd ed. New York: Modern Language Association, 1998.

4. Ritter, R. M. *Oxford Style Manual.* Oxford: Oxford UP, 2003.

5. University of Chicago Press Staff. *The Chicago Manual of Style: The Essential Guide for Writers, Editors, and Publishers.* 15th ed. Chicago: U of Chicago P, 2003.

> **Reminder!**
>
> *Consider numbering bibliographic citations, particularly if citing numerous publications by the same author. Doing so will make it easier for reviewers to call attention to a particular entry during a busy review session. Also consider skipping a full or half line between entries so that reviewers may read entries more easily.*

Biographical Sketch

The biographical sketch differs significantly from the standard curriculum vita. While the curriculum vita is a comprehensive document listing all of a researcher's accomplishments, the biographical sketch is a more concise document that emphasizes those accomplishments most relevant to the proposed research project. In short, it highlights the qualifications – education, training, publications, grant awards, and the like – that will persuade program managers and reviewers that the applicant has the capacity to successfully conduct and manage the proposed research project. Because of this, it should be crafted in such a way that it underscores the applicant's unique qualifications and presents information that is both complete and up to date.

The specific requirements for the biographical sketch vary from one agency to the next. Some agencies, for instance, require that applicants prepare the biographical sketch on a special form, limit the biographical sketch to a specific number of pages, and/or adhere to other restrictions. For instance, NIH limits the biographical sketch to four pages, and requires that the list of publications conclude at the end of the second page. Similarly, NSF limits the biographical sketch to two pages, and requires that the list of relevant publications and other significant publications include no more than five citations each. Though these details are seemingly minor, applicants must give attention to them; after all, reviewers often presume that an applicant's ability to attend to such details in the application serves as an indication of how carefully he or she will attend to details in the proposed research project.

Some of the elements frequently requested in the biographical sketch include the following:

- **Name**
- **Title**
- **Institutional affiliation**
- **Education** – Typically requires that the applicant indicate major fields of study, degrees, institutions from which degrees were earned, and years degrees were earned.
- **Professional appointments** – Typically requires that applicants indicate the name of their department and institution, as well as the term of their appointment there.
- **Publications** – Typically requires that applicants provide full citations in the bibliographic style required and/or recommended by the agency. It is important to note that many agencies allow inclusion of only those publications that have been published, while others also allow inclusion of those that are in press or that have been accepted for publication. Few agencies allow inclusion of publications that are still under review.

- **Grant awards** – Typically requires that applicants provide information on completed, ongoing, and/or pending grant support. This information often includes the grant number, the name of the agency that funded the project, the title of the project, a short summary of the overall goal of the project, the name of the principal investigator and/or co-investigators, and the start and end dates of the project. It also sometimes includes the percent effort of the principal investigator and/or co-investigators and the award amount.

- **Collaborators** – Typically requires that applicants identify their co-authors, co-editors, advisors, and advisees; program managers often use this information when they are recruiting individuals to review the application to ensure that there is no conflict of interest.

- **Other** – Some agencies require that applicants provide additional information, such as a list of professional memberships, honors and awards, or descriptions of synergistic activities.

Sample biographical sketches, the first for NIH and the second for NSF, appear on the following pages.

BIOGRAPHICAL SKETCH

Provide the following information for the key personnel and other significant contributors in the order listed on Form Page 2.
Follow this format for each person. **DO NOT EXCEED FOUR PAGES.**

NAME	POSITION TITLE
Caroline J. Ketcham	Assistant Professor
eRA COMMONS USER NAME	

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)*

INSTITUTION AND LOCATION		DEGREE *(if applicable)*	YEAR(s)	FIELD OF STUDY
Colby College	Waterville, ME	BA	1996	Biology/Psychology
Arizona State University	Tempe, AZ	MS	1999	Kinesiology / Motor Beh.
Arizona State University	Tempe, AZ	PhD	2003	Kinesiology / Motor Beh.

A. Positions and Honors

Professional Appointments
1994, 1995	Traumatic Brain Injury Intern, Valley Children's Hospital, Fresno, California
1997-1999	Graduate Teaching Assistant, Department of Kinesiology, Arizona State University
1999-2001	NASA Graduate Student Researcher, Arizona State University and The Johnson Space Center
2000	Neuroscience Research Assistant, Neuroscience Division, Imperial College, UK
1997-2003	Graduate Research Assistant, Motor Control Laboratory, Arizona State University
2003-2004	Faculty Research Associate, Motor Control Laboratory, Arizona State University
2004-Present	Assistant Professor, Graduate Faculty, Faculty of Neuroscience Department of Health and Kinesiology, Texas A&M University

Honors
1997-2001	Member of Flinn Foundation Neuroscience Research and Training Program: Adaptive and Computational Aspects of Motor Coordination
1999	Faculty Women's Association Distinguished Master's Student Nominee
1999, 2001	Exercise Science Departmental / Graduate College Travel Grant
1999-2000	NASA Graduate Student Researchers Program Award (replacement student-PI).
2000-2001	Graduate Student Advisory Board Member
2000-2002	Preparing Future Faculty
2001	Student Member, Muscle Physiologist Search Committee
2001	Outstanding Graduate Student, Graduate College Accolades
2001	Society for Neuroscience Travel Grant
2001-2002	Achievement Reward for College Scientist Scholar
2002-2003	Graduate Academic Scholarship
2005	Women's Progress Award, Faculty Awardee, Texas A&M University

B. Selected peer-reviewed publications.

Peer-reviewed journal articles:

1. Alberts JL, **Ketcham CJ**, Adler CH, Stelmach GE (1998) Predictive force control impairments
   in Parkinson's disease patients. *Movement Disorders, 13:* 181.
2. **Ketcham CJ**, Dounskaia NV, Seidler RD, Stelmach GE (2000) Multijoint control is compromised
   in Parkinson's disease patients. *Journal of Human Kinetics, 4(supplement),* 85-95.
3. Stelmach GE, **Ketcham CJ,** Dounskaia NV (2001) The influence of biomechanical properties

in the control of multijoint drawing movements. In RGJ Meulenbroek and B Steenbergen (Eds.) *Proceedings of the Tenth Biennial Conference of the International Graphonomics Society* (pp. 29-35). Nijmegen: IGS.

4. **Ketcham CJ**, Kennard C, Hodgson TL, Stelmach GE (2001) Bradykinesia in Parkinson's disease: A kinematic analysis of limb and eye movements. *Journal of Neurological Sciences 187(1),* S180.

5. Dounskaia NV, **Ketcham CJ**, Stelmach GE (2002) Influences of biomechanical constraints on horizontal arm movements. *Motor Control 6:* 368-389.

6. Dounskaia NV, **Ketcham CJ,** Stelmach GE (2002) Commonalities and differences in control of a large set of drawing movements. *Experimental Brain Research 146:* 11-25.

7. **Ketcham CJ,** Seidler RD, van Gemmert AWA, Stelmach GE (2002) Age-related kinematic differences as influenced by task difficulty, target-size, and movement amplitude. *Journal of Gerontology: Psychological Sciences and Social Sciences, 57B,* P54-P64.

8. Dounskaia NV, **Ketcham CJ,** Stelmach GE (2003) Biomechanical structure of the arm predicts kinematic invariants of hand movements. In *Proceedings of the IASTED International Conference*: 141-146.

9. Dounskaia N, **Ketcham CJ,** Stelmach GE (2003) Arm geometry and sinusoidal joint movements predict the bell-shaped velocity and the two-third power law. In HL Teulings and AWA van Gemmert (Eds.) *Proceedings of the 11th Biennial Conference of the International Graphonomics Society* (pp. 38-41). Scottsdale: IGS.

10. **Ketcham CJ,** Dounskaia N, Stelmach GE (2003) Control of multijoint drawing movements: A comparison of young and elderly adults. In HL Teulings and AWA van Gemmert (Eds.) *Proceedings of the 11th Biennial Conference of the International Graphonomics Society* (pp. 42-45). Scottsdale: IGS.

11. **Ketcham CJ,** Hodgson TL, Kennard C, Stelmach GE (2003) Memory-motor transformations are impaired in Parkinson's disease. *Experimental Brain Research 149(1):* 30-39.

12. **Ketcham CJ,** Dounskaia NV, Stelmach GE (2004) Multijoint movement control: The influence of interactive torques. In S Mori, D Stuart, and M Weisendanger (Eds.) *Brain Mechanisms for the Integration of Posture and Movement, Progress in Brain Research, 143,* 207-218, Elsevier Publishing: London.

13. **Ketcham CJ,** Dounskaia N, Stelmach GE (2004) Age-related differences in the control of multijoint movements. *Motor Control, 8:* 422-436.

14. Dounskaia N, **Ketcham CJ,** Leis B, Stelmach GE (2005) Disruptions in joint control during drawing arm movements in Parkinson's disease. *Experimental Brain Research,* Epub PMID: 15891873.

15. **Ketcham CJ,** Dounskaia NV, Stelmach GE (2005, in press) The role of vision in the control of continuous multijoint movements. *Journal of Motor Behavior, in press.*

Peer-reviewed book chapters:

1. **Ketcham CJ,** Stelmach GE (2002) Motor Control of Older Adults. In Ekerdt DJ, Applebaum RA, Holden KC, Post SG, Rockwood K, Schulz R, Sprott RL, and Uhlenberg P (Eds.) *Encyclopedia of Aging.* New York: Macmillan Reference USA.

2. **Ketcham CJ,** Stelmach GE (2004) Movement control in the older adult (Ch. 3). In RW Pew and SB Van Hemel (Eds) *Technology for Adaptive Aging,* (pp. 64-92). National Academies Press: Washington DC.

3. **Ketcham CJ,** Stelmach GE (In press) The control and regulation of movement in Elderly Adults. *Measurement Issues in Aging and Physical Activity,* Human Kinetics.

C. Research Support.

CJ Ketcham (PI)   5/2005-4/2006
Vice President for Research Developmental Grant, Texas A&M University,
"Planning and Organization of Multijoint Movements in Parkinson's Disease Patients"
[No overlap with current application.]

Caroline J. Ketcham

Professional Preparation

Colby College	Biology/Psychology	B.A.	1996
Arizona State University	Motor Control	M.S.	1999
Arizona State University	Motor Control	Ph.D.	2003

Appointments

2004-Present   Assistant Professor, Graduate Faculty, Faculty of Neuroscience, Department of Health & Kinesiology, Texas A&M University

2003-2004   Faculty Research Assoc, Motor Control Laboratory, Arizona State University

2000-2001   Neuroscience Researcher, Imperial College School of Medicine, London

1999-2001   NASA Graduate Student Researcher, Johnson Space Center, Arizona State University

1997-2003   Graduate Research Assistant Motor Control Lab, Arizona State University

1994-1995   Traumatic Brain Injury / Neuropsychology Intern, Valley Children's Hospital

Relevant Publications

1. Dounskaia N, **Ketcham CJ**, Leis B, Stelmach GE (In press). Disruptions in joint control during drawing arm movements in Parkinson's disease. *Experimental Brain Research.*

2. **Ketcham CJ**, Dounskaia N, Stelmach GE (2004). Age-related differences in the control of multijoint movements. *Motor Control, 8,* 422-436.

3. **Ketcham CJ,** Dounskaia NV, Stelmach GE (2004). Multijoint movement control: The influence of interactive torques. In S Mori, D Stuart, and M Weisendanger (Eds.) *Brain Mechanisms for the Integration of Posture and Movement, Progress in Brain Research, 143,* 207-218, Elsevier Publishing: London.

4. Dounskaia NV, **Ketcham CJ**, Stelmach GE (2002). Commonalities and differences in control of a large set of drawing movements. *Experimental Brain Research, 146,* 11-25.

5. Dounskaia NV, **Ketcham CJ**, Stelmach GE (2002). Influences of biomechanical constraints on horizontal arm movements. *Motor Control, 6,* 368-389.

Other Significant Publications

1. **Ketcham CJ**, Stelmach GE (2004). Movement control in the older adult (Ch. 3). In RW Pew and SB Van Hemel (Eds). *Technology for Adaptive Aging* (pp. 64-92). National Academies Press: Washington DC.

2. **Ketcham CJ**, Hodgson TL, Kennard C, and Stelmach GE (2003). Memory-motor transformations are impaired in Parkinson's disease. *Experimental Brain Research, 149(1),* 30-39.

3. **Ketcham CJ**, Seidler RD, van Gemmert AWA, and Stelmach GE (2002). Age-related kinematic differences as influenced by task difficulty, target-size, and movement amplitude. *Journal of Gerontology: Psychological Sciences and Social Sciences, 57B,* P54-P64.

4. Dounskaia NV, **Ketcham CJ**, and Stelmach GE (2001). Joint control during hand movements in different directions. In N Gantchev (Ed.) *From Basic Motor Control to Functional Recovery II* (pp. 185-192), Academic Publishing House: Sofia

5. **Ketcham CJ**, Dounskaia NV, Seidler RD, Stelmach GE (2000). Multijoint control is compromised in Parkinson's disease patients. *Journal of Human Kinetics, 4 (supp.),* 85-95.

Synergistic Activities

1. Research Mentor to Underrepresented Undergraduate and Graduate Students in Kinesiology:
   - **Sofia Costa,** Kinesiology, Undergraduate Research Experience, Spring 2005
   - **Kayla Felderhoff,** Kinesiology, Undergraduate Research Experience, Summer 2005
   - **Courtney Golden,** Kinesiology, Undergraduate Research Experience, Summer 2005
   - **Tiffany Rodriguez,** Motor Behavior, Ph.D. Chair, Diversity Fellow, 2004-present
     — NSF Pathways Diversity Fellow, $75,000 for 3 years.
   - **Alberto Cordova,** Motor Behavior, Thesis Committee Member, 2004-present
   - **Janet Staples,** Arizona State, Co-Chair, Undergraduate Fulbright Scholar, 2001-2002

2. Organizer for Motor Behavior Seminar, Texas A&M University, Spring 2005
   Flinn Foundation Seminar Series, Arizona State University, 1997-2001
   - Invited local, national, and international scholars of motor behavior or closely related fields to interact with students, post-docs and faculty in formal and informal discussions.

3. Organizer/Program Committee for International Graphonomics Society, 2003;
   Motor Control Symposium 2003; Brain Day Symposium, 2000
   - Organized all aspects of these symposia, which included inviting local, national, and international scholars to give research talks; also planned budgets and organized event locations.

4. Course developer for two graduate-level courses: (1) Motor Control and Special Populations; (2) Neurophysiological Basis of Movement (Texas A&M University), and one undergraduate course: (1) Motor Control and Aging (Arizona State University).

5. Women in Progress Award
   - One faculty member chosen for the 2004-2005 award. Acknowledges women who promote equity and gender issues in the classroom and research arenas.

Collaborators and Other Affiliations

Collaborators and Co-Editors:
Buchanan, John (Texas A&M University)
Dounskaia, Natalia V. (Arizona State University)
Hodgson, Timothy L. (University of Exeter, UK)
Kennard, Christopher (Imperial College School of Medicine, UK)
Leis, Berta (Booth Gardner Parkinson's Care Center)
Seidler, Rachael D. (University of Michigan)
Stelmach, George E. (Arizona State University)
van Gemmert, Arend WA. (Arizona State University)

Graduate and Postdoctoral Advisors:
Stelmach, George E. (Arizona State University)

Thesis Advisor and Postgraduate Scholar Sponsor:

Total number of graduate students advised in last 5 years: 6
Cordova, Alberto, *M.S. Student*, Committee Member, Texas A&M University, 2004-Present
Kim, Wondae, *Ph.D. Student*, Directed Research, Texas A&M University, 2005
Rodriguez, Tiffany M., *Ph.D. Student*, Chair, Texas A&M University, 2004-Present
Uk, Young, *Ph.D. Student*, Directed Research, Texas A&M University, 2005
Wilde, Heather, *Ph.D. Student*, Committee Member, Texas A&M University, Awarded 2004
Zihlman, Kirk A., *Ph.D. Student*, Chair, Texas A&M University, 2004-Present

CHAPTER 9K
DRAFTING THE PROPOSAL

Resources

When evaluating a grant application, reviewers will not only consider the quality of the scholarship and/or science underlying the proposed research project, but also the feasibility of having the project conducted at the applicant's institution. Therefore, the resources section should identify the applicant's access to all relevant personal, departmental, college, and/or university resources, and should describe how use of these resources will enhance the applicant's ability to conduct his or her proposed research project. Equally important, the resources section should demonstrate the applicant's access to intellectual capital – that is, to supportive colleagues and faculty research groups, as well as to relevant colloquia, seminars, and workshops. Reviewers understand that being part of an intellectually stimulating research environment encourages exciting research and enhances the likelihood that the project will be successful.

Listed below are different types of resources that an investigator may be required to describe in a proposal. Exact details and formatting requirements vary from one agency to the next and can be obtained from the target funding agency's proposal preparation guide and/or from the proposal solicitation:

> **Reminder!**
>
> *If a project will be conducted at multiple sites, be sure to describe the resources for each of these sites.*

- **Office** – The building, room number, and square footage of the principal investigator's office should be identified to assure reviewers that there is sufficient office space to administer the proposed research project. The office's proximity to other required resources should also be noted since the distance between this office and these resources may affect the efficiency with which the project can be managed.

- **Laboratory** – The building, room number, and square footage of the principal investigator's laboratory should be identified to assure reviewers that there is sufficient laboratory space to conduct the proposed research project. If laboratory space is shared with other researchers, this should be indicated and access to the laboratory described, since reviewers will want to know that the investigator will be able to secure sufficient laboratory time to conduct the project in a timely manner. All relevant laboratory equipment and instrumentation available for use on the project should also be described.

- **Clinical** – The clinical facility where research will be conducted should be identified. Access to subject pools should also be indicated since reviewers will want to know that the investigator has access to a large and/or diverse enough pool from which to select appropriate subjects for inclusion in the project.

- **Animal** – The species/strain of research animals should be identified, and the source and availability of these animals indicated. Housing facilities and veterinary care and other provisions for the animals should be identified so that reviewers can be assured that the investigator is meeting animal care requirements.

- **Major Equipment** – The relevant equipment available to the investigator for use on the project should be identified. When identifying equipment, it is important to be specific, i.e., to include the make, model, and specifications, as well as a description of the purpose and capabilities of the equipment. Reviewers will want to know that the equipment is sufficiently sophisticated to support the project.

- **Computer** – The relevant computer resources (e.g., computers, computer networks, printers, scanners, etc.) in the investigator's office and laboratory should be identified. When identifying hardware and software, it is important to be specific, i.e., to include the make, model, and specifications, since reviewers will want to know that the computer resources are sufficiently powerful to support the project. It is also important to indicate access to computer support services, whether from the investigator's department, college, and/or university.

- **Other** – Unique resources or features that will benefit the proposed research project should be identified. These resources might include such things as geographic location, access to special populations and/or special collections, and participation in collaborative arrangements.

Completed, Ongoing, and Pending Support

Most sponsors require that the applicant include a list of completed, ongoing, and pending grant support. Reviewers use this information to determine the degree to which an investigator has established a clear research agenda and to determine the extent to which an investigator has published the results of his or her funded research projects. When evaluating a list of ongoing and pending grant support, reviewers are interested in making sure that an applicant is not so overcommitted to other projects that he or she would have difficulty managing or completing the proposed work. Reviewers are also interested in making sure that there is no overlap – in whole or in part – between a previously funded project and the proposed project.

> ## Reminder!
>
> *Keep a copy of all grant contracts in a file for easy reference. Access to contract information may be needed during the course of a project to ensure that all contract requirements are being met and may prove helpful during the preparation of future grant applications.*

Listed below are the types of information from completed, ongoing, and/or pending research grants that are typically requested by sponsors. Exact details and formatting requirements vary from one agency to the next and can be obtained from the target funding agency's proposal preparation guide and/or from the proposal solicitation:

- Contract number
- Principal investigator's name
- Sponsor's name
- Project title
- Project period (include both project start and end dates)
- Project summary (limit to a few sentences)
- Investigator's role
- Investigator's percent effort
- Annual and/or total direct costs

All of these details except the contract number are usually included on the application cover sheet. By keeping a copy of the cover sheet of each submitted application on file, the investigator can easily access these details for inclusion in future grant applications and, should a grant application be funded, for inclusion in his or her curriculum vita.

Budget

When reading a proposal solicitation, applicants may find it tempting to focus on sections describing the proposed research program, and to skim – or skip altogether – sections outlining budgetary guidelines. However, it is important to read and understand these guidelines, for they provide information that dictates the type and amount of support that can be requested, which in turn affects the kind and scope of research that can be proposed.

Determine What Is Actually Needed

Many applicants struggle to prepare a competitive budget request. Some – concerned that the funding agency will cut the proposed budget and award less than is needed – attempt to circumvent this problem by inflating the budget, rationalizing that if the agency does cut the budget, they will still receive enough funds to complete the proposed project. At the other extreme, some researchers request far too little, thinking that cost-conscious reviewers will be impressed with an extremely low budget. Neither approach is effective. After all, reviewers are themselves experienced researchers; they know what things cost. Simply put, a competitive budget is one that contains a request for the amount that is needed to complete the proposed project – no more, no less – that is based on real costs, and that is fully justified.

> **Reminder!**
>
> *A competitive budget is one that contains a request for the amount that is needed to complete the proposed project – no more, no less – and that is based on real costs.*

Base the Budget on Real Costs

Proposal administrators at each of the campus grants and contracts offices – Texas A&M Research Foundation, TAES, TEES, or TTI – will assist in developing a project budget. After obtaining some basic information from the principal investigator (e.g., a list of project personnel and their percent effort, as well as a description of equipment, materials, and travel needs), they will prepare a preliminary line-item budget. They will e-mail this budget to the applicant to review, revise (if necessary), and approve. Throughout this iterative process, the proposal administrator will verify that the budget complies with both sponsor and university requirements.

> **Reminder!**
>
> *If submitting a proposal to an agency (such as NIH) that requires a modular budget, the preparation of a line-item budget will enable the applicant to accurately determine how many modules to request.*

Understand Common Budget Terms

Although campus proposal administrators will prepare the budget, applicants can facilitate this process by gaining a clear understanding of some of the most common budget terms and budget categories.

Common budget terms include the following:

Direct Costs – Refers to those costs that can be identified with a particular sponsored project, instructional activity, or other institutional activity, or that can be directly assigned to such activities relatively easily with a high degree of accuracy. Direct costs include the compensation of employees (including fringe benefits and health insurance) for the performance of work under the sponsored agreement; the costs of equipment, materials, or travel required for the performance of the work; and other costs incurred for the sponsored agreement.

Indirect Costs – Also known as facilities and administration (F&A) costs. Refers to those costs that are incurred for common or joint objectives and that can therefore not be assigned to a particular sponsored project, instructional activity, or other institutional activity. The university uses indirect costs to fund capital improvements, purchase major equipment, and cover operations and maintenance expenses.

> **TAMU System
> Indirect Cost Rates**
>
> *On campus   45.5% of MTDC*
> *Off campus   26.0% of MDTC*
>
> *MDTC = modified total direct costs.*

> *Note: Some sponsors may place limits on the amount of indirect costs they will fund, and some may elect not to fund these costs at all. In these instances, the applicant should contact his or her Office of Sponsored Projects and request an indirect cost reduction or waiver.*

Cost Share – Refers to the portion of the total project cost of a sponsored agreement that is contributed by the university and/or other non-federal source(s) but that is not reimbursed by the sponsor. It may consist of cash or in-kind contributions. It may be mandatory (i.e., matching funds required by the sponsor) or voluntary.

In-Kind Contribution – Refers to a non-monetary contribution.

Understand Typical Budget Categories

Typical budget categories include personnel, equipment, materials, and travel.

Other categories, such as publication costs, animal costs, and service fees for the use of instrumentation and/or facilities, can be added as needed and allowed.

Personnel – Refers to salaries and wages, as well as to fringe benefits and health insurance.

> **TAMU System Fringe Benefit Rates**
>
> *For students .... 8.35% of salaries and wages*
> *For all others................ 15.6% of salaries and wages*
>
> **TAMU System Health Insurance Rates**
>
> *Employee Only............. $344/month*
> *Employee/Children...... $433/month*
> *Employee/Spouse......... $487/month*
> *Employee/Family $558/month*
>
> *Proposal administrators will calculate fringe benefits and health insurance rates.*
>
> *Note: Fringe benefit and insurance rates listed above are effective September 1, 2005 – August 31, 2006.*

Equipment – Refers to an article of nonexpendable, tangible personal property having a useful life of more than one year and an acquisition cost that exceeds $5,000.

Materials – Refers to materials, supplies, and fabricated parts.

Travel – Refers to transportation, lodging, and subsistence.

Prepare a Budget with Assistance from the Texas A&M Research Foundation

When the applicant has clearly defined the project's scope of work and identified the resources – whether personnel and/or equipment, materials, or travel – that will be needed to complete the proposed research project, he or she may begin preparing the project budget. The Texas A&M Research Foundation's proposal administrators will assist with this task, and will even complete required budget forms.

> **Reminder!**
>
> *A draft of the proposal text and the final version of the proposal budget are required for routing at least 6 days before the proposal due date. Additional time should be allowed for a proposal that involves multiple investigators, since such a proposal will likely require additional signatures.*

1. When the principal investigator has clearly defined the project's scope of work and identified the people who will serve on the project team, the principal investigator should e-mail his or her proposal administrator to request assistance in preparing the budget.

   Note: *For a list of proposal administrators, visit http://rf-web.tamu.edu/preaward/proposaladm.html.*

2. The principal investigator should then provide his or her proposal administrator with basic budget information, such as a list of project personnel and their percent effort, as well as a description of equipment, materials, and travel needs. Once the proposal administrator has received this basic information, he or she will review the sponsor guidelines, calculate the budget, and e-mail a preliminary budget to the principal investigator for review.

4. The principal investigator should then review the preliminary budget. Unless the target funding agency calls for an extraordinarily simple budget, revisions will likely be required in order to reach a realistic yet competitive budget. This revision process is iterative; throughout the process, the principal investigator will need to provide the proposal administrator with information on how to revise the budget, e.g., by reducing/increasing the number of project personnel and/or their percent effort; by reducing/increasing the amount of equipment, materials, or travel requested; and/or by reallocating funds from one budget category to another, depending on sponsor and university requirements.

5. The principal investigator should approve the budget. Once the proposal draft and the final budget have been prepared, and at least 6 working days before the proposal is due, the proposal administrator will prepare a routing packet and give this packet to a Texas A&M Research Foundation courier, who will take the packet to the principal investigator, the co-investigators (if applicable), the department head(s), college dean(s), and the vice president for research and/or provost for signatures.

Review a Sample Budget

A sample project budget is provided below. This budget was prepared for a multi-year project; therefore, salaries have been escalated by 3% per year to accommodate cost-of-living increases.

Budget Category	Cost		
Personnel	**Year 1**	**Year 2**	**Year 3**
Principal Investigator ($100,000 x 30% FTE)	$30,000	$30,900	$31,800
Fringe Benefits ($100,000 salary x 30% FTE x 15.6% fringe benefit rate)	$4,680	$4,820	$4,961
Health Insurance ($558/month for employee and family x 30% FTE)	$2,009	$2,069	$2,129
Co-Investigator ($75,000 x 15% FTE)	$11,250	$11,588	$11,935
Fringe Benefits ($75,000 salary x 15% FTE x 15.6% fringe benefit rate)	$1,755	$1,808	$1,862
Health Insurance ($487/month for employee and spouse x 15% FTE)	$877	$903	$929
Research Assistant ($30,000 x 100% FTE)	$30,000	$30,900	$31,800
Fringe Benefits ($30,000 salary x 100 FTE x 15.6% fringe benefit rate	$4,680	$4,820	$4,961
Health Insurance ($344/month for employee only x 100% FTE)	$4,128	$4,252	$4,376
Equipment	**Year 1**	**Year 2**	**Year 3**
Differential interference optics	$10,815	$0	$0
Materials	**Year 1**	**Year 2**	**Year 3**
Reagents	$700	$700	$700
Chemicals	$3,500	$3,500	$3,500
Glassware and plasticware	$1,500	$1,500	$1,500
Travel	**Year 1**	**Year 2**	**Year 3**
Airfare to Washington, D.C. ($608 x 2 people)	$1,216	$1,216	$1,216
Lodging in Washington, D.C. ($153 x 2 people x 2 days)	$612	$612	$612
Meals in Washington, D.C. ($51 x 2 people x 2 days)	$204	$204	$204
Local transportation in Washington, D.C. ($100 x 2 people x 2 days)	$400	$400	$400
Total Direct Costs	**$108,326**	**$100,192**	**$102,885**
Modified Total Direct Costs	**$97,511**	**$100,192**	**$102,885**
Total Indirect (F&A) Costs	**$44,367**	**$45,587**	**$46,813**
Total Funds Requested	**$152,693**	**$145,779**	**$149,698**

Budget Justification

The budget justification is an important part of the grant application and can be a critical component in the overall competitiveness of a proposal. The budget justification allows the applicant to explain in much more detail the raw budget numbers by category, requested amounts, and proportional importance to the project in a way that better guides the program officers and reviewers in understanding the overall scope of the budget request and its relationship to the proposed scope of work over the performance period. Moreover, the budget justification provides an excellent complement to the proposal text by giving the applicant an additional opportunity to explain in more detail the operation and management of the proposed project and how the various funding categories and funding allocations meld to support the overall research objectives.

The budget justification can play a significant role on larger or more complex research proposals, as well as on proposals that integrate research and educational objectives and require a project management section in the proposal narrative. In this case, the applicant can reference the budget justification in the narrative section of the proposal text when more elaboration on operational detail is required, particularly when it is required on a level of detail that may not be appropriate in the narrative or that may be distracting to the flow of the narrative. At NSF, for example, the budget justification allows the applicant to expand the level of operational and management detail of the project beyond what is often possible due to page limitations on the narrative section of the proposal. The budget justification is an opportunity for the applicant to demonstrate to the program officers and reviewers the applicant's ability to structure and manage a complex project in a way that best optimizes the use of the sponsor's resources in meeting the program objectives.

A well-written, detailed budget justification will often play an important role by providing documentation that can be very helpful if, for example, six months after submission of a proposal the sponsor enters into budget negotiations with the applicant. In this case, the budget justification provides both the sponsor and the applicant a starting point for budget negotiations that benefit significantly from a level of budget detail and rationale likely not possible from the spreadsheet budget alone.

Ensure Accuracy

Preparing the research plan for a grant application is a highly iterative process requiring many revisions, and it is likely that it will be necessary to significantly tweak the scope of work in at least one of these revisions, if not in several of them. When doing so, it is critical to remember to revise the budget and budget justification accordingly. Reviewers routinely compare the information in these sections to ensure that it matches; discrepancies can result

in ambiguity, leaving program officers and reviewers uncertain about the project intent and thereby possibly compromising the competitiveness of the application. Therefore, before submitting a grant application, it is important to take the time to verify that the personnel, equipment, materials, travel, etc., mentioned in the research plan are accurately reflected in both the budget and budget justification, and that the justification gives clear detail on the relationship of the various funding categories over the performance period.

Justify All Budget Requests

The budget justification should parallel the budget; in other words, if the budget includes a category for personnel, equipment, materials, and travel, so, too, should the budget justification. In short, the budget justification should include a clear and persuasive explanation of why each budget request is needed, and this explanation should include sufficient detail to allow program managers and reviewers to understand how the budget request was calculated and to be assured that the request is reasonable. In addition, the justification should include a clear and persuasive explanation of any unusual expenses, as well as a rationale for any escalation of costs (e.g., for personnel) from one project year to the next.

Sample budget justifications are provided on the following pages. The first was prepared for an NIH application, the second for an NSF application.

	Initial Period	2nd	3rd	4th	5th	Sum Total (For Entire Project Period)
BUDGET JUSTIFICATION PAGE **MODULAR RESEARCH GRANT APPLICATION**						
DC Less Consortium F&A	100,000 (Item 7a, Face Page)	100,000	100,000	100,000		400,000 (Item 8a, Face Page)
Consortium F&A	0	0	0	0		0
Total Direct Costs	100,000	100,000	100,000	100,000		$ 400,000

Personnel

Susan E. Maier, Ph.D., Principal Investigator. Dr. Maier be responsible for the overall scientific direction and conduct for the project. She will be involved with designing experiments, analyzing data, interpreting the results, writing manuscripts and progress reports, and presenting the results at scientific meetings. Dr. Maier's expertise in the field of developmental alcohol exposure and embryology is critical to the success of this project with respect to the direction of current and future research. She will spend at least 15% of her time on the project, and that percentage of her salary is requested.

Faria Sohrabji, Ph.D., Co-Investigator. Dr. Sohrabji will be responsible for training the research team members in performing the techniques of subtractive hybridization and real-time PCR, and interpreting the outcome of the experiments involving differential gene expression. Dr. Sohrabji's involvement in this project is critical because of her expertise in molecular biology, and her knowledge of differential gene expression (via differential display). The PI has collaborated with Dr. Sohrabji on various experiments, and the PI has published a manuscript with Dr. Sohrabji involving PCR. Dr. Sohrabji will spend 7% of her time on the project, and that percentage of her salary is requested.

Nora Rogers, BA, Research Assistant. Ms. Rogers will be responsible for carrying out the daily activities of the project and ensuring that the individual aspects of the project are completed in a timely manner. She will also assist the student worker with the daily maintenance of the adult fish, and she will administer treatments to the embryos. She will be trained by Dr. Sohrabji on the molecular techniques, and she will be trained by Dr. Maier to recognize and quantify the various aspects of embryonic dysmorphologies resulting from developmental alcohol exposure. She will spend 100% of her time on this project, and that amount of her salary is requested.

Equipment Justification. In the first year, we need to purchase Differential Interference Optics (DIC) to fit on our current microscope. DIC, specifically Nomarksi optics, is a technique widely used for observation of unstained objects such as living cells or tiny processes from stained cells. DIC consists of a system of polarizing filters and prisms that renders sharply defined, relief-like images with excellent resolution and contrast. These optics are necessary to observe the fine details associated with zebrafish anatomy. The costs associated with upgrading the current microscope with these particular optics is $10,815, and that amount is requested in the first year.

Travel Justification. Travel funds are requested for one trip each year for one team member to attend a national meeting. National trip cost is figured at $1000 per trip.

Consortium

Fee (SBIR/STTR Only)

F. Budget Justification

The "IGERT: Materials Science and Mathematics – A Systems Approach" program requests funding of **$3,032,845** for a five-year program to provide IGERT fellows with an integrative educational experience that will prepare them to conduct cutting edge materials research. These funds include **$2,739,987** for the basic program, **$92,858** for Year 1 start-up expenses (faculty time for curriculum development, shared equipment and services of an external evaluator) and **$200,000** for the international program. Funds will be used to support six IGERT Fellows in the first year and 12 Fellows in each of Years 2 though 5.

Personnel

One month per year is allocated to support the Principal Investigator for program coordination and administration. Four person-months is allocated from Year 1 "start-up funds" for faculty for the development of four new courses, the modification of two courses and the development of curriculum to be used in annual retreats. Because assessment and evaluation will be a key focus of the IGERT, two months per year are allotted for project and education evaluators. Undergraduate time is budgeted for 10 hours per week to assist with laboratory courses.

Total Salaries and Wages: $234,940

Fringe Benefits, including insurance: $80,236

Travel

Domestic travel for the **External Advisory Board** to attend annual meetings at TAMU in College Station. Estimate $1,950 to $2000 per member for 5 members = **$49,750**

Travel for external meta-evaluator consultant as part of the Year 1 start-up allocation: **$2000**

International travel for faculty as part of the international program: 6 trips per year x $3433 per trip x 4 years = **$82,400**

Total Travel for Faculty, Advisory Board and Consultant: $134,150

Participant Support Costs

Funds will be used to support 6 IGERT Fellows in Year 1 and 12 Fellows per year for Years 2 through 5. Fellows will be supported using IGERT funds for two years and then will be transitioned to other research funds for the remainder of their studies, with the exception of Fellows who start in Year 5. (They will be supported on IGERT funds for one year but will be supported at the same level using other research funds for their second year.)

Graduate Stipends: $30,000/year/student x 54 student-years = $1,620,000
Cost of Education (listed in F4): $10,500/year/student x 54 student-years = $567,000
Travel of IGERT Fellows to conferences: $1,000/student/year x 54 student-years = $54,000
Student Travel for International Program (described below) = $56,000
Subsistence for International Program (described below) = $61,600

Total Participant Support Cost: $2,358,600

Shared Research Equipment (Materials and Supplies)

A total of $54,000 will be used to purchase and set up shared research equipment in the first year for IGERT fellows to promote interdisciplinary communication and research. This equipment will comprise shared computers and specialized software for materials modeling and simulation research.

Total Materials and Supplies Cost: $54,000

Consultant Services

Services of an external evaluation consultant to advise on design and start-up of evaluation plan.

Consultant Services: $2,000

Other

Funds for an annual **3-day retreat** for all IGERT Fellows and faculty, focusing on communication and diversity issues and for **annual program symposium**, which will include research presentations by project students, faculty and guests:

3-day retreat: $6,000 in Year 1, $12,000 in Year 2, $10,750 in Year 3, $9,500 in Year 4, $8,250 in Year 5 = **$46,500**

Annual program symposium: $4,000 per year x 5 years Year 1 = **$20,000**

Total Other Direct Costs (Materials & Supplies + Consultant + Other): $122,500

Indirect Costs

As specified by NSF, 8% total direct cost, excluding equipment and Cost-of-education allowances:

Total Indirect Costs: $182,655

Supplementary Materials

Supplementary materials, sometimes referred to as appendices, provide applicants with an opportunity to include materials that are supportive of the grant application. Before providing supplementary materials, however, it is important to determine whether or not the target funding agency allows appended materials, and, if so, to find out what kinds of documents they permit, as well as the page limit and formatting requirements (if any) for these documents.

Organize Supplementary Materials

Applicants should keep appended materials concise and to the point, and should avoid the temptation to use supplementary materials as a means of circumventing page limitations. Appendices are not the place for "new" data about the proposed research project; rather, supplementary materials should support and complement the proposal and should include relevant information that is of secondary interest to the reviewer. It is important to note that reviewers are not always required to read supplementary materials or take information presented in an appendix into consideration when making a funding recommendation.

Supplementary materials may include such diverse documentation as publications, manuscripts, or abstracts; letters of support or other endorsements; samples of surveys, questionnaires, or data collection instruments; copies of clinical protocols or informed consent documents; and photographs, graphics, or other media that are directly relevant to the proposed project. For example, a proposal for an educational initiative might include a sample of the curriculum being implemented, a sample test and a testing schedule, or letters of support indicating the willingness of a particular school district to engage in the research project.

Create Letters of Support

Letters of support or endorsement can be very effective in the quest for funding. Such letters may demonstrate a commitment to provide services or assets; for example, an industrial company may commit to hiring a student for a summer internship. Similarly, if the proposed project involves consultants or review boards, such letters can convey the board's willingness to participate in the project while simultaneously outlining their responsibilities to the project. Letters of support can also be a powerful method of demonstrating institutional commitment for the project, as in a statement from university administration ensuring that adequate space or other resource allocations will be available during the project.

Support letters should be prepared on the letterhead of the supporting letter writer, and most should be addressed to the principal investigator. Although letters of support are usually no more than one page in length, it is highly advisable to begin gathering letters as soon as a clear, concise scope of work has been established for the project. In a university environment, it may be appropriate to include letters of support from the department head, college dean, graduate dean, provost, or other administrative officials. If the project involves partnerships or collaboration with other institutions, state agencies, or the private sector, the letter should be secured from the person(s) with whom the investigator will be working most closely.

Schedule Receipt of Letters

When requesting a letter of support, it is important to provide the letter writer with a reasonable deadline by which the letter will be needed, and to allow at least a week before the actual submission date of the proposal to compensate for any difficulties in receiving the final signed support letter. If the proposal is being submitted electronically, it is often easier for the letter writer to send the applicant a PDF version of the letter. This saves both the letter writer and the applicant some time as the applicant will need to convert the hard copy of the letter to a PDF format for electronic submission. The letter writer can also fax the applicant a copy of the letter, but it is important that the applicant white out the fax transmission lines at the top and/or bottom of the transmittal prior to converting the fax to a PDF file. Doing so will not only make the letter look more polished, but also prevent any part of the supplementary materials from being rejected at the time of electronic submission for exceeding the allowed margins.

Letter of Support Contents and Examples

At a minimum, letters of support should refer to the proposed research project by name and briefly summarize what the project is intended to accomplish. Oftentimes, the letter writer may request a copy of the executive summary in order to gain a clear idea of the project's scope and objectives. When seeking letters of support, it is quite helpful if the applicant provides a sample or draft letter to the individual from whom he or she is requesting the letter. However, it is very important to ensure that sample letters do not become form letters; if all the letters say the same thing, then their impact upon reviewers is negligible. Therefore, one should always tailor individual drafted letters of support to the individual signer. One method of doing this is to include information about each letter writer's department or office. **Figure 1** below provides an example of a letter of support that includes the project name, a statement of the grant's intent, why the letter writer believes in the project and is providing support, and a concluding statement of endorsement for the applicant's leadership.

Figure 1.
Sample Letter of Support.

Dear Dr. Smith:

As Dean of Graduate Studies, I strongly support your proposal for *Graduate Fellowships in Biotechnology at Texas A&M University.* I am committed to working with you in every way possible to make this program a success. It is clearly aligned with the long-term A&M System vision under our Integrative Plan, as well as the Texas A&M University System *Pathways to the Doctorate* initiative that links this office with the nine graduate deans across the A&M System. Your recruitment plan fully supports Texas A&M's commitment to diversity at the graduate level that is competitive at the highest national levels of achievement and success.

Successful transitioning of students from the MS to the PhD is critical to achieving and maintaining high rates of student retention and graduation, not only in the science program but throughout graduate education at TAMU. The faculty mentor/researcher collaborations you propose to assist Fellows as they navigate this transition phase represent an exemplary model for success that we will clearly want to duplicate in other disciplines.

The goals of your proposed fellowship program in biotechnology will complement and expand ongoing graduate research activities in the departments of animal science, veterinary pathobiology, integrative biosciences, and the genetics program. A major strength in these departments is the number of ongoing multidisciplinary research projects that are available to help doctoral students prepare for their future roles as leaders and teachers in academic and industrial research and education.

Under your leadership as Project Director, I am confident that the proposed fellowship program in biotechnology will result in the successful recruitment, retention, and graduation of highly qualified students in food and agricultural sciences. Your team of researchers and mentors represents a cadre of faculty dedicated to student research, student mentoring, and development of the critical thinking and problem-solving skills necessary for success. It is with pleasure that I offer you my full endorsement and support.

Sincerely,

John R. Giardino
Dean of Graduate Studies
Texas A&M University

Additional Examples of Letters of Support

Additional examples of letters of support may be found at the web sites listed below:

- http://www.epsrc.ac.uk/ResearchFunding/FundingOpportunities/FirstGrantScheme/LetterOfSupportExample1.htm

- http://www.epsrc.ac.uk/ResearchFunding/FundingOpportunities/FirstGrantScheme/LetterOfSupportExample2.htm

- http://www.rdsgrants.com/grant_writing_tools/sample_letters.htm

CHAPTER 10

Addressing
Compliance Issues

When preparing a grant application for a research project that involves the use of any of the following, the applicant will need to address compliance issues on at least some level in the application:

- Human subjects

- Animals

- Hazardous materials, select agents, or recombinant DNA

At a minimum, the applicant will need to justify the use of human subjects, animals, and/or hazardous materials, select agents, or recombinant DNA; describe the experimental design; and explain laboratory and safety procedures. After all, if a reviewer has a concern about how an applicant has addressed a compliance issue, that compliance issue then becomes a science issue, calling into question a critical component of the project's approach.

Describe the Use of Human Subjects

When research involves the use of **human subjects**, the applicant should include information to justify use of those subjects, to demonstrate that the potential benefits of the proposed research outweigh the potential risks to the human subjects, and to explain exactly how the human subjects will be safeguarded from any potential risks. The applicant should also demonstrate appropriate inclusion of women, minorities, and children in the proposed research project.

Describe the Use of Animal Subjects

Similarly, when research involves the use of **animals**, the applicant should include information to justify use of those animals; to delineate the species, strains, ages, sex, and number of animals to be used; and to describe the veterinary care that will be provided to the animals. The applicant should also describe the procedures that will be used to ensure that discomfort, distress, pain, and injury will be limited to that which is unavoidable in the conduct of scientifically sound research. To this end, the applicant should describe the use of analgesic, anesthetic, and tranquilizing drugs and/or comfortable restraining devices, where appropriate, to minimize discomfort, distress, pain, and injury. If the research results in more than momentary pain or distress to animals, the applicant should conduct a search for alternatives to **replace** the use of live animals, to **reduce** the number of animals

required, and to **refine** techniques to decrease pain and distress. The applicant should also describe his or her search for alternatives and summarize the results. If the research requires that any animals be euthanized, the applicant should describe which method of euthanasia will be used and justify the reasons for its selection.

Describe the Use of Hazardous Materials, Select Agents, or Recombinant DNA

If a project involves the use of **hazardous materials** or **select agents**, the applicant should justify the use of those materials; describe the appropriate training for all personnel who will work with the materials or agents; and explain laboratory safety, security, and biological containment requirements and practices. The applicant should also delineate emergency contingency plans, including those for containment and cleanup of spills. If the project involves the use of **recombinant DNA**, the applicant should demonstrate that he or she will adhere to NIH requirements for recombinant DNA research.

Prepare Research Protocols

Some sponsors require that applicants submit and obtain approvals of any required human subjects, animal subjects, and/or biosafety protocols before the grant application is submitted to the sponsor; others, such as NIH, allow "just-in-time" approvals. If the targeted funding agency allows **"just-in-time" approvals**, the investigator may submit the application to the sponsor before obtaining institutional approvals. Then, when the applicant is notified that an award is likely, he or she must submit and obtain institutional approvals of the approproiate protocol(s) before the research project can proceed. The sponsor's solicitation should indicate when institutional approvals for compliance issues should be submitted. Applicants are encouraged to contact the Office of Research Compliance with questions or for assistance.

> **Reminder!**
>
> *Remember that research protocols – whether for the use of human subjects, animal subjects, or hazardous materials, select agents, or recombinant DNA – must be approved and all research personnel trained before work on the research project can be initiated.*

Institutional Review Board

Home page:	http://researchcompliance.tamu.edu/irb2.php
E-mail:	irb@tamu.edu
Phone:	979-458-4067
Assurance number (TAMU):	FWA00000092
Assurance number (BCD):	M-1453

The primary purpose of the Institutional Review Board (IRB) is to safeguard the rights and welfare of human subjects at risk in any research activity, whether that activity is financially supported or not. To this end, the IRB requires that any investigator conducting research involving the use of human subjects submit a human subject protocol for review.

A **human subject protocol** is a document that delineates the formal design for research involving human subjects; it includes a statement on the purpose of the research, the selection of subjects, research procedures, and data analysis methods, as well as a description of the risks and benefits of the proposed research to the subjects.

The IRB reviews human subject protocols to determine whether the risks of the proposed research outweigh the benefits of that research for the subjects involved in the study. If the IRB determines that risks will be involved, they will verify that those risks will be minimized, and that participants will be made fully aware of the risks and of their right to withdraw from the study at any time without any form of penalty.

When the proposed research carries no or only very minimal risk to the subjects, the IRB may elect to conduct an administrative review of the protocol. However, if the proposed research is not exempt or appropriate for an expedited review – for instance, if it involves a sensitive topic and/or involves the use of children, pregnant women, or prisoners – the IRB will conduct a full review of the protocol during one of its monthly meetings.

Submit a Protocol to the IRB

1. Go to http://researchcompliance.tamu.edu/irb_approval.php, then click on the link to the "IRB Protocol Checklist and Application" to obtain a PDF fillable human subjects protocol form.

> **Reminder!**
>
> *Allow up to 1 month for the IRB to review the human subject protocol. Note that missing information will delay approval of the protocol.*

2. Save the form to a computer file.

3. Complete the form.

4. Schedule a pre-submission review of the protocol.

    Note: To schedule the review, call 979-458-4067 or e-mail irb@tamu.edu.

5. Attend the pre-submission review and make careful note of any items that may need to be revised.

6. Incorporate suggested revisions.

7. Submit one original and one photocopy of the completed human subjects protocol and all required attachments to Sharon Alderete, IRB, Office of Research Compliance, Texas A&M University, Centeq Building, 1500 Research Parkway, Suite B150, College Station, TX 77843-1186.

8. Attend the IRB meeting to answer any questions that the IRB members may have.

    Note: Call 979-458-4067 oe e-mail irb@tamu.edu to learn the date, time, and location of the IRB meeting.

9. After all items have been satisfactorily addressed, the IRB will issue an approval notice.

University Laboratory Animal Care Committee

Home page: http://animal.tamu.edu/
E-mail: ulacc@vprmail.tamu.edu
Phone: 979-845-1828

Assurance number (TAMU):   A-3893-01
Assurance number (BCD):   A-3027-01
Assurance number (HSC):   A-3895-01 (Scott & White only)
Assurance number (IBT):   A-4012-01

The primary purpose of the University Laboratory Animal Care Committee (ULACC) is to ensure the humane use and care of animals used in any research activity, whether that activity is financially supported or not. To this end, ULACC requires that any investigator conducing research involving the use of animals submit an animal use protocol for review. An **animal use protocol** is a document that delineates the formal design for research involving the use of animals; it includes a justification for the use of animals, as well as for the species and number of animals to be used. It also includes a statement describing how the animals will be obtained, housed, cared for, and, if necessary, euthanized.

ULACC reviews animal use protocols to ensure that animals will be used and cared for in a humane way. They also review protocols to ensure that the investigator will avoid or minimize discomfort, pain, or injury to the animals; use no more animals than are necessary to reach sound scientific conclusions or to teach the class; and, when appropriate, painlessly sacrifice animals.

Submit a Protocol to ULACC

1. Go to http://animal.tamu.edu/forms.html, then click on the link to the "Animal Use Protocol" to obtain a PDF fillable animal use protocol form.

> **Reminder!**
>
> *Allow up to 2 months for ULACC to review the animal use protocol. Note that missing information will delay approval of the protocol.*

2. Save the form to a computer file.

3. Complete the form.

4. Schedule a pre-submission review of the protocol.

    Note: To schedule the review, call 979-845-1828 or e-mail ulacc@vprmail.tamu.edu.

5. Attend the pre-submission review and make careful note of any items that may need to be revised.

6. Incorporate suggested revisions.

7. Submit one original and one photocopy of the completed animal use protocol – along with a copy of the research proposal – to Olivia Ash, ULACC, Office of Research Compliance, Texas A&M University, Centeq Building, 1500 Research Parkway, Suite B150, College Station, TX 77843-1186.

8. Attend the ULACC protocol review meeting to answer any questions that the ULACC members may have.

    Note: Call 979-845-1828 or e-mail ulacc@vprmail.tamu.edu to learn the date, time, and location of the ULACC meeting.

9. After all items have been satisfactorily addressed, ULACC will issue an approval notice.

Institutional Biosafety Committee

Home page: http://researchcompliance.tamu.edu/IBC.php
E-mail: ibc@tamu.edu
Phone: 979-458-1467

The primary purpose of the Institutional Biosafety Committee (IBC) is to review and oversee the use of hazardous materials (e.g., toxins and pathogens), select agents, or recombinant DNA used in any research activity, whether that activity is financially supported or not. To this end, the IBC requires that any investigator conducing research involving the use of hazardous materials, select agents, or recombinant DNA submit a registration document.

The **registration document** requires that the applicant justify the use of hazardous materials, select agents, or recombinant DNA. It also requires that the applicant state the purpose of the research; identify which toxins, pathogens, or recombinant DNA will be used; describe laboratory procedures; describe potential medical risks; explain how exposure will be controlled; identify any hazardous materials that will be transported into or out of the laboratory; and explain procedures for disposing of hazardous materials.

The IBC reviews registration documents to ensure that appropriate laboratory practices, biological containment procedures, and emergency plans are in place before research begins.

Submit a Registration Document to the IBC

1. Go to http://researchcompliance.tamu.edu/IBC.php, then click on the link to the "Application for IBC Review and Approval" to obtain a PDF fillable registration form.

> **Reminder!**
>
> *Allow up to 2 months for the IBC to review the registration document. Note that missing information will delay approval of the registration.*

2. Save the registration form to a computer file.

3. Complete the registration form.

    Note: Only those portions of the registration form that are applicable to the research project need to be completed.

4. Forward the completed registration form to the IBC, Office of Research Compliance, Texas A&M University, Centeq Building, 1500 Research Parkway, Suite B150, College Station, TX 77843-1186.

    Note: Original signatures are required. All protocols require a 10-day review process. After the review process is completed, the applicant will be notified if there are any items requiring revision or clarification.

5. Incorporate suggested revisions and/or clarifications and resubmit the protocol to the IBC for further review.

6. After all items have been satisfactorily addressed, the IBC will issue an approval notice.

Addressing Commercialization Issues

If a proposed research project will result in a new invention – defined as a material, process, or design that is novel, useful, and not obvious – the researcher will likely want to take steps to commercialize that invention.

The commercialization process is a lengthy and complex one; however, the Texas A&M University System has established the Technology Commercialization Center (TCC) to help System researchers navigate this process.

The TCC manages the Technology Licensing Office (TLO) and helps researchers protect their inventions by assisting them in obtaining patents and copyrights and seeks to transfer the intellectual property to industry through both royalty-bearing license agreements for commercial products that result in economic development and public benefit and through spin-out companies that commercialize System innovations.

> **Did You Know?**
>
> *On average, the Technology Licensing Office files a patent application every other day and executes a license agreement once a week. It ranks among the top 10 technology transfer offices in the United States in the number of licenses executed annually with small businesses.*

Specifically, the TCC will assist with the following:

- Documenting the invention
- Evaluating the invention
- Marketing the invention
- Handling licensing negotiations
- Developing spin-out companies from System technology
- Facilitating industry relations for research

In this way, the TCC helps researchers move their inventions from the laboratory to commercial application.

Learn More

To learn more about the TCC's faculty services, visit http://tlo.tamu.edu/index.shtml or contact the TCC at the address, phone number, or e-mail below:

Address:
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Texas A&M University System
1700 Research Parkway, Suite 250
College Station, TX 77845-3369

Phone: 979-847-8682

E-mail: Visit http://tlo.tamu.edu/tlo/email.shtml to submit a question.

CHAPTER 12

Vetting the Proposal

The process of vetting the grant application is much different than the process of editing and proofreading it. Indeed, vetting the grant application involves asking colleagues to read through the entire grant application to provide substantive feedback on how well key concepts and ideas, scientific and technical details, and enthusiasm and excitement for the project have been expressed. This process offers applicants the opportunity to obtain constructive criticism on the application well *before* it must be submitted to the funding agency, thereby giving them time to identify and address any issues that might potentially cause program managers and reviewers concern. In particular, it enables applicants to confirm that they have included all required material, located that material where reviewers can easily find it, and presented it in a way that reviewers can easily understand. This is quite important; many program managers and reviewers will have only a limited amount of time to review each application and subsequently make preliminary recommendations, and will have less enthusiasm for an application if they must search for critical aspects of it.

Identify Colleagues Who Can Vet the Proposal

When identifying colleagues to vet an application, it is important to make sure that the colleagues selected have expertise in the general area of research being proposed, though it is not necessary for them to have specialized expertise in the specific topic being proposed. Indeed, a well written application enables even people working outside the field to understand the logic and rationale for the proposed project and to understand how the project was designed.

When colleagues vet an application, they will likely raise questions that may help the applicant refine ideas or simply help the applicant restate these ideas in a manner that is consistent with a general, rather than a specific, audience. Because the people who review applications for scientific merit are not necessarily experts in the specific field of research being proposed, they need sufficient information to help them fill in the intellectual gaps between what they know and what is being proposed. A well written application will not leave the reader with any significant questions. The idea is to address all of the potential questions within the application without letting that detract from the flow of reading. This can be accomplished by having other investigators within and outside the field read the application and provide feedback.

It is a good idea to ask people from various areas of research to vet the application because they will have different perspectives on how to request research money. In addition, it is advisable to have successful investigators vet the proposal. Notwithstanding differences in

writing style and technical content, people who have been successful in obtaining multiple grants obviously recognize the common elements of good proposals. Here are some common questions one might ask when vetting an application, regardless of proposal topic:

- What is the application trying to achieve, and is that purpose addressed early in the text?

- Is the application written for a broad audience?

- Is the application written in an enthusiastic voice?

- Is the terminology clear and persuasive, and does the application have credibility?

Departmental Colleagues – Faculty may want to ask departmental research colleagues to vet the application, while graduate students may want to ask their advisor to do so. The key is to identify those colleagues who are doing the same general kind of research (e.g., experimental or clinical) and who have competed successfully for extramural funding in the past. These people will have the most valuable input based upon their many perspectives. Faculty may also want to ask their department head to vet the application, since the department head has a vested interest in his or her faculty members' career development and wants to see them succeed in obtaining funding. Faculty may also want to seek feedback from members of faculty interest groups of which they are, or want to become, a member (e.g., Faculty of Nutrition, Faculty of Toxicology), since members of these groups will likely share a common interest in the research being proposed and can offer good advice.

Program Staff at the Funding Agency – Depending upon their time constraints, program staff will likely not be able to review the entire draft of the application; however, they may be willing to look at the executive summary or abstract. Through this document, they can assess how well key concepts and ideas, scientific and technical details, and enthusiasm and excitement for the project have been expressed. If they have trouble understanding how the proposal fits together based on this document, then at the very least, perhaps they can provide guidance on how the executive summary or abstract can be re-written.

Understand the Vetting Process

The vetting process can confer numerous benefits; however, to reap these benefits applicants must understand the requirements and potential outcomes of the process.

Time – It is important that applicants give people time to read the application thoroughly in order to obtain substantive feedback on the content, rather than mere proofreading.

Ideas – It is important that applicants ask only trusted colleagues to vet the application. In some instances, some colleagues may take an applicant's idea and use it in his or own research. This is more likely to occur in the more competitive research fields, where money is tight and competition for extramural funding is particularly fierce. By interacting with colleagues at national meetings and listening to them give talks, applicants can develop an idea of which colleagues are trustworthy and which are not. On a more positive note, applicants may discover a potential collaborator in someone they ask to vet their application simply because these colleagues derive a better understanding of what the applicant does (and wants to do), and they may be able to offer intellectual input or scientific and/or technical services on future applications.

Criticism – After vetting an application, colleagues may tell an applicant that the proposal is simply not yet ready for prime time and that they think it needs much more work before it should be submitted. If such information is coming from a colleague that is an established investigator in the field, it may be wise to heed such warnings, while that same advice from someone not aware of the research field may not carry much weight in the decision about whether or not to submit. Again, this is related to choosing the appropriate people to vet the completed application.

Editing and Proofreading the Proposal

Once the application has been vetted, the sometimes arduous task of assimilating feedback and answering colleagues' questions or comments begins, often entailing substantive editing and rewriting of text. As with many aspects of proposal development and writing, this task can take longer than anticipated. However, the importance of careful editing and proofreading prior to submitting a final application cannot be overstated.

> **Reminder!**
>
> *The importance of careful editing and proofreading prior to submitting a final application cannot be overstated.*

Incorporate Comments and Feedback

If a colleague has questions about an objective or some aspect of the project's methodology, it is quite likely that reviewers will have similar questions. After rewriting a section or even just a sentence or two, it is useful to check with the original person who provided comments and ask if the revisions are appropriate and if their questions have been answered. Alternatively, it is helpful to ask someone who has not seen the application before to review it to see if they have questions about the same (or other) section(s).

Review for Organization and Content

Before submitting the application, it is important to review the proposal solicitation once more to make certain all agency requirements have been addressed. During this process, the applicant should compare section headings and ordering of the proposal narrative with the solicitation, being sure to echo the agency's sequencing of sections and language. Similarly, the applicant should take time to double-check solicitation guidelines against the final proposal narrative, verifying that page limits, font requirements, etc., are consistent with the agency's instructions.

All sections of the proposal should be re-evaluated for content, clarity, flow, and relevance. Each of these elements will be enhanced by a well-crafted narrative that is divided into easily distinguishable, logically ordered sections and subsections. If, for example, the solicitation calls for an evaluation plan, all aspects of the plan should be contained within that section; the reviewer should not have to look elsewhere for details about the project's evaluation plan.

A well-designed layout will improve the readability of complex proposal narratives. Use of subheadings can draw the reviewers' attention to a special topic or idea that may need to be emphasized, giving the overall application more clarity and readability. Subheadings also assist reviewers as they look for or refer back to a particular topic or section. The principal

investigator should be responsible for ensuring that consistent heading and subheading formatting is used throughout the proposal, especially when several collaborators may be contributing authors.

The overall flow of any narrative, and especially detail-rich, technique-heavy research proposals, is hindered by long sentences that are crowded with several important concepts or points. If one sentence takes up three or more lines of text, one should consider breaking that sentence into two separate sentences. Overuse of qualifying statements or redundant phraseology can camouflage the most important point being expressed within a sentence and detract from the strength and clarity of the text.

> ### Reminder!
>
> *The overall flow of any narrative, and especially detail-rich, technique-heavy research proposals, is hindered by long sentences that are crowded with several important concepts or points.*

Proofread Carefully

An objective reader can usually spot mistakes that the original writer has missed. Below are several tips that can be used when proofreading a proposal narrative:

- Note that while spell check is a wonderful tool, exclusive reliance upon it is no substitute for a careful and thorough re-reading of the proposal.

- Beware of overusing acronyms; if an acronym is used less than three times throughout the narrative, drop the abbreviation and spell out the complete name/title.

- Make certain that acronyms, other abbreviations, and symbols are used consistently throughout the text (e.g., percent or %; Texas A&M or TAMU; U.S. or US).

- Stick to the topic within sections and paragraphs, and keep related ideas and information together.

- Use bulleted or numbered lists to draw visual attention to and emphasize key facts.

- Ensure that tables and figures are self-contained and relevant to the overall proposal.

- Verify references to figure or table designations, and double-check consistency between information presented in the table/figure and the text.

- Make a list of references and verify that all citations are included in the bibliography and are accurately cited.

CHAPTER 14

Routing and Submitting the Application

Submission of grant applications must be made through an approved campus grants and contracts agency. The proposal text and the final proposal budget are reviewed and routed through one of these agencies:

- Texas A&M Research Foundation (TAMRF)
- Texas Agricultural Experiment Station (TAES)
- Texas Engineering Experiement Station (TEES)
- Texas Transportation Institute (TTI)
- Health Science Center (HSC)

Each of these agencies has its own set of guidelines for reviewing, processing, and submitting grant applications. At a minimum, however, each will route the application to each principal investigator, as well as to each investigator's department head, college dean, and vice president for research and/or provost. These institutional officials will review the proposal text and budget to ensure that they are in compliance with both the sponsor's and the campus agency's rules and regulations; if they are, the institutional officials will sign the routing sheet, thereby clearing the application for submission to the sponsor. (See **Figures 1a and 1b** on the following pages.)

Route an Application
Through the Texas A&M Research Foundation

1. Call or e-mail the proposal administrator and notify him or her that the application is ready to route.

   Note: *For a list of proposal administrators, visit http://rf-web.tamu.edu/preaward/proposaladm.html.*

2. **E-mail the *draft* proposal text and the *final* proposal budget to the proposal administrator *at least* 6 working days before the proposal due date.** Allow additional time if the proposal involves multiple investigators, since such a proposal will likely require additional signatures.

   Note: *An investigator may continue to revise the proposal text (but not the budget) while the proposal is being routed.*

3. The proposal administrator will prepare a routing packet, give it to a Texas A&M Research Foundation courier, who then takes the packet to the principal investigator, any co-investigators, the department head(s), college dean(s), and the vice president for research and/or provost for signatures.

> **Reminder!**
>
> *The Texas A&M Research Foundation is pilot-testing electronic routing, so the routing procedures described here are subject to change based upon changes in electronic procedures.*

Figure 1a.
Texas A&M University Routing Sheet (Page 1).

Figure 1b.
Texas A&M University Routing Sheet (Page 2).

Title_____   Total Sponsor Support: $ _____
Sponsor _____
APPROVALS: There must be approvals from all department heads, deans, and/or directors whose personnel or facilities are involved in
conducting the proposed work.

ATTN. INVESTIGATORS: You signature below certifies, to the best of your knowledge and belief, that . . .

  a.) You are not delinquent on any Federal debt, such as student loans, etc. (this does not include income taxes); (applies to fellowships,
       scholarships, IPAs, etc. where the implied recipient of funds is an individual vs. an organization; per A-110.22 and A-129.)

  b.) You are not currently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from current
       transactions by a Federal department or agency; (per Executive Order 12549).

  c.) You agree to accept responsibility for the scientific conduct of the project and to provide the required progress reports if an award is
       made as a result of this application;

  d.) You agree to comply with the TAMU Conflict of Interest Rule (per NSF 60 FR 35820, 7/11/95; NIH 60 FR 35810, 7/11/95).

  e.) You agree to comply with the TAMUs Policy on Ethics in Research and Scholarship, TAMUs #15.99.03.

  f.) You agree to comply with the TAMUs Policy on Management of Intellectual Property, TAMUs #17.02.01

ATTN. DEPT. HEADS, DIRECTORS, DEANS: By your signature below you certify that you have reviewed this proposal and all
accompanying forms; you are aware of all requirements of this project and are committed to providing them, except as noted.

	INVESTIGATOR(S)	DEPT. HEAD	DEAN	VICE PRESIDENT/RESEARCH
1. SIGNATURE				
NAME/TITLE				
DATE				
2. SIGNATURE				
NAME/TITLE				
DATE				
3. SIGNATURE				
NAME/TITLE				
DATE				
4. SIGNATURE				
NAME/TITLE				
DATE				
5. SIGNATURE				
NAME/TITLE				
DATE				

Submit an Application
Through the Texas A&M Research Foundation

1. Notify the proposal administrator that the *final* version of the application is ready for submission.

2. **E-mail the *final* proposal text to the proposal administrator or upload the final proposal text *at least* 2 full working days before the proposal due date.**

3. The proposal administrator will complete the following activities to finalize the application and prepare it for submission to the sponsor:

   - Review the final text for compliance with the sponsor's guidelines, as well as for compliance with the campus agency's guidelines.

   - Assemble the grant application in the specified format.

   - Perform a quality control check.

   - Photocopy the grant application.

   - Check the quality of the photocopy.

4. The proposal administrator will submit the grant application via the appropriate carrier and/or will e-mail/upload the application electronically.

5. The proposal administrator will e-mail the principal investigator an electronic copy of the final proposal subsequent to submission.

Reminder!

At the same time the proposal administrator is preparing one grant application for submission, he or she may also be assisting numerous other investigators with their applications, especially if there is a major deadline on the horizon. To facilitate proposal processing, investigators should establish good communication with proposal administrators early in the process, and submit materials well before the required deadlines.

Important Note Regarding Electronic Proposal Submission Procedures

New and developing electronic proposal initiatives for private and particularly for federal proposals have added significant preparation time to the proposal process. As these new systems come online, there will likely be an initial period marked by glitches; therefore, extra time will be required to submit grant applications via these systems. Indeed, federal grant applications flow through at least two electronic systems during submission (the Grants.gov system as well as the sponsor's system). The additional edit checks required by these systems are adding substantial time to the proposal submission process, causing federal agencies to request that proposals be submitted the day before the actual deadline. Campus proposal offices will need additional time to meet these requirements.

Revising & Resubmitting the Proposal

In today's highly competitive funding environment, many excellent applications do not get funded. It is not uncommon for the applicant to have to consider revising a rejected proposal based on reviewers' comments, and resubmitting the application to the same funding program or a different one. Because nearly all researchers, sooner or later, have an application rejected and have to go through the revision and resubmission process, it is worthwhile to consider strategies to make that process a successful one that leads to a funded project.

Post-Review Process

Respect the Views of Peers

Most reviews will have been written by an applicant's peers and are meant to be helpful. They are intended to point out weaknesses in any aspect of the application, including such things as the scholarly and scientific ideas presented, the research methods and plans, and the clarity with which the applicant has presented his or her ideas. As the applicant considers the negative comments of reviewers, it is helpful to keep in mind that even the most excellent proposal can be improved by carefully weighing input from peers. In fact, the foundation of a good (but not necessarily positive) review can become a roadmap for the applicant to improve the proposal and ultimately to get it funded.

Review the Reviews: Discuss Reviews with Senior Faculty

Sometimes, with a negative review, it is hard to tell whether a reviewer has identified a genuine problem with the proposed research, or whether he or she simply disagrees with the applicant's ideas. In the first case, the applicant would have to re-think the scholarly or scientific approach, whereas in the second case, the applicant would have to more carefully justify the idea and approach. To help sort this out, applicants can consider discussing their reviews with senior faculty members in their department. Most senior faculty will have had experience with both applying for their own research funding and reviewing other people's applications for research funding. They may be able to offer insights on the interpretation of reviewers' comments and to help applicants decide how best to respond to the comments.

Review the Reviews: Discuss Reviews with Program Managers

It is possible to receive reviews that are not so much negative as they are off base; these can be unconstructive. For example, applicants may receive two reviews rated "Very Good" and one rated "Poor." The applicant will have to decide whether the "Poor" review is legitimate

or an outlier. Outlier reviews can come about in a number of ways. Perhaps the reviewer did not take the time necessary to thoroughly understand the application. Perhaps the reviewer has a personal or scientific axe to grind. Perhaps the reviewer was annoyed by the proposal, thinking it was poorly written, poorly organized, or just plain too hard to read. On the other hand, perhaps the reviewer saw a problem in the application that the other two reviewers missed. In any event, discussing reviews with the program manager can help the applicant decide how to respond to seemingly unconstructive reviews.

Respond to Reviewer Comments

When a proposal is rejected, the applicant must decide how and to what degree he or she will respond to reviewers' comments when preparing to resubmit the application. Carefully assessing the reviews, as discussed above, is really the only way to evaluate and respond to reviewers' comments. The applicant has to decide whether addressing reviewers' comments will strengthen the proposal. It is possible to respond in a general way to the reviewers' conceptual comments, and in a very specific way to reviewers' specific comments. It is also possible to respond in greater detail to some of the reviewers' comments than to others. Reviewers' comments that focus heavily on the style and organization of the proposal may be relatively easy to address. Comments that call for a basic scholarly or scientific revision, however, are likely to be more difficult to attend to. Ultimately, of course, it is left to the judgment and discretion of the applicant to address or not address reviewers' comments.

Determine Whether Reviews Are Reliable Guides to Program Objectives for the Next Funding Cycle

The crux of evaluating reviewers' comments is determining whether they have identified substantive faults with the proposal that can and should be fixed, or whether they have focused more on the extent to which the applicant addressed specific funding program objectives. When it is the latter, it is very important that the applicant discuss the nature of the reviews with the program manager. Some funding programs may have very consistent objectives from one funding cycle to the next, but many do not. It obviously would not be in the applicant's best interest to address an individual reviewer's comments if those comments would not be relevant to the next funding cycle anyway. Program managers will be the best source of information about this question.

Answer the Question: "Do I have a Viable Research Idea?"

Reviews may generate a fundamental reassessment by the applicant of the intellectual merit of the research idea, methods, and work plan. When reviews come back that uniformly identify intrinsic flaws with the applicant's basic concept, idea, or methods, the applicant needs to determine whether he or she has a viable research idea, or whether the fundamental research approach needs to be altered or even abandoned. It is possible that reviewers' comments will spark an applicant's insight and lead to a revised direction ("I should have thought of doing my study that way…"). On the other hand, unanimously negative reviews may lead the applicant to conclude that he or she would be better served putting energy into developing an entirely new research topic than into revising the old one. It may even take the applicant more than one round of rejected proposals to make the difficult decision to either fundamentally change the idea or come up with a new one.

Competitive Resubmissions

Once an applicant has decided that the basic research idea and proposal can be revised and improved, and that he or she intends to resubmit the proposal, there are some strategies that may help make the resubmission as competitive as possible:

- Be certain the targeted funding program is the correct one for the proposal.

- Be certain revisions that have been made based on reviewers' comments are clearly identified in the proposal.

- Focus on submitting a great proposal.

When considering a resubmission, it may be wise for the applicant to search alternative funding agencies for funding programs that may be applicable to the proposed work. There is some overlap among funding programs, and applicants may find that the proposal could fare as well as or even better at an entirely different funding program or agency. Applicants may wish to revisit the evaluation of funding agencies and their research priorities; it may be possible to find a funding program that would have been a better "fit" in the first place. Care should be taken, however, that proposal revisions **not** be made based on reviewers' comments for one funding agency if those comments run contrary to the priorities of the new agency or program. In other words, don't fix what's not broken according to the mission and priorities of the resubmission agency.

On the other hand, when revisions are being made – especially with the intent to resubmit to the same funding program – applicants should make sure those revisions are clearly identified. Many funding agencies ask applicants to clearly state when a proposal is a resubmission. It will be much easier for the program manager and reviewers to assess the revised proposal if the problems with the initial proposal are identified early on in the revised proposal, along with a discussion of how the problems were addressed. An exception to that, clearly, would be when the reviewers' comments dealt primarily with the proposal's organization and style.

Finally, the applicant can enhance the competitiveness of a resubmission by preparing a superb proposal. The applicant should present the idea with clarity so that reviewers are left with no doubts about the scholarly and scientific objectives and methods, or about the significance of the study's outcome for the funding agency and society at large.

Learning More

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CHAPTER 17

Identifying
System Contacts

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Texas A&M Research Foundation (TAMRF)	Jane Zuber	979-845-8615	jane-zuber@tamu.edu
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Texas Engineering Experiment Station (TEES)	David Hollingsworth	979-845-1264	dhollingworth@tamu.edu
Texas Transportation Institute (TTI)	Toni Monroe	979-862-3942	t-monroe@ttimail.tamu.edu

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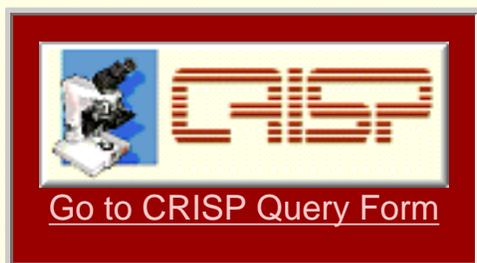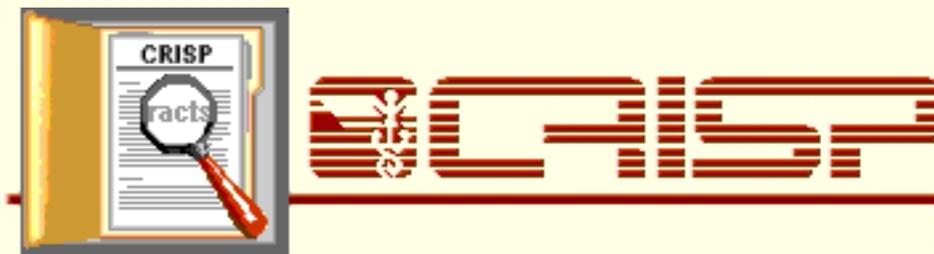
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Principal Investigator

First Name:

Last Name:

Hint: Including CO-PI will result in slower searches.

Include CO-PI:

Organization:
State:

ZIP Code:

Country:

Hint: Historical data is from prior to 1976. This data may not be as complete as recent data.

Historical Awards:

Active Awards Only:

Expired Awards Only:

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