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Preparing Research Proposals in the Social and Behavioral Sciences: The Graduate Student Guide to Funding

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Glossary of Terms

Dear Colleague Letter (DCL): A document NSF uses to communicate important information to research communities and to announce special funding opportunities or invite proposals on special research topics not covered in existing program solicitations (see below).

Dissertation Awards: Provide funding for specific tasks related to dissertation research

Extramural Research: Refers to research conducted by scientists who work outside (external) of the agency that provides the funding.

Facilities and Administration Costs (F&A): Overhead charged by a university or agency receiving the grant award for operating, or administration, costs – also called "indirect costs".

Fellowships: Provide support (usually primarily salary) for an individual for specific training and research activities.

Funding Opportunity Announcement (FOA): The publicly available document that contains all the official information (e.g., goals, deadline, eligibility, reporting) about a federal grant. An FOA is how a federal grant-making agency announces the availability of a grant, and it provides instructions on how to apply for that grant.

Funding Mechanisms: Refers to the specific type of grant; e.g., predoctoral fellowship or doctoral dissertation research grant.

Grants: Provide money to an eligible entity (such as a university) for a designated investigator to carry out a specific approved project.

Intramural Research: Refers to research funded by and conducted within a specific agency, organization, institute or center by scientists who work there (internal).

Letter of Intent (LOI): A brief letter stating one's intent to respond to a specific solicitation. Some agencies (such as NSF) require this only for some solicitations; other agencies request this so they can estimate the number and expertise of reviewers they will need.

NSF: The National Science Foundation. Not a part of PHS (see below). An independent federal agency that funds basic science research in most fields of science, social science, and engineering, and mathematics (STEM); does not fund clinical or health research.

Peer Review: The evaluation of research/creative work or a grant proposal by one or more people with similar competences as the producers of the work or proposers (peers).

PHS: The U.S. Public Health Service. Encompasses most federal agencies dealing with health and welfare, including the National Institutes of Health (NIH), the Centers for Disease Control and Prevention (CDC), the Agency for Health Care Quality and Research, and the Indian Health Service, among others. Does not include NSF (see above).

PHS398: Previously was the standard application form for research grants for PHS agencies. However, some agencies have switched to online submission at Grants.gov and now SF424 (see below) unless specifically directed to use PHS 398.

Predoctoral: Covers graduate doctoral training and research prior to awarding of the doctoral degree.

Postdoctoral: Covers the time period following the awarding of the doctoral degree; period varies, but typically up to 7 years post degree.

Principal Investigator (PI): Person who submits the funding application and assumes primary responsibility for award administration and proposed activities.

Glossary of Terms

Priority Score: Used by NIH review committees, after discussing an application, members of the review group privately vote a numerical impact/priority score from 1 to 9, where 1 is best. The normalized average of all reviewer impact/priority scores constitutes the final impact/priority score. Impact scores run from 10 to 90, where 10 is best. Generally speaking, impact/priority scores of 10 to 30 are most likely to be funded; scores between 31 and 45 might be funded; scores greater than 46 are rarely funded.

Program Announcement (PA): An announcement by one or more NIH Institutes or Centers requesting applications in a specific scientific area(s). Generally, money is not set aside to pay for them. A PAS is a PA that includes specific set-aside funds, as described in the PAS announcement. A PAR is a PA for which special referral guidelines apply, as described in the PAR.

Program Solicitation: Used by some agencies (such as NSF) to encourage submission of proposals in specific areas of interest to the agency. For NSF, a program solicitation is a also a formal document describing a funding program and its program-specific application requirements.

Request for Applications (RFA)/Request for Proposals (RFP): A type of solicitation notice in which an organization, usually a government agency or non-profit organization or foundation, announces that grant funding is available.

Scientific Review Committee: A group composed of established, well-regarded investigators from universities and research institutes worldwide charged with carefully reviewing and rating funding applications.

Scholarships: An award of funding not tied to any specific research or training plan, but rather based on merit or other criteria.

SF4224: Replaced PHS398 as the standard application form used on Grants.gov for PHS applications.

Traineeships: Funds made available through training grants awarded to faculty for the purpose of providing enhanced training for graduate students. Application is usually to a university department or faculty member.

Introduction

This Guide was originally designed for graduate students in psychology in the United States and was prepared by faculty and students as part of a graduate course on grant writing in psychology at UC Riverside. It has been updated and revised to be relevant for graduate students across the social and behavioral sciences. Because funding opportunities and requirements change regularly, contacts, deadlines, and requirements should be verified.

For the purposes of this Guide, funding is limited to fellowships and grants specifically linked to research and training activities. We also do not review every possible opportunity, but focus on what we believe are best bets that apply to most graduate students in the social and behavioral sciences. We do not include or discuss need-based or merit-based awards, financial aid, loans, scholarships, or other sources of support not tied specifically to research or training. Most Ph.D. granting universities in the United States provide some type of financial assistance. They also frequently provide small competitions for research grants and awards from travel to professional meetings. Grants and fellowships described here are not limited to students from specific universities.

The process of identifying grant and fellowship opportunities, determining eligibility, understanding guidelines for submission, developing a coherent and fundable proposal, and submitting (and often resubmitting) in a timely manner can be difficult to navigate. Although there are a number of helpful websites and publications, they are often specific to a particular university and may require access available only to students at that university. Further, there is a wide array of information available that can at times seem overwhelming.

This Guide is intended to provide a simple and basic overview of funding for social and behavioral science graduate students that describes predoctoral opportunities, and also provides guidance for postdoctoral and early career funding. It covers promising sources of funding, proposal development and submission, examples of successful proposals, and strategies for success. Considerable space is devoted to discussing National Institutes of Health (NIH) and National Science Foundation opportunities.

E-mail from a successful UC psychology graduate student…on sharing his predoctoral training application (F31).

I think this is great that you are compiling these applications. As I was preparing my own application, I found it incredibly helpful to see other people's previously successful efforts.

I have attached the vast majority of my application. I have excluded 2 pieces for privacy/professional reasons. First, I excluded the initial pages, which contain mostly personal, demographic information. Second, I excluded the training plan, as it is not solely my work; the training plan is written in combination with the advisor.

The application that is attached is my second submission. I worked very hard on my first submission and was quite proud of it. My score, however, placed me in the 53rd percentile, far out of the fundable range. I was devastated and needed to put the feedback away for a couple weeks before I could really absorb it. However, when I was able to address the feedback with open eyes (and sans anger!), I saw how insightful and correct it all was. I basically redrafted the entire application, spending several months wrestling with the complex questions that the reviewers raised. My second time around, my score placed me in the 2nd percentile. Quite a leap!

Please feel free to share my story with any discouraged students!

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Where do I start?

Why should I apply for fellowships or grants in the social and behavioral sciences?

There are several compelling reasons to apply for grants and fellowships in graduate school. First, funding can enable you to conduct your own independent research. Funds can also be used for travel to present at meetings, attend conferences, etc. Second, grants and fellowships are important for your c.v. and show that you are on the road to becoming a grant-active researcher. Third, there is often a natural sequence of grant activity beginning with fellowships and training opportunities, continuing during the post-doctoral phase, moving into small grants, and followed by larger research project grants. Beginning this cycle early will enable you to apply for the most appropriate funding across the different stages of your academic career. Below is an article in the *APA Monitor* by Lea Winerman (December, 2006).

In January, the National Institutes of Health (NIH) announced a new grant program called the "Pathway to Independence" award. The $400 million program will provide five years of funding for 150 to 200 promising new postdoctoral researchers each year. The goal is to help the young scientists begin independent research careers. The program stems from concern among NIH officials that young researchers might be having trouble competing with established researchers for limited funding, according to NIH Deputy Director for External Research Norka Ruiz Bravo, PhD. "The worry [is] that when the budget is tight, the new investiga¬tors will have a difficult time breaking into the field," she says.

Indeed, many researchers find applying for their first independent research grant a daunting task. "It scares people because grant applications can be long and complicated, but also because they worry they'll be judged against more senior researchers," says Mitchell Prinstein, PhD, a psychology professor at the University of North Carolina, Chapel Hill and co-author of the early-career guide The Portable Mentor: Expert Guide to a Successful Career in Psychology (Springer, 2005). New researchers can get over that hurdle, he says, by taking advantage of the many opportunities offered to them by funders like NIH, individual universities and groups such as APA.

Start Small
Psychologist David DiLillo, PhD, studies the long-term effects of child abuse and neglect. As a postdoctoral researcher at the University of Missouri in the late 1990s, he studied the links between people's history of childhood abuse and their later marital relationships. DiLillo began by applying for two grants offered by the university's research office. Neither grant was large by the standards of a major study--each provid¬ed about $lO,OOO-but together they gave him enough money to collect promising pilot data. Such funds, often doled out by university research offices, can be an excellent resource for new researchers who aren't ready to apply for larger grants from agencies like NIH, says Dilillo, who is now a professor at the University of Nebraska-Lincoln. The university grants can be less competitive, he says, and some may even be held for young researchers.
"A lot of times funds like these are specifically earmarked for junior faculty because they want to help people jump¬start their research programs," DiLillo says. "They're investing in you." APA divisions and other organiza¬tions that focus on specific research interests can also provide seed money for collecting pilot data, says Prinstein. For example, AP1\s Div. 20 (Adult Development and Aging) offers a $1,500 postdoctoral research grant each year, and Div. 53 (Society of Clinical Child and Adolescent Psychology) offers $5,000 to one postdoctoral researcher each year.

Think Big
With pilot data and other preparation in hand, it's time to start thinking of going after bigger research grants, says DiLillo. There are several programs that can ease the way for new researchers taking this next step. DiLillo's first big grant, for example, was a K award; a five-year research award from NIH that can provide up to $50,000 per year for project expenses. There are several different types of K awards, and DiLillo's-from the National Institute of Mental Health-was a KO1, which

is a mentored grant aimed at new researchers. DiLillo is working with four mentors, each of whom provides feedback and expertise in a different area of his project, including content and statistical analysis.

Prinstein took a slightly different route. His first major grant was an R01 research grant from NIH. R01 grants are the standard NIH grants that most researchers—including more experienced ones—apply for. However, Prinstein tapped a program that allows scientists to designate themselves "new investigators" on the grant application. "Then when we're considering the grant, we can adjust our expectations for the amount of previous publications and such," Ruiz Bravo says. "Obtaining an NIH grant early in one's career serves as a record of the quality of one's research—getting a foot in the door early on is good for that reason."

What are the different types of funding available (e.g. grants, fellowships, dissertation awards, scholar programs)?

There are many different types of grants, fellowships, awards, and scholar programs. Students are sometimes unclear about the specific distinctions between each type of funding mechanism. A ***grant*** provides money to an eligible entity (such as a university) for a designated investigator to carry out a specific approved project. A ***fellowship*** provides support for an individual for specific training and research activities. A ***dissertation award*** provides funding for specific tasks related to the dissertation research. ***Scholar programs*** typically provide research and training support for a group of students whose research fits within specific guidelines. Funds for predoctoral and postdoctoral training may also be received through an academic department whereby students can apply for these ***traineeships*** through their departments (if the department has a training grant). Although it is possible to receive more than one award (for instance, a training award for data collection not linked to the dissertation and a dissertation award), it is important not to receive funding for the same tasks from multiple agencies.

It is also important to recognize the difference between funding ***requests for proposals or applications (RFP or RFA***) that are tied to specific amounts of money already designated for this support, applications that are submitted under specific ***program announcements (PA)*** that are not specifically linked to set aside funds, and investigator-initiated research that is on any topic the investigator chooses. Keep in mind that program announcements (PA), such as those announced in NSF Dear Colleague Letters, typically describe new, ongoing, or expanded interest or high-priority programs, but generally do not have set-aside funds. In contrast, RFA and RFP solicited proposals typically have set-aside funds for a certain number of awards (RFA) or one-time competitions (RFP). Investigator-initiated awards are funded according to review ratings or priority scores and the available budget. (See glossary for more information.)

When should I apply and how do I know if I am eligible?

A first step in the funding process is to determine your eligibility as well as whether you qualify for grants and fellowships specific to certain groups (e.g., minorities, students with disabilities, etc.). This requires that you read program information very carefully, check with your advisor and other faculty members, and contact the designated program officer before you begin to prepare your application or proposal. Writing a fellowship or grant proposal is very time consuming and should be done after determining that you are eligible. The ideal timing to apply also depends on the specific requirements of the funding mechanism, your progress in graduate school, your own career plans, and whether you can resubmit a proposal that is not funded. Applications for predoctoral training and research should be prepared mid-way through your graduate career, in order to allow

enough time for you to formalize your ideas, become well versed in the literature, and collect pilot data or perform research in a lab, but also to allow you time to revise and resubmit and still carry out the proposed project before you receive your dissertation (with the exception of post-doctoral training applications). The time from submission to review can be between 6 and 10 months. Remember that many applications can only be submitted on selected dates, so that the process of submitting and resubmitting may take quite a while.

What are the major obstacles to grant writing and how can I overcome them?

"It's such an overwhelming task"
Probably the biggest obstacle to writing grants and fellowships is the fact that it seems to be an overwhelming task to most students. There is an array of information available from your school's grants and contracts office, websites, department information, your advisor, and other students. Simply sifting through this information can seem daunting. Further, once you have identified a potential funding source and application process, the sheer amount of detail and work to complete as required is difficult to imagine. How can you overcome this obstacle? As with all complex tasks, it is important to approach grant writing one step at a time. You should first develop your research ideas (and related training needs) carefully. Next you should identify viable sources of funding and consult with others about the specific procedures to follow. When you have identified one or more sources of funding, be sure to read all of the information, instructions, requirements, etc., carefully. Another strategy for simplifying this process is to talk with others who have been successful and gather copies of successful applications for the funding source you are interested in.

"I don't have time"
This problem is not limited to applying for grants and fellowships. Graduate students and faculty typically juggle multiple tasks which makes it difficult to find time for everything (or sometimes for anything). But fellowships and grants almost always are submitted by specific deadlines. One strategy is to select a deadline and allocate an appropriate amount of time before that deadline to focus almost exclusively on preparing your application (which will require having already collected pilot data, reviewing the literature, etc.). This time will be specifically for putting it all together and writing the proposal. You must also check to be sure that your time frame coincides with department and university schedules for submission.

"I don't have any pilot data"
Grants and fellowships that emphasize a research plan often require some type of pilot data. For doctoral students, this is usually collected as part of the second year or master's project, or collected in collaboration with your advisor. It is not necessary to have an accepted publication based on this pilot data, but it is important to make a case for your proposed research based on work you have already done (or ongoing work in your lab). Pilot data is particularly important if you are using new measures, novel situations, or participants from different ethnic or cultural groups (compared to previous studies).

"My area of research is hard to get funding for"
It is true that certain areas of research come into vogue for funding, often linked to specific advances in the fields, pressing social problems, or political winds. These concerns are often more pronounced for large-scale research projects. Remember that funding for predoctoral and postdoctoral students is linked primarily to the student and his or her capacity for success in academia. A strong academic record and clear career trajectory is very important!

"It's just too much responsibility to have to worry about grants, budgets, reports, etc.—I just want to get through graduate school!"
But you also want to start a successful career, and grant funding is important!

What is my advisor's role in the grant and fellowship process?

As with all research and training activities, you should always consult regularly with your advisor. Predoctoral applications often benefit by one or two years in your advisor's research lab. In disciplines not organized around faculty research labs, your advisor can provide advice and guidance in developing a sound research project and proposal. For most fellowships with a training component, your training plan will be written in collaboration with your advisor. For NSF doctoral dissertation awards, your advisor serves as the PI and for some programs needs to provide a letter indicating that s/he has read the proposal and affirms that the student is ready to undertake the proposed research.

What is the review process?

Many foundations will assign reviewers to read and write a review of your proposal; in some cases, the reviewers meet to discuss their comments and in other cases the recommendations are sent to the foundation and evaluated by a specific committee appointed by the foundation. Applications to federal institutes are reviewed by committees or panels comprised largely of academic researchers; sometimes you can request a specific committee at the time of submission in a cover letter. In most cases, you will receive written and detailed reviews of your proposal. These will be very important in preparing a resubmission (when allowed). It is important to think of your reviews as helpful advice that provides you with an opportunity to improve your work.

Can foreign students apply for federal grants?

Traineeships and fellowships are only awarded to U.S. citizens or permanent residents.

However, you don't need U.S. affiliation or citizenship to apply for a research project grant – including research project grants (R01), small grants (R03), or exploratory/developmental grants (R21). Applications are accepted from foreign institutions and from non-residents/non-citizens at U.S. institutions. This is because federal agencies make awards to *institutions*, not directly to individuals, and most NIH and NSF grants are awarded to domestic institutions.

If you are working at a U.S. institution that is receiving the award, you have to remain there long enough to finish your project.
- If you do not have a permanent visa, state in your application that your visa will allow you to remain in the U.S. long enough for you to be productive on the project.
- Your institution ensures that you have an appropriate visa.
- If your visa doesn't cover the entire grant period or you cannot assure us that you will be getting one that does, the agency may not issue an award naming you as PI. Alternatively, your institution could nominate a PI to replace you if you have to leave. In the case of NSF Doctoral Dissertation Improvement grants, your advisor serves as the PI; the student is a Co-PI.

Can you send an application to more than one federal agency?

You may not send the same application to more than one Public Health Service (PHS) agency at the same time. You may apply to an organization outside PHS with the same application, but the PHS agency will not fund you if you get that award. Sometimes agencies will allow you to submit a plan for cost-sharing that specifies which research costs will be paid by which award/agency, but duplicate funding is generally not allowed.

What are my chances of success and how can I improve them?

Success rates vary by source of funding, typically hovering between 15% and 30%. As an example, the graph below illustrates number of F31 NIH applications reviewed and awarded over the past decade. As you can see, the submission rate has increased in recent years, although funding levels have increased only slightly. One way to improve your chance of success is to submit the strongest proposal you can by getting comments and feedback on drafts from your advisor, other faculty and fellow graduate students and refine your proposal before submitting it. Another way is to resubmit when appropriate and to be persistent!

If you search carefully on most websites, you can determine number of grants received and number funded each year to determine success rates.

Number of NIH Fellowship (F31) Applications Received and Awarded 2009-2018
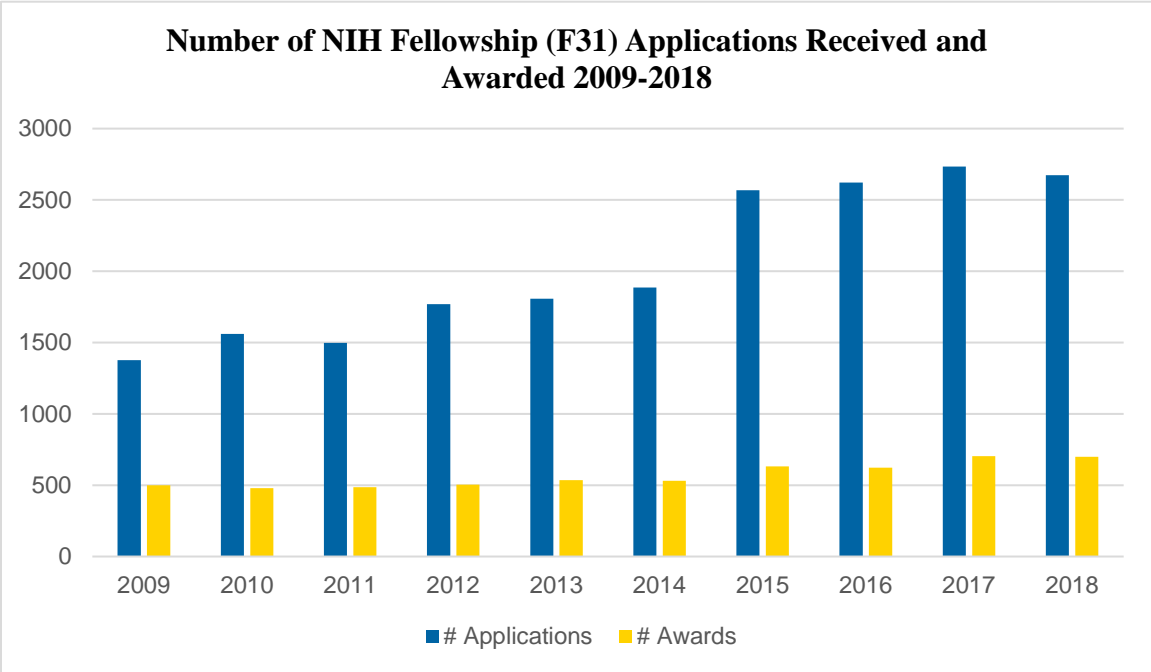
Best Websites for Learning about Pre- and Postdoctoral Funding Opportunities in the Social and Behavioral Sciences

There are many websites that provide information about grant and fellowship opportunities for graduate students and postdoctoral researchers. Some websites cover a wide range of opportunities and include a search engine for most appropriate grants (after relavant user information is entered). Other websites are more specific to particular disciplines or to a specific institute. Federal government websites related to major sources of funding are also extermely useful. It is helpful to look at multiple websites as well as to decide which ones are best for your needs.

PIVOT Pivot is a subscription-based funding search tool–available to all UCI faculty, staff and students courtesy of the Office of Research–featuring over $71 billion of opportunites of all types and levels worldwide and across all disciplines. The tool is powerful–it allows you to save searches, monitor and track opportunities, and receive updates–and is the best and most comprehensive tool on the market for funding searches.

GRAPES (UCLA Graduate Postdoctoral Extramural Support) GRAPES is a database of extramural funding opportunities – 625 private and publicly funded awards, fellowships and internships – for prospective and current graduate students, students working on a master's thesis or doctoral dissertation, and postdoctoral scholars.

GRANTS.GOV Grants.gov is a central storehouse for information on over 1,000 U.S. government grant programs offered by 26 federal grant-making agencies and provides access to approxiately $500 billion in annual awards.

FOUNDATION DIRECTORY Foundation Directory is a database of over 140,000 grant makers and their grants, including U.S. foundations, corporate giving programs, and grantmaking public charities, plus a growing number of non-U.S. grant makers.

YOUNG INVESTIGATOR FUNDING OPPORTUNITIES (UCSD) UCSD provides this excellent resource; a frequently updated and comprehensive list of funding opportunities geared toward early career faculty.

In addition to these comprehensive web-based funding databases, you may also search the websites of specific agencies, organizations or foundations.

FEDERAL AGENCIES

National Institutes of Health – http://www.nih.gov/ and http://grants.nih.gov/grants/grant_tips.htm for specific grant writing tips at NIH

National Science Foundation – www.nsf.gov and for Social, Behavioral and Economic Sciences – http://www.nsf.gov/funding/pgm_list.jsp?org=SBE

Center for Disease Control and Prevention – www.cdc.gov

National Institute of Justice – https://nij.gov/funding/Pages/current.aspx and https://nij.gov/funding/fellowships/graduate-research-fellowship/Pages/welcome.aspx

Environmental Protection Agency – https://www.epa.gov/careers/fellowships-scholarship-and-post-doctoral-opportunities

Federal Opportunities for Students in STEM (including Social and Behavioral Sciences) – https://stemgradstudents.science.gov

Department of State Fulbright Study/Research Award – https://us.fulbrightonline.org/about/types-of-awards/study-research

Department of Education Fulbright Hays Doctoral Dissertation Research Abroad – https://www2.ed.gov/programs/iegpsddrap/applicant.html

Sources of Funding: The National Institutes of Health (NIH)

NIH Overview and Organization

The National Institutes of Health (NIH) is part of the U.S. Department of Health and Human Services. It is the primary Federal agency for conducting and supporting medical research, focused on ways to prevent disease as well as causes, treatments, and cures. NIH research is relevant to child and teen health, minority health, women's health, wellness, and other health-related concerns. *Program announcements (PA), Request for Proposals (RFP) and Request for Applications (RFA) specify participating institutes. Applicants for funding will be routed to the most appropriate institute or center and to the most appropriate program within that institute or center.* NIH is comprised of 27 Institutes and Centers:

National Cancer Institute (NCI)
National Eye Institute (NEI)
National Heart, Lung, and Blood Institute (NHLBI)
National Human Genome Research Institute (NHGRI)
National Institute on Aging (NIA)
National Institute on Alcohol Abuse and Alcoholism (NIAAA)
National Institute of Allergy and Infectious Diseases (NIAID)
National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS)
National Institute of Biomedical Imaging and Bioengineering (NIBIB)
National Institute of Child Health and Human Development (NICHD)
National Institute on Deafness and Other Communication Disorders (NIDCD)
National Institute of Dental and Craniofacial Research (NIDCR)
National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK)
National Institute on Drug Abuse (NIDA)
National Institute of Environmental Health Sciences (NIEHS)
National Institute of General Medical Sciences (NIGMS)
National Institute of Mental Health (NIMH)
National Institute of Neurological Disorders and Stroke (NINDS)
National Institute of Nursing Research (NINR)
National Library of Medicine (NLM)
Center for Scientific Review (CSR)
John E. Fogarty International Center (FIC)
National Center for Complementary and Alternative Medicine (NCCAM)
National Center on Minority Health and Health Disparities (NCMHD)
National Center for Research Resources (NCRR)
NIH Clinical Center (CC)

Example: The National Institute of Mental Health (NIMH) funds a large percentage of the research in psychology. The mission of the National Institute of Mental Health (NIMH) is to reduce the burden of mental illness and behavioral disorders through research on mind, brain, and behavior. According to the NIMH website, "Investments made over the past 50 years in basic brain and behavioral science have positioned NIMH to exploit recent advances in neuroscience, molecular genetics, behavioral science and brain imaging; to translate new

knowledge about fundamental processes into researchable clinical questions; and to initiate innovative clinical trials of new pharmacological and psychosocial interventions, with emphasis on testing their effectiveness in the diagnostically complex, diverse group of patients typically encountered in front-line service delivery systems. NIMH-funded investigators also seek new ways to translate results from basic behavioral science into research relevant to public health, including the epidemiology of mental disorders, prevention and early intervention research, and mental health service research."

The NIMH provides leadership at a national level for extramural research on brain, behavior, and mental illness (***Extramural research*** is research conducted by scientists outside of the NIMH.). The institute funds extramural research project and research center grant awards and contracts to individual investigators in fields related to its areas of interest and to public and private institutions. NIMH also maintains and conducts a diversified program of intramural and collaborative research in its own laboratories and clinical research units at the National Institutes of Health. (***Intramural research*** is research conducted by scientists who work at NIMH.)

NIMH Extramural research areas are organized within programs that fall in five separate research divisions.

Division of Neuroscience and Basic Behavioral Science (DNBBS)
Supports research programs in basic neuroscience, genetics, basic behavioral science, research training, resource and technology development and drug discovery.

Division of Adult Translational Research and Treatment Development (DATR)
Supports translational research on the mechanisms of adult psychopathology and the development of novel treatment approaches for adult mental disorders.

Division of Pediatric Translational Research and Treatment Development (DPTR)
Supports integrated research and research training that translates knowledge from basic/behavioral science into a better understanding of pediatric psychopathology and the development of novel treatment and prevention strategies.

Division of AIDS and Health and Behavior Research (DAHBR)
Supports research on mechanisms and interventions on the interrelationship of physical and mental health and includes the Center for Mental Health Research on AIDS.

Division of Services and Intervention Research (DSIR)
Supports research that evaluates the effectiveness of treatment and preventive mental health interventions and mental health services research.

NIH Training, Career Development and Related Programs

It is the mission of NIH to discover new knowledge that will lead to better health for everyone. A critical part of this mission is the education and training of the next generation of biomedical and behavioral scientists. See **Ruth L. Kirschstein National Research Service Award (NRSA) Research Training Grants and Fellowships** for an overview of this NIH Program.

Training—Individual Fellowships

- *(F30) INDIVIDUAL PREDOCTORAL NATIONAL RESEARCH SERVICE AWARDS FOR M.D./Ph.D. FELLOWSHIPS* are designed to help ensure that highly trained physician/scientists will be available in adequate numbers and in the appropriate research areas and fields to meet the Nation's biomedical research needs.
- *(F31) NATIONAL RESEARCH SERVICE AWARDS FOR INDIVIDUAL PREDOCTORAL FELLOWSHIPS* are designed for promising applicants with the potential to become productive, independent investigators in the scientific mission of the NIH. Predoctoral training support is available for doctoral candidates who have successfully completed their comprehensive examinations or the equivalent by the time of award and will be conducting dissertation research. Longer-term awards for up to five years of graduate training and research are available for individuals with disabilities and members of ethnic minority groups.
- *(F32) RUTH L. KIRSCHSTEIN NATIONAL RESEARCH SERVICE AWARDS FOR INDIVIDUAL POSTDOCTORAL FELLOWS* are designed for promising postdoctoral students with the potential to become productive, independent investigators in fields related to the scientific mission of the NIH.

Training—Institutional Fellowships

- *(T32) NIH NATIONAL RESEARCH SERVICE AWARD INSTITUTIONAL RESEARCH TRAINING GRANTS.* Faculty at the training institution apply for these grants. If the institution has a training grant, faculty select students to participate who are pursuing a research doctorate (predoctoral traineeships) or who have recently completed their doctoral studies, including physicians (postdoctoral traineeships).
- *(T34) NIMH CAREER OPPORTUNITIES IN RESEARCH (COR) HONORS UNDERGRADUATE RESEARCH TRAINING GRANT* is intended to strengthen research and research training experiences of undergraduate minority students in scientific disciplines related to health. Again, the institution must have received this award in order to provide funding to students.

Research Career Development Grants

The NIH offers a series of research career development grants to individuals who have the potential to become outstanding investigators and to those who, later in their careers, have demonstrated the capacity to continue to be exceptionally creative scientists and mentors to younger researchers. These grants provide a portion of salary support to free time for the conduct of research.

Four types of awards are designed for persons who require further mentoring in order to become outstanding, independent investigators:

- *(K01) Mentored Research Scientist Development Award* is designed for beginning investigators who have had a research doctorate and some postdoctoral research experience.
- *(K08) Mentored Clinical Scientist Development Award for Clinicians* is designed for beginning investigators with a clinical doctorate and some postdoctoral clinical experience;
- *(K23) Mentored Patient-Oriented Research Career Development Award* is designed for clinically trained professionals who have made a commitment to focus their research endeavors on patient-oriented research, and who have the potential to develop into productive clinical investigators.
- *(K25) Mentored Quantitative Research Career Development Award* is designed to foster the career development of investigators with quantitative scientific (such as: mathematics, statistics, computer science, informatics, physics, chemistry), and engineering backgrounds outside of biology or medicine who have

made a commitment to focus their research endeavors on behavioral and/or biomedical research (basic or clinical).

Other K Mechanisms.

- _**(K99/R00) NIH Pathway to Independence (PI) Award**_ is intended to help investigators to receive an R01 award earlier in their research career. It will provide up to five years of support consisting of two phases. The initial phase will provide 1-2 years of mentored support for highly promising, postdoctoral research scientists. This phase will be followed by up to 3 years of independent support contingent on securing an independent research position. Specific details of this new mechanism are provided below (see next page).

Summary of F30 and F31 Predoctoral Fellowships

**The Ruth L. Kirschstein National Research Service Awards for Individual Predoctoral Fellowships to Promote Diversity in Health-Related Research (F30)** supports students at institutions with NIH-funded institutional predoctoral dual-degree training programs. The purpose of the Kirschstein-NRSA, dual-doctoral degree, predoctoral fellowship (F30) is to enhance the integrated research and clinical training of promising predoctoral students, who are matriculated in a combined MD/PhD or other dual-doctoral degree training program (e.g. DO/PhD, DDS/PhD, AuD/PhD, DVM/PhD), and who intend careers as physician/clinician-scientists. Applicants must propose an integrated research and clinical training plan and a dissertation research project in scientific health-related fields relevant to the missions of the participating NIH Institutes and Centers. The fellowship experience is expected to clearly enhance the individual's potential to develop into a productive, independent physician/ clinician-scientist. This Funding Opportunity Announcement (FOA) is designed specifically for applicants proposing research that does not involve leading an independent clinical trial, a clinical trial feasibility study, or an ancillary study to a clinical trial, but does allow applicants to propose research experience in a clinical trial led by a sponsor or co-sponsor.

**The Ruth L. Kirschstein National Service Award for Individual Predoctoral Fellowship (F31)** provides predoctoral training support for doctoral candidates who have successfully completed their comprehensive examinations or the equivalent by the time of award and will be performing dissertation research and training. The applicant should provide evidence of potential for a productive research career based upon the quality of previous research training and academic record. The applicant must propose a dissertation research project and training program which falls into a research area within the scientific mission of the NIAAA, NIBIB, NIDCD, NIDA, NIMH, or NINDS. The research training experience must enhance the applicant's conceptualization of research problems and research skills, under the guidance and supervision of a committed mentor who is an active and established investigator in the area of the applicant's proposed research. The research training program should be carried out in a research environment that includes appropriate human and technical resources and is demonstrably committed to the research training of the applicant in the program he/she proposes in the application. The application must include evidence that current and ongoing instruction in the principles of responsible conduct of research will be incorporated into the proposed research training plan. Fellowship awardees are required to pursue their research training on a full-time basis, devoting at least 40 hours per week to the training program. The F31 fellowship supports research training applied toward preparation of a dissertation and does not support study leading to the M.D., D.O., D.D.S., Psy.D., or similar professional degrees unless it is part of a combined degree program such as the M.D./Ph.D.

The NIH recognizes a unique and compelling need to promote diversity in the biomedical, behavioral and clinical sciences research workforce. Accordingly, the NIH continues to encourage institutions to diversify their student and faculty populations and thus to increase the participation of individuals currently underrepresented in the

biomedical, clinical, behavioral, and social sciences. This announcement seeks to stimulate the participation of individuals from the following groups: (a) individuals from underrepresented racial and ethnic groups; (b) individuals with disabilities; and (c) individuals from socially, culturally, economically, or educationally disadvantaged backgrounds that have inhibited their ability to pursue a career in health-related research.

Postdoctoral/Early Career Funding (K099/R00)

Source of funding and website for forms and instructions	NIH Pathways to Independence Award (K99/R00) http://grants.nih.gov/grants/guide/pa-files/PA-06-133.html
Type of grant/fellowship	1-2 years of postdoctoral research and then 3 years of independent support contingent on securing an independent research position.
Eligibility requirements	U.S. citizens and. Permanent residents. Must have earned a terminal clinical or research doctorate (including Ph.D., M.D., D.O. D.C., N.D., D.D.S., D.V.M., Sc.D., D.N.S., equivalent doctoral degree or a combined clinical degree and Ph.D.). Must have no more than 5 years of postdoctoral research training. Must not have been a principal investigator on NIH research grants (such as R01, P01 or subprojects of such grants) or have been a principal investigator on peer-reviewed non-NIH research grants over $100,000 in direct costs per year intended for faculty members.
Funding amount and duration	Will provide up to five years of support consisting of two phases. The initial phase will provide 1-2 years of mentored support for highly promising, postdoctoral research scientists, followed by up to 3 years of independent support contingent on securing an independent research position. Total cost per year for the initial mentored phase may not exceed $90,000. Salary is limited to $50,000, plus applicable fringe benefits, and up to $20,000 for research support costs for a 12-month budget period. The total cost for the independent investigator phase may not exceed $249,000 per year. This amount includes salary, fringe benefits, research support allowance and applicable F&A costs.
Number of applications received per year/success rate	
Submission dates	Application Receipt Date(s): Cycle 1: Feb 12; Cycle 2: Jun.12; Cycle 3: Oct.12
Review process and resubmission guidelines	Applicants may submit only one PI Award application, and may not simultaneously submit applications or have awards pending for any other PHS career development award (K-series mechanisms). Up to two revisions of an application will be accepted.
General description and important information	Pathway to Independence Award Program (PI) designed to facilitate receiving an R01 award earlier in an investigator's research career.

The initial application for the mentored phase may be submitted on behalf of the candidate (principal investigator) by any domestic for-profit or non-profit institution/organization such as universities, colleges, hospitals and laboratories, etc. Foreign institutions are not eligible to apply. Planning, direction, and execution of the proposed research and career development plans are the joint responsibility of the applicant and mentor(s). Pathway to Independence Awards are neither renewable nor transferable from one principal investigator to another. Following the postdoctoral research phase, the individual may request up to 3 years of support to transition, as an independent scientist, to an extramural sponsoring institution/organization to which the individual has been recruited. This support is to allow the individual to continue to work toward establishing his/her own independent research program and prepare an application for regular research grant support (R01). Support for the independent phase, however, is not automatic and is contingent upon being accepted by an extramural institution and the successful NIH programmatic review of the individual's mentored phase of the award. |

Beyond Fellowships: Summary of major NIH research grants

Predoctoral and/or postdoctoral support from fellowships or traineeships provides an important first step in the funding process that begins in graduate school or shortly after. However, it is not necessary to have a fellowship or traineeship to apply for NIH research grants. As shown in the table that follows, there are a number of different types of research grants (or grant mechanisms). Two types of grants that are particularly well-suited for junior investigators are the R03 and R21 mechanisms. R03 supports small projects that can be carried out in a relatively short time. Funding and time for research is also limited to two years at up to $50,000 per year. R21 supports innovative and exploratory research. Studies appropriate for R21 funding are often pilot studies or small research projects, but more funding is available than for R03 grants, with up to $275,000 for two years. However, not all centers and institutes provide support for the R03 and R21 mechanism.

For AREA grants or R15 small grants, eligibility is determined for your university based on federal dollars received. You must check with the contracts and grants office to determine if you are eligible. For example, UCI gets too much federal research funding to be eligible for these grants.

Remember, the research grants in the following table require that you have a PhD. However, NIH is committed to support new investigators. Toward that end, it encourages new investigators to self-identify in a special box on the application face page so they can be given special consideration. This means that peer reviewers are asked to focus more on the proposed approach than on the investigator's track record and to expect less preliminary data.

NIH Research Grant Mechanisms (nih.gov)

Activity	Description
Research Grants	
Traditional Research Project Grant (R01)	**Research Project Grants** are awarded to eligible institutions on behalf of a principal investigator to support a discrete project related to the investigator's area of interest and competence. These grants make up the largest category of NIH funding.
Small Research Grant (R03) http://grants.nih.gov/grants/funding/r03.htm	**Small Research Grants** support small research projects that can be carried out in a short period of time with limited resources for projects such as pilot or feasibility studies; secondary analysis of existing data; development of research methodology and/or technology.
Academic Research Enhancement Award (AREA) (R15) http://grants.nih.gov/grants/funding/area.htm	**Academic Research Enhancement Awards** provide support to scientists at eligible domestic institutions for small-scale health-related research projects, such as pilot research projects and feasibility studies; development, testing, and refinement of research

	techniques; and similar discrete research projects that demonstrate research capability. Award is directed toward those smaller public and private colleges and universities that provide undergraduate training for a significant number of the U.S. research scientists.
Exploratory/Developmental Research Grant (R21/R33) http://grants.nih.gov/grants/funding/r21.htm	**Exploratory/Developmental Research Grants** seek to broaden the base of inquiry in fundamental biomedical research by encouraging applications for research projects that involve an especially high degree of innovation and novelty. NIH provides pilot-scale support for potentially ground-breaking ideas and methods that meet the following criteria: they lack sufficient preliminary data for feasibility to be established, their successful demonstration would have a major impact on biomedical research, and they fall within the areas supported by the awarding I/C.
Small Business Innovation Research Grant (SBIR: R43/R44) **Small Business Technology Transfer Grant (STTR: R41/R42)** http://grants.nih.gov/grants/funding/sbir.htm	**SBIR and STTR grants** are made to eligible domestic for-profit small business concerns conducting innovative research that has the potential for commercialization.
Program Project Grant (P01)	**Program Project Grants** are more complex in scope and budget than the individual basic research (R01) grant. While R01s are awarded to support the work of one principal investigator who, with supporting staff, is addressing a scientific problem, program project grants are available to a group of investigators with differing areas of expertise who wish to collaborate in research by pooling their talents and resources. Program project grants represent synergistic research programs designed to achieve results not attainable by investigators working independently. Not all ICs accept P01 applications.
Research Center Grant (P50/P60)	**Research Center Grants** serve varying scientific and IC-specific purposes, but they have elements in common. The grants are multidisciplinary in scope and may focus more on an area or discipline of science than on a specific theme or goal. Independent investigators direct the projects and cores. Center grants offer a greater opportunity for scientific interactions and overall progress than with individually-funded projects. Not all ICs accept P50/P60 applications.
Scientific Meeting Support (R13) http://grants.nih.gov/grants/funding/r13/index.htm	NIH provides support for scientific meetings, conferences, and workshops that are relevant to its scientific mission. Any U.S. institution or organization, including an established scientific or professional society, is eligible to apply.

Sources of Federal Funding: The National Science Foundation

Overview and Organization (www.nsf.gov)

The National Science Foundation (NSF) is an independent federal agency (not part of PHS) created to promote the progress of science. It has an annual budget of 7.8 billion dollars, and is the funding source for 24% of all federally supported basic research conducted in US colleges and universities. NSF is the major source of federal support for research and education in most fields of science and engineering, including the social, behavioral and economic sciences. NSF does not fund clinical research nor most health-related research apart from that conducted in fields such as medical anthropology, medical geography or health economics.

NSF fulfills its mission by issuing limited-term grants. It receives approximately 40,000 proposals and currently makes about 11,000 new awards each year, with an average duration of three years. Most of these awards go to individuals or small groups of investigators. Others provide funding for research centers, instruments and facilities for cutting-edge research.

The agency does not operate laboratories or conduct intramural research itself but does support National Research Centers, user facilities, certain oceanographic vessels and Antarctic research stations. The Foundation also supports cooperative research between universities and industry, US participation in international scientific and engineering efforts, and educational activities at every academic level.

Most NSF funding opportunities are divided into broad program areas: biological sciences; computer and information sciences; education; engineering; geosciences; international; math and physical sciences; polar research; science statistics and methods; and social, behavioral and economic sciences. In addition, there are a number of interdisciplinary (cross-directorate) funding initiatives related to different themes. Examples of these include Coastlines and People (CoPe), Innovations at the Nexus of Food-Energy-Water (INFEWS), and Smart and Connected Communities (SCC).

As the organizational charts on the next page illustrate, the agency is divided into Directorates based on broad areas of science. Seven of these directorates (shaded in blue) have funding programs. The other two are administrative units. Directorates are then further divided into Divisions, which are divided into Programs or Sections. For example, the Directorate for Social, Behavioral and Economic Sciences is divided into 3 divisions and an office for multidisciplinary activities. Two of these divisions (shaded in blue), the Division of Behavioral and Cognitive Sciences and the Division of Social and Economic Sciences, are further divided into disciplinary-based programs that fund grants.

Applications for research grants are typically in response to specific program solicitations within each program area. These solicitations specify due dates, amount of funding, special requirements, etc. Some require letters of intent or pre-proposals, from which only the most meritorious applications are invited to submit a full proposal. Other programs are open competitions. General guidelines for submitting proposals may be found in the Proposal and Awards Policies and Procedures Guide (PAPPG), or publication NSF 19-01, which may be found at www.nsf.gov.

NSF Directorates
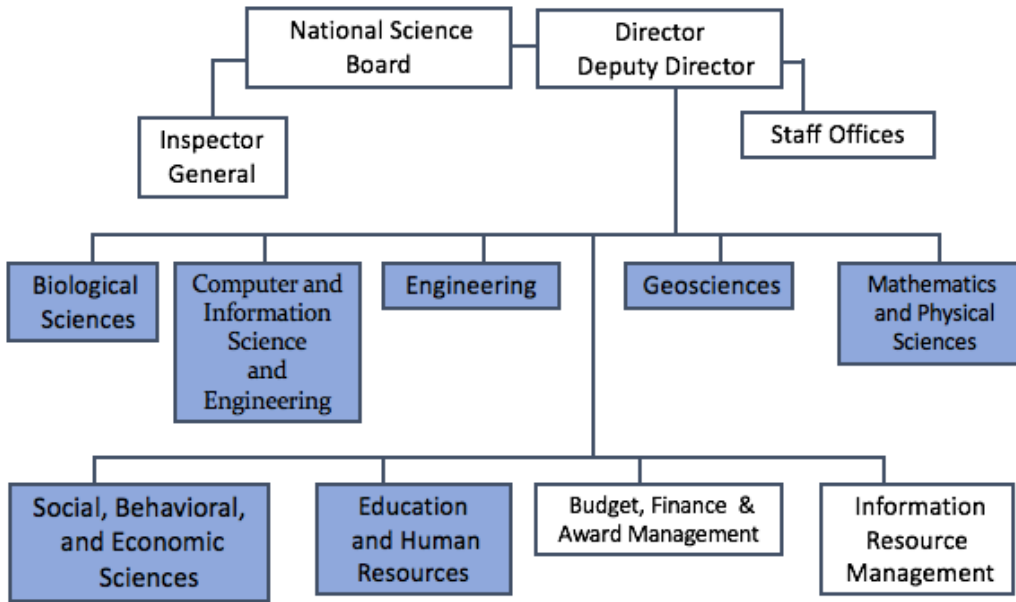
Directorate for Social, Behavioral and Economic Sciences (SBE)
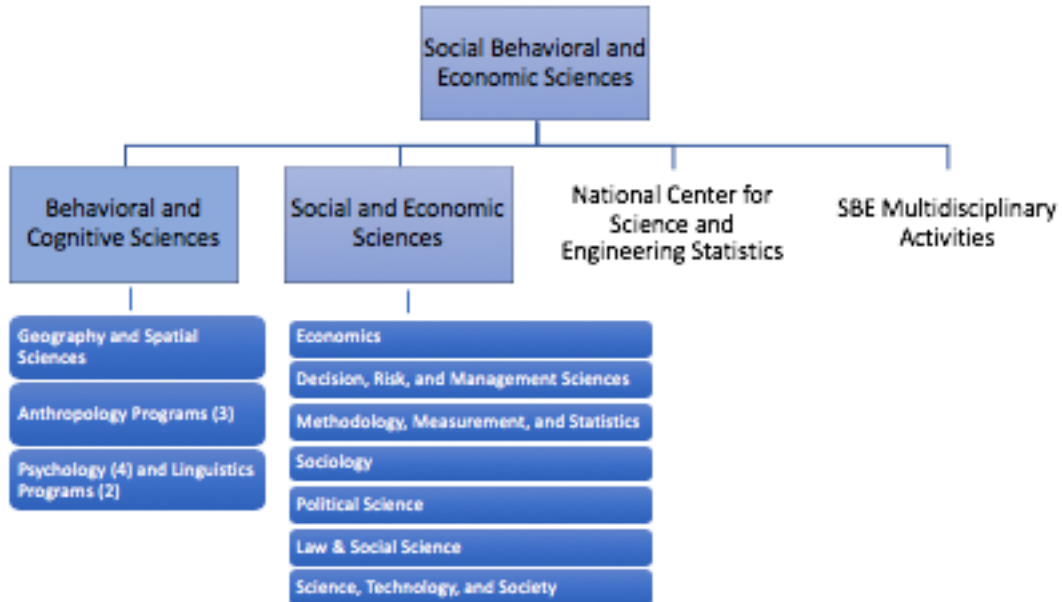
Graduate Research Fellowship Program (GRFP)

See https://www.nsfgrfp.org.

The NSF Graduate Research Fellowship Program (GRFP) provides three years of support (usable over five years) for graduate study leading to research-based master's or doctoral degrees and is intended for students who are at the early stages of their graduate study. This mechanism is only appropriate for students who are about to enter graduate school or are in their first year (see eligibility below). Students must be in science (including social science), technology, engineering, or mathematics. The funding ($46,000/year) covers stipend, tuition/fees, and a one-time travel grant. In 2018, NSF awarded 2000 fellowships from over 12,000 applications. It expects to award 1600 fellowships in 2019-20.

Eligibility: See the Graduate Research Fellowship Program Solicitation (for 2019, NSF 19-590) for complete eligibility requirements. Essentially, applicants must:

- Be a U.S. citizen, national, or permanent resident
- Intend to enroll or be enrolled full-time in a research-based graduate degree program in an eligible Field of Study in STEM or STEM education (See Appendix and Section IV.3 of NSF 19-590 for eligible Fields of Study)
- Have never earned a master's, professional, or bachelor's-master's degree in any field, unless (i) returning to graduate study after an interruption of two (2) or more consecutive years immediately preceding the deadline, and; (ii) are not enrolled in a graduate degree program at the application deadline

In addition:
- Undergraduate seniors and bachelor's degree holders may apply before enrolling in a degree-granting graduate program.
- Graduate students enrolled in a degree-granting graduate program are limited to only **one** application to the GRFP, submitted in the first year or at the beginning of the second year of their degree program.
- Individuals pursuing a master's degree simultaneously with the bachelor's degree (joint bachelor's-master's degree) must have completed three (3) years in the joint program and are limited to **one** application to GRFP; they will not be eligible to apply again as a doctoral degree student.

Application Process: Fellowship applications must be submitted by the student electronically using the Research.Gov NSF GRFP Application Module at: (https://www.research.gov/grfp/Login.do).

Applicants must first register at this website. Applications require official transcripts and three letters of recommendation. See the current program solicitation for complete instructions.

Doctoral Dissertation Research Improvement Grants (DDRI)

Several (not all) programs at NSF award Doctoral Dissertation Research Improvement (DDRI, aka DDRIG) grants to individuals working on their doctoral dissertations. The DDRI(G) program is designed to improve the quality of doctoral dissertation research by providing funds for items and activities not normally available to students through their universities, such as significant data-gathering projects or field research in off-campus settings. DDRI awards do not provide cost-of-living or other stipends or tuition, but they do provide travel costs, including accommodation expenses in settings away from campus or the student's normal place of residence.

Eligibility: Applicants do not have to be U.S. citizens or permanent residents, but they must be enrolled in a graduate program at a U.S. educational institution. Applicants need not have passed their qualifying exams at the time of application, but they should be ready to undertake the research at the time the award will be made (6-12 months after the proposal is submitted).

Note that unlike the GRFP, which is awarded to directly to individual students, DDRI grants are awarded to institutions, not directly to students. They must therefore be submitted via Fastlane or Research.gov by the institution, **not the student**, and students are advised to work with their designated institutional official, usually someone in the university grants and contracts office, to submit the proposal in keeping with institution rules, due dates, and procedures. Because awards are made to institutions, the doctoral advisor (or other appropriate faculty member) serves as the PI; the student is a Co-PI, but it is understood that the research will be conducted by the student.

The following programs with the SBE Directorate award DDRI grants with *approximate* deadlines (based on 2018-19; **check the specific program solicitation for exact deadlines**):

Archeology – Open deadline
Biological Anthropology – January 22 and July 20
Cultural Anthropology – January 15 and August 15
Decision, Risk, and Management Sciences – January 18 and August 19
Documenting Endangered Languages – Open
Economics – January 18 and August 19
Geography & Spatial Sciences – Open
Law and Social Science – January 15
Linguistics – January 15 and July 15
Methods, Measurements and Statistics – January 31 and August 29
Political Science – June 17
Science, Technology and Society – August 3
Science of Science Innovation and Policy – February 11 and September 9
Sociology – October 29 (Spring competition by invitation only)

Note: *The Psychology programs at NSF do not award DDRI grants.*

Sources of Federal Funding: The National Institute of Justice (NIJ)

Overview and Organization (https://nij.ojp.gov)

The National Institute of Justice (NIJ) is the research, development and evaluation agency of the U.S. Department of Justice. Its mission is to improve knowledge and understanding of crime and justice issues through science. It provides objective and independent knowledge and tools to inform the decision-making of the criminal and juvenile justice communities to reduce crime and advance justice, particularly at the state and local levels.

The NIJ is led by a presidentially-appointed director and is organized into six offices: the Office of the Director, two science offices, and three support offices. The two science offices are the Office of Investigative and Forensensic Sciences, which seeks to improve the quality and practice of forensic science, and the Office of Research, Evaluation, and Technology, which supports research, development and evaluation to further understanding of the causes and correlates of crime and violence; methods of crime prevention and control; and criminal justice system responses to crime and violence. Each of the science offices is composed of scientists from specific groups of scientific disciplines — social and behavioral scientists, forensic scientists, and physical scientists and engineers.

NIJ awards grants and cooperative agreements for various research, development, and evaluation projects; forensic laboratory enhancement activities; and fellowship programs. It funds physical and social science research, development and evaluation projects about criminal justice through competitive solicitations. The focus of the solicitations varies from year to year based on research priorities and available funding.

Graduate Research Fellowship Program

The NIJ Graduate Research Fellowship (GRF) program supports doctoral students engaged in research that advances NIJ's mission. The goal of the program is to increase the pool of scholars engaged in research that addresses the challenges of crime and justice in the United States. The program has two tracks:

- Social and Behavioral Sciences
- Science, Technology, Engineering and Mathematics (STEM)

The Graduate Research Fellowship in the Social and Behavioral Sciences track is open to doctoral students in all social and behavioral science disciplines. The Science, Technology, Engineering and Mathematics track includes physical anthropology and cognitive science in addition to life sciences, physical sciences, engineering and mathematics science disciplines. In the past the fellowship awards provided support for 12 months. As of Fiscal Year (FY) 2019, the NIJ extended the award to three years of support usable over a five-year period. With the expanded award period, the NIJ increased the award amount from a maximum of $32,000 to $150,000.

Applications for NIJ funding must be submitted through Grants.gov. The NIJ website contains a lot of useful information on the proposal submission process and how to build your proposal as well as sample applications. See https://nij.ojp.gov/funding/guidance-applicants-and-awardees#sampleapps and https://ojp.gov/grants101/writeproposal.htm for more information.

NIJ's Research Assistantship Program

The NIJ Research Assistantship Program offers highly qualified doctoral students the opportunity to obtain practical and applied research experience. Research assistants are "full-time graduate research assistants" nominated by their universities and approved by NIJ. They work 20 to 30 hours per week on either a 9.5- or 12-month appointment. RAs work primarily at the NIJ office in Washington, DC and perform a range of research-related duties. Sometimes works is conducted in the field, such as during data collection efforts.

Applications are welcome from students across academic disciplines who wish to connect their research to the criminal justice field. Candidates must be enrolled in a research-based doctoral-degree program at a public or private university and be working towards a doctoral degree throughout the research assistantship period of performance.

NIJ provides funds to participating universities to pay salaries, health insurance, and tuition remission. Universities recommend doctoral students for research assistant positions supported by NIJ. The university's recommendation(s) are submitted by the Graduate Development Program to the NIJ RAP manager. Candidates must provide a Statement of Interest (1000 words), a Public Safety Challenge Essay, a resume/CV, unofficial copies of transcripts, one letter of recommendation, three contacts for reference checks, and a writing sample of a scientific paper. Applications are typically due in mid-January for placements in September. The due date in 2020 is January 15th. More information may be obtained at: https://nij.ojp.gov/funding/nijs-research-assistantship-program.

Other Sources of Private and University Grant and Fellowship Support

Private organizations (such as foundations and research community membership organization) and universities provide a range of opportunities, including awards for predoctoral, dissertation, and postdoctoral research and training. Dissertation research grants and fellowships provide financial support to doctoral students who are in the stages of conducting research and writing their dissertation. Funding can be used to support travel, field work, supplies, language training, and sometimes even living expenses. Some private organizations limit funding to specific groups of individuals (women, ethnic minorities, economically disadvantaged students) or to specific areas of focus that are of interest to the organization (e.g., a particular world region; mental health; child welfare). University support typically is limited to students at that university, although some postdoctoral programs are open to students who have completed their doctoral degree elsewhere. The following are examples of some of the grants and fellowships that are available.

Ford Foundation Fellowship Program
http://sites.nationalacademies.org/pga/fordfellowships/index.htm

The Ford Foundation Fellowships are designed to increase the diversity of the nation's university faculties by increasing ethnic diversity, maximizing the benefits of diversity, and encouraging faculty to use diversity as a resource for enriching student education. The program awards approximately 70 predoctoral fellowships, 36 dissertation fellowships, and 20 postdoctoral fellowships. Predoctoral fellowships provide three years of support for individuals engaged in graduate study leading to a Doctor of Philosophy (Ph.D.) or Doctor of Science (Sc.D.) degree. Dissertation fellowships provide one year of support to individuals working to complete a dissertation leading to a PhD or ScD degree; and postdoctoral fellowships provide one year of support for individuals engaged in postdoctoral study after the attainment of the PhD or ScD degree.

Harry F. Guggenheim Dissertation Fellowship http://www.hfg.org/df/guidelines.htm

In addition to support for postdoctoral research, the foundation awards ten or so dissertation fellowships of $20,000 each year to graduate students who would complete the writing of a dissertation within the award year. The fellowships are designed to support the writing of a dissertation in a timely manner, not doctoral research. Applicants may be citizens of any country and studying at colleges or universities in any country. Questions that interest the foundation concern violence and aggression in relation to social change, intergroup conflict, war, terrorism, crime, and family relationships, among other subjects. Dissertations with no relevance to understanding human violence and aggression will not be supported. Priority will also be given to areas and methodologies not receiving adequate attention and support from other funding sources.

Haynes Lindley Doctoral Dissertation Fellowship http://haynesfoundation.org/program/index.asp

Doctoral Dissertation Fellowships are awarded on an annual basis to graduate students enrolled at institutions which grant the Ph.D. degree in the social sciences in the greater Los Angeles area (i.e., the California Institute of Technology, the Claremont Graduate University, the University of California, Los Angeles, the University of California, Irvine, the University of California, Riverside, and the University of

Southern California). The fellowships are competitive and are awarded to students whose dissertation proposals have been approved and which address economic, social, policy or political problems of the Los Angeles area.

AAUW American Dissertation Fellowships https://www.aauw.org/what-we-do/educational-funding-and-awards/american-fellowships/af-dissertation-application/

The American Association of University Women (AAUW) provides a number of opportunities for women at various stages of their careers. Programs support both US citizens/permanent residents and international students who are not citizens or permanent residents. The American Dissertation Fellowship program provides fellowships for women pursuing full-time study to complete dissertations, conducting postdoctoral research full time, or preparing research for publication for eight consecutive weeks. The purpose of the Dissertation Fellowship is to offset a scholar's living expenses while she completes her dissertation.

American Bar Foundation Doctoral Fellowships in Law and Inequality http://www.americanbarfoundation.org/research/Fellowshipopportunities/LawAndInequalityFellowshipsProgram.html

The purpose of this fellowship is to encourage original and significant empirical and interdisciplinary research on the study of law and inequality. Fellows receive a stipend of $35,000 per year for up to two academic years in addition to a modest research account to reimburse expenses related to research or travel to meet with advisor or to conferences. Fellowships are held in residence at the ABF. Doctoral research must be in the general area of socio-legal studies or involve social scientific approaches to the law, legal institutions, legal processes, or social justice. The research must address significant issues in the field and show promise of a major contribution to social scientific understanding of law and inequality. Students from underrepresented minority groups are especially encouraged to apply.

Mellon/ACLS Dissertation Completion Fellowship https://www.acls.org/Competitions-and-Deadlines/Mellon-ACLS-Dissertation-Completion-Fellowships

This fellowship supports a year of research and writing to help advanced graduate students in the humanities and related social sciences in the last year of PhD dissertation writing. It provides a stipend of $35,000 plus funds to cover research costs up to $3000. In addition to the monetary support provided, fellows may apply to participate in a seminar of preparing for the academic job market.

The Paul and Daisy Soros Fellowship for New Americans https://www.pdsoros.org

The Paul & Daisy Soros Fellowships for New Americans program provides funds to support the graduate education of approximately 30 "new Americans" (immigrants or children of immigrants) each year who are poised to make significant contributions to US society, culture or their academic field. Each Fellow receives up to $90,000 in financial support over two years.

American Psychology Association (APA) Minority Fellowship Program (MFP) http://www.apa.org/mfp

The APA MFP is a mentoring and career development program that aims to enhance the psychological and behavioral outcomes of ethnic minority communities. MFP is committed to increasing the number of

ethnic minority professionals in the field and advancing understanding of the life experiences of ethnic minority communities. It offers programs for both pre-doctoral and postdoctoral scholars, including fellowships and a summer institute.

NAEd Spencer Dissertation Fellowships
https://www.spencer.org/grant_types/dissertation-fellowship

This fellowship program supports the research training of promising doctoral students from a wide range of disciplines, taking up research relevant to the improvement of education. Funded by Spencer, but administered through the National Academy of Education, the $27,500 fellowships support individuals whose dissertations show potential for bringing fresh and productive perspectives to the history, theory, analysis, or practice of formal or informal education anywhere in the world.

The Robert and Patricia Switzer Foundation **http://www.switzernetwork.org/become-fellow**

This foundation awards Switzer Environmental Fellowships to highly talented graduate students in New England and California. The Fellowship includes a $15,000 cash award for academic studies, two multi-day leadership development trainings, and membership in the Switzer Fellowship Network. Approximately twenty fellowships are awarded to assist graduate students in a broad range of environmental science and related fields.

SSRC International Dissertation Research Fellowship **https://www.ssrc.org/fellowships/view/idrf-fellowship/**

This fellowship offers 9-12 months of support to graduate students in the humanities and humanistic social sciences who are enrolled in PhD programs in the United States and conducting dissertation research on non-US topics. Fellowships vary in size but average $23,000 and include participation in an SSRC-funded interdisciplinary workshop.

University of California President's Postdoctoral Fellowship Program **https://ppfp.ucop.edu/info/**

The University of California established a postdoctoral fellowship program in 1984 to encourage outstanding women and minority PhD recipients to pursue academic careers at the University of California. The current program offers postdoctoral research fellowships, professional development and faculty mentoring to outstanding scholars in all fields whose research, teaching and service will contribute to diversity and equal opportunity at UC.

In addition to these programs, the website 30 Dissertation Research Fellowships (https://www.profellow.com/fellowships/30-dissertation-research-fellowships-for-doctoral-students/), lists information and links for the following (among many others):

- World Politics and Statecraft Fellowship (Smith Richardson Foundation)
- Kauffman Dissertation Fellowship (Kauffman Foundation)
- Jennings Randolph (JR) Peace Scholarship Dissertation Program (US Institute of Peace)
- American Educational Research Association (AERA) Dissertation Grant
- Mellon-CES Dissertation Completion Fellowships in European Studies
- Mellon International Dissertation Research Fellowship (IDRF)
- Charlotte W. Newcombe Doctoral Dissertation Fellowships

- The Woodrow Wilson Dissertation Fellowships in Women's Studies Lowell Harris Dissertation Fellowship Program
- National Academy of Education/Spencer Dissertation Fellowship Program
- Chateaubriand Fellowship – Humanities and Social Sciences (research in France)
- Title VIII Research Scholar Program (research in Central Asia, Russia, South Caucasus, Ukraine, Southeast Europe and Moldova)
- IAF Grassroots Development PhD Fellowship Program (Latin America and Caribbean)
- Doris Duke Fellowships for the Promotion of Child Well-Being
- History of Science Fellowships (Beckman Center for History of Chemistry) – wide range of disciplines across humanities and social sciences
- Josephine De Karman Fellowships
- Health Policy Research Scholars

Writing Successful Proposals

There are several components to a strong grant application. First, the subject must be creative, exciting, and worthy of funding. Then, the project must be developed through a rigorous, well-defined research plan. Finally, you must make sure that the information is presented in clear language and that your application follows the rules and guidelines detailed in the grant application.

Some "Rules" for Writing Successful Grant Proposals

Adapted from Hapke, H.M., "Writing Successful Grant Proposals: A few 'rules' to guide your effort" IN: Orr, Shannon and Zavattaro, Staci (Eds), Reflections on Lives and Careers in Academia. Palgrave MacMillan, 2017.

Rule #1: Give yourself plenty of TIME. - Writing a successful grant proposal requires a lot of preparation and care, and you will want to make sure you have sufficient time to adequately prepare a solid proposal. This is particularly important since funding success rates at many agencies are remarkably low as a result of strong competition and limited funds.

Rule #2: Purposefully target appropriate funding agencies and do your proposal preparation homework. - A wide variety of funding agencies and organizations exists in both the public and private sphere. Some of these have broad interests; others are more focused. It is important to understand the mission, priorities, and strategic objectives of the agencies that may support your research and to address those in your proposal. Gather information about the organization you are targeting. Carefully read proposal solicitations and review lists of recent awards. Show how your project will contribute to advancing the funder's priorities. If you apply to multiple agencies or organizations to fund the same project, make sure you rework the proposal to fit each agency. Do not write a proposal with one agency in mind and then submit the exact same proposal to another agency that may be appropriate but have a different orientation.

Rule #3: Design a research project with significance and intellectual merit. - A strong research proposal starts with compelling research questions that address a significant problem and will yield results that advance knowledge in a potentially transformative way. Questions to ask yourself include: Why is this an important problem? Who is likely to find the research interesting or useful? Does this interest community align with those served by the targeted funding agency? What is the current state of knowledge about this problem, and how will your research build on and contribute to this body of knowledge? What methods are most suitable for investigating this problem? Generally, the most competitive proposals are those that will make a significant contribution to one or more disciplines or will be broadly applicable to a social problem or issue. If your research topic and questions are appealing to only a small number of people or have limited relevance outside a particular disciplinary subfield, a proposal on that topic may not be very successful in a funding agency or organization interested in broad issues.

Rule #4: Prepare and submit a well-written strong, solid proposal. - First, read the proposal guidelines and adhere to formatting requirements. Second, make sure you understand the review

criteria, the review process and who the audience of reviewers will be: disciplinary specialists, disciplinary generalists, or reviewers from multiple disciplines? Try to think like a reviewer, and speak to your audience! Minimize the use of jargon and overly technical language. Provide clear statements of expected outcomes and contributions. Demonstrate awareness of the possible limitations of your planned approach and indicate how you will account for these limitations. Finally, edit the proposal for spelling and grammatical errors. Ask colleagues from both within and outside your discipline to read the proposal to ensure it is easily comprehended and presents a compelling case.

Rule #5: If at first you don't succeed, REVISE and submit again. - Although it is easy to get discouraged (or angry) when a proposal fails to be awarded, a decline does not necessarily mean the idea was not good or the project is not worth pursuing. Respect the review process and bear in mind that a lot of worthy proposals do not get funded due to limited funds or other kinds of constraints. Read reviews and other forms of feedback carefully. Seek out additional information from grant program personnel about what the proposal's shortcomings were and what the prospect might be for reworking and submitting a new proposal. Then re-work the proposal in a way that accounts for and addresses the shortcomings or weaknesses identified by reviewers.

General strategies for successful proposals

Identifying appropriate funding sources and grant mechanisms. To write a successful grant application for any agency or foundation, you first need to understand the granting philosophy, mission, and guidelines of the funding agency *and* the specific requirements for the particular grant mechanism you are applying for. So the first questions you should ask are: a) Is this an appropriate agency for my proposal? B) Is this the appropriate funding mechanism for my proposal?

Read carefully the mission of the agency and guidelines for submissions. For instance, NIH and CDC have as a primary goal the improvement of public health. If your planned research has health implications (and falls within the purview of the institutes or centers of the agency), then these agencies are appropriate. The National Science Foundation's mission is to support *basic science* research, but it does not fund clinical research. While it funds research that falls within medical anthropology or medical geography, it generally does not fund health-related research. It is also important that your proposed project also matches the guidelines of the particular funding mechanism. For instance, if you are applying for fellowships emphasizing diversity (e.g., Ford Foundation fellowships), then it is important that your background and proposed research address these issues. When in doubt, contact that program officer to review what you plan to propose.

Convincing reviewers of the merits of your proposal. Proposal are also typically reviewed by a panel or group of scholars who are reasonably knowledgeable about the research area of your proposal. The peer review system evaluates each project for its merit – agencies do not give money to investigators simply because they are established or well known. In general, the scientific quality of a project is the factor that determines whether it is funded. Consider reviewers to be "informed strangers". A primary function of your proposal is to persuade the review group that what plan to do stands out in terms of conceptual innovation, methodological rigor, and substantive content. Remember that the review group has to choose among or rate many highly competitive proposals. Reviewers also can't read your mind – if you don't write it in the proposal, they won't know about it. Don't make reviewers have to infer what you

mean or intend to do. You must provide enough detail to convince them your research questions and hypotheses are sound and important, your aims are logical and feasible, you understand potential problems, and you are able to properly analyze the data.

The typical peer reviewer:
- has a breadth and depth of knowledge, experience, and wisdom and a vested interest in ranking the applications in an unbiased, fair, scientifically rigorous way, knowing that the interests of the scientific community are served by giving the best scores to those grants that are most likely to contribute to our body of knowledge.
- may not be extremely familiar with all techniques used in a grant, or may have used the techniques, but does not have experience with the specific pursuit found in the grants under review. All parts of the grant must therefore be clear and written in such a way that a non-expert can understand them.
- may not know the applicant personally, or feel comfortable with his or her level of independence, knowledge of the field, ability to design experiments with appropriate controls, ability to decide what to do if proposed experiments don't work out, etc. It is the job of the applicant to convince the reviewer.
- may not fully understand the significance of the research area without a clear, compelling argument presented in the application.
- is capable of understanding and interpreting preliminary data if well-presented. These data must therefore be appropriate for support of the proposed science.
- must read 10 to 15 applications in great detail and form an opinion about all of them. The successful application is clear and precise, is easy to read, has a detailed experimental design section, and is free of typographical and other errors.

Basic questions reviewers ask about research proposals:

- How high are the intellectual quality and merit of the study?
- What are we going to learn as a result of the proposed project that we do not already know, i.e., what is its potential impact, and why is it worth knowing?
- How novel is the proposal? If not novel, to what extent does potential impact overcome this lack? Is the research likely to produce new data and concepts?
- Is the hypothesis valid, and is there evidence to support it?
- Are the goals or aims logical?
- Are the procedures appropriate, adequate, and feasible for the research?
- Is the investigator qualified to conduct the research?
- Are the facilities adequate and the environment conducive to the research?

Additional questions reviewers ask about training plans:

- Is the training plan distinct from the regular course of graduate study?
- Is the training plan feasible, i.e., can it be accomplished within time, funding and geographic constraints?
- Will the training plan contribute significantly to the applicant's academic career?
- Is there appropriate coordination between research and training components?

Writing the proposal. Writing a grant or fellowship proposal is different from writing up the results of research. A major difference is that the proposal details what you plan to do, rather than reporting on work already completed. You must take care to communicate effectively through clear and concise writing. Well-written proposals are organized, direct, concise, and carefully crafted to address the guidelines in the application. It is helpful to have several objective experts review your proposal before you submit it.

Writing Tips

- Prefer the active rather than the passive voice. For example, write "We will develop a cell line," not "A cell line will be developed."
- Keep related ideas and information together, e.g., put clauses and phrases as close as possible to - preferably right after the words they modify.
- Simplify and breakup long, involved sentences and paragraphs. In general, use short simple sentences; they are much easier on the reader. Your goal is communication, not literature.
- Edit out redundant words and phrases. Edit and proofread thoroughly. Look carefully for typographical and grammatical mistakes, omitted information, and errors in figures and tables. Sloppy work will definitely suffer in review. Reviewers feel that if the application is sloppy or disorganized, the applicant's research may be as well.

Writing an Application for a Research Project Grant

The sections below are primarily based on a typical NIH research project grant proposal (R01) but are applicable to other research proposals. They are based on information from nih.gov.

Title
- Make your title specific and detailed. If your application is a revision, do not change the title. For NSF proposals avoid "clever" or "cutesy" titles.
- Stay within the 56-character limitation (which includes spaces between words).

Developing the Research Questions and Hypothesis

- Most reviewers feel that a good grant application is driven by a strong set of research questions and, in the case of experimental research, a strong hypothesis. Your research questions and/or hypothesis are the foundation of your application. Make sure they are solid. They must be important to the field, and in hypothesis-driven research, you must have a means of testing it.
- Provide a rationale for the hypothesis. Make sure it's based on current scientific literature. Consider alternative hypotheses. Your research plan will explain why you chose the one you selected.
- A good hypothesis should increase understanding of biologic processes, diseases, treatments and/or preventions.
- Your proposal should be driven by one or more hypotheses, not by advances in technology (i.e., it should not be a method in search of a problem). Also, avoid proposing a "fishing expedition" that lacks solid scientific basis.
- State your hypothesis in both the specific aims section of the research plan and the abstract.

Developing Your Methodology and Research Plan

A scientifically valid methodology and top-quality research plan are the most important factor determining your application's success in peer review. As with a scientific publication, developing your ideas is key. Read the grant application kit carefully for specific elements to be included in the research plan.

Before proceeding into specific sections of the plan, here are some general tips:

- Your application should be based on innovative research questions and, if appropriate, a strong hypothesis.
- Be sure your project has a coherent direction.
- Keep the sections of the plan well-coordinated and clearly related to the central focus.
- Emphasize mechanism: A good grant application asks questions about biological mechanisms.
- Don't be overly ambitious - your plan should be based on a feasible timetable.
- Specific aims and experiments should relate directly to the hypothesis to be tested.
- The RO1 total page length *must be 12 pages for the whole proposal.*

A. Specific Aims (Should include 2-4 aims)

- Your specific aims are the objectives of your research project, what you want to accomplish. The project aims should be driven by the hypothesis you set out to test. Make sure they are highly focused.
- Begin this section by stating the general purpose or major objectives of your research. Be sure all objectives relate directly to the hypothesis you are setting out to test. If you have more than one hypothesis, state specific aims for each one. Keep in mind your research methods will relate directly to the aims you have described.
- State alternatives to your hypothesis and explain why you chose the one (or more) you selected.
- Choose objectives that can be easily assessed by the review committee. Do not confuse specific aims with long-term goals.

(An excellent resource: NIH Grant Applications: The Anatomy of a Specific Aims Page. https://www.biosciencewriters.com/NIH-Grant-Applications-The-Anatomy-of-a-Specific-Aims-Page.aspx)

B. Background and Significance

- Keep the statement of significance brief. State how your research is innovative, how your proposal looks at a topic from a fresh point of view or develops or improves technology.
- Show how the hypothesis and research will increase knowledge in the field. Relate them to the longer-term, big picture scientific objectives and to the betterment of public health.
- Justify your proposal with background information about the research field that led to the research you are proposing. The literature section is very important because it shows reviewers you understand the field and have a balanced and adequate knowledge of it.
- Use this opportunity to reveal that you are aware of gaps or discrepancies in the field. Show familiarity with unpublished work, gained through personal contacts, as well.
- Identify the next logical stage of research beyond your current application.

C. Preliminary Studies/Progress Report

By providing preliminary data, this extremely important section helps build reviewers' confidence that you can handle the technologies, understand the methods, and interpret results.
- Preliminary data should support the hypothesis to be tested and the feasibility of the project.
- Explain how the preliminary results are valid and how early studies will be expanded in scope or size.
- Make sure you interpret results critically. Showing alternative meanings indicates that you've thought the problem through and will be able to meet future challenges.
- Preliminary data may consist of your own publications, publications of others, unpublished data from your own laboratory or from others, or some combination of these.
- Include manuscripts submitted for publication.

D. Research Design and Methods

Describe the experimental design and procedures in detail and give a rationale for their use. Organize this section so each experiment or set of experiments corresponds to one of your specific aims and is stated in the same order. Even holding to this structure, the experiments still must follow a logical sequence. They must have a clear direction or priority, i.e., the experiments should follow from one another and have a clear starting or finishing point.

Convince reviewers that the methods you chose are appropriate to your specific aims, that you are familiar with them, and that, unless innovative, they are well established. If your methods are innovative, show how you have changed existing, proven methods while avoiding technical problems. Also, describe why the new methods are advantageous to the research you propose to do.

More and more applicants are including colored charts, graphs, and photographs in their applications. If you must use color to get your point across, it is wise to also place a copy of the item in an appendix, noting this in the body of the text. (However, do not put important figures only in the appendix, or overly-reduced figures in the body of the application with enlargements in the appendix. The Research Plan must be self-contained. The appendix should not be used to circumvent the Research Plan page limits.) Many applicants are not aware that most of the study section members receive only black and white photocopies of their original application. However, assigned reviewers do receive originals of the appendices (which is why five copies are requested) and usually receive original copies of the application as well.

Approach

- State why you chose your approach as opposed to others.
- If you are choosing a nonstandard approach, explain why it is more advantageous than a conventional one. Ask yourself whether the innovative procedures are feasible and within your competence.
- Call attention to potential difficulties you may encounter with each approach. Reviewers will be aware of possible problems; convince them you can handle such circumstances. Propose alternatives that would circumvent potential limitations.
- Consider the limitations of each approach and how it may affect your results and the data generated.
- Spell it out in detail. While you may assume reviewers are experts in the field and familiar with current methodology, they will not make the same assumption about you. It is not sufficient to state, "We will grow a variety of viruses in cells using standard in vitro tissue culture techniques." Reviewers want to know which viruses, cells, and techniques; the rationale for using the particular system; and exactly how the techniques will be used. Details show you understand and can handle the research.
- Make sure any proposed model systems are appropriate to address the research questions and are highly relevant to the medical problem being modeled.

Results

- Show you are aware of the limits to - and value of - the kinds of results you can expect based on current knowledge of the subject. State the conditions under which the data would support or contradict the hypothesis and the limits you will observe in interpreting the results.
- Show reviewers you will be able to interpret your results by revealing your understanding of the complexities of the subject.

- Many applications benefit from statistical analysis. The early involvement of a statistician to determine the amount of data to collect and the methods for analyses will favorably impress reviewers.
- Describe your proposed statistical methods for analyzing the data you plan to collect. Define the criteria for evaluating the success or failure of a specific test.

E. Human Subjects

Assuring NIH human subjects are protected is a key responsibility of the applicant, in concert with the applicant's institution. Awards cannot be made until assurances are on file here. If your proposed research does not involve human subjects, indicate this by noting "Not applicable in this section of the 398." Anyone reading your application will know immediately you have not just forgotten to complete this section. If your proposed research involves human subjects or samples from human subjects, read carefully and follow the Human Subjects Research section of the PHS 398 instructions. Include enough information so reviewers have no questions about what you propose to do. In addition, your research plan must be certified by your institution's institutional review board (IRB) prior to funding (unless exempt). Though IRB approval is not required at the time of application, you should start the process early because revisions and final approval can take time. Before an application can be funded, a Human Subjects Assurance must be on file with the Office of Human Research Protections. Contact OHRP or your institutions grants and contracts office for details and help.

F. Vertebrate Animals

If the proposed research involves vertebrate animals, your project must be reviewed and approved by an institutional animal care and use committee (IACUC) prior to review, and an Animal Welfare Assurance must be on file with the Office of Laboratory Animal Welfare. See the instructions for item 5 of the face page of PHS 398 for further details. For more information, contact OLAW or your institution's grant or contracts office.

G. Literature Cited

Refer to the literature thoroughly and thoughtfully but not to excess. The publications you cite need not be exhaustive but should include those most relevant to your proposed research. Research proposals typically do not fare well when applicants fail to reference relevant published research, particularly if it indicates that the proposed approach has already been attempted or the methods found to be inappropriate for answering the questions posed. Each citation must include the names of all authors (not et al.), name of the book or journal, volume number, page numbers (not first page only), and year of publication.

Common Mistakes in Research Grant Proposals

The categories below are specific to the PHS 398 research grant format but are applicable as general guidelines. In other words, although the format for grant applications may vary, most include some reference to significance of the work, aims or goals, research methods and data analysis, qualities of the application or investigator, and support from the institution.

Problems with significance:

- Not significant nor exciting nor new research
- Lack of compelling rationale
- Incremental and low impact research

Problems with specific aims:

- Too ambitious, too much work proposed
- Unfocused aims, unclear goals, listing of activities rather than research objectives

Problems with (experimental) approach:

- Too much unnecessary experimental detail
- Not enough detail on approaches, especially untested ones and data analysis
- Not enough preliminary data to establish feasibility
- Feasibility of each aim not shown
- Little or no expertise with approach
- Lack of appropriate controls
- Not directly testing hypothesis
- No discussion of interpretation of data

Writing an Application for an F31 Fellowship

The NIH F31 fellowship provides an example of funding for graduate students that combines support for both research and training. Accordingly, many of the criteria listed above for a research project grant are applicable to an F31 fellowship. The research proposal typically is the dissertation project, although the proposed research can go beyond the dissertation (or be in addition to the dissertation). It is understood that the applicant is a beginning scholar, and the committee evaluates the overall quality of the entire application. A common mistake that applicants make is that they do not adequately develop the training plan and/or link it to the proposed research. It is extremely important that the training plan be distinct from the regular graduate course of study and contribute significantly to the applicant's career development.

The NIH review of F31 applications focuses on four substantive areas (candidate, research training plan, sponsor, institutional environment/commitment), a general summary and recommendation, and review of inclusion, monitoring, and human subject protections. These areas are reviewed according to criteria described below.

Candidate: The objective of this section is to provide a concise assessment of the candidate's potential to become a productive researcher. Evaluation focuses on undergraduate and graduate performance (grades), prior and current research experience, publications, presentations at conferences and meetings, and comments by the sponsor and other referees.

Research Training Plan: The objective of this section is to assess both the proposed research and the adequacy of the training plan. The quality and significance of the proposed research is evaluated in terms of the theoretical underpinnings of the proposed work and the strengths and weaknesses of the research design. The training plan is evaluated in terms of linkages between objectives and proposed coursework and other advanced training (e.g., seminars, institutes, etc.). It is also evaluated in terms of connections with the proposed research, i.e., whether there is appropriate coordination between the research and training components. Further, the gender, minority, child inclusion, and human subjects' compliance are assessed.

Sponsor: The objective of this section is to assess the appropriateness of the sponsor, his/her record of working with doctoral candidates, and her/his research record, publications, and overall stature in the field. Although there are some clear advantages to having more senior faculty as sponsors, the review committee considers the sponsor's research trajectory, such that more junior faculty are reviewed favorably if they have an ongoing and productive research agenda. The sponsor should also demonstrate clear commitment to the candidate's training goals.

Institutional Environment/Commitment: The objective of this section is to assess whether the sponsoring institution (university) will provide resources needed to carry out the proposed research and training (e.g., lab space, computer time, facilities).

Common Mistakes in Fellowship Applications

Problems with the candidate:

- Poor academic record (low grades, few scholarly awards)
- Lack of clear focus or potential to become a productive research scientist
- Letters of recommendation are not very enthusiastic or supportive

Problems with the research training plan:

- Proposed research is vague, not clearly defined
- Overly ambitious, too much work proposed
- Weak methodology
- Proposed training does not significantly add to regular graduate training
- Training plan and research plan are not connected

Problems with the sponsor:

- Low commitment to candidate's proposed research and training
- Weak research record and few publications
- Commitment of sponsor cannot be overestimated – this is very important!

Problems with the institutional environment/commitment

- Low commitment to candidate; few resources available or provided. This is very important!!

The Submission, Review and Resubmission Process

Submitting an application for funding. Preparing an application for submission is a time-consuming process that requires utmost attention to detail. Writing a high-quality proposal narrative is essential; however, there are many other aspects of proposal preparation and submission that must be carefully carried out. Be sure to pay attention to proposal page length (double- or single-spaced?), font size, margins, deadlines for submission (mailing or receipt date?), format of your biosketch or CV, what should be included in the text versus what should be in the appendices, and other details.

Most funding agencies require online submission. You can get help with preparation of the required forms, procedures, etc., from your department and/or your research grants and contracts office. Talk to them and find out how they can help you. Also, don't be intimidated about contacting the funding agency for additional information.

Submission dates vary by agency and within agencies and depend on the specific funding mechanism or program. Some agencies have regular cycles. Program announcements and special funding requests often have different deadlines. Remember, deadlines are firm (and they often change)!

The review process. The review process varies across funding agencies and organizations. For example, foundations typically assign reviewers to read and write a review of your proposal. In some cases, reviewers meet and discuss applications while in other cases they are sent to the foundation and evaluated by a specific committee. Applications to federal agencies are reviewed either by individual (ad-hoc) reviewers or by review committees or panels. For NIH, you may request a specific committee in a cover letter when you submit your proposal. For NSF, the advisory panel for the program you submit your proposal to will usually review the proposal. Many governmental agency committee rosters are posted on the agency's website (NIH is posted, NSF is not). The timeframe for the review process varies as well. Typical turnaround time for federal agencies is 8-10 months. In most cases, you will receive detailed reviews either via email or through the agency's submission portal (for NSF proposals, these are available by logging into Fastlane). Reading these reviews is very important for improving your proposal for a resubmission (when allowed).

The resubmission process. It may take some time for you to look at your reviews and cope with any emotional reactions. Then the task of revision begins. Guidelines for revisions (number of times allowed, etc.) vary across agencies and programs within agencies, so be sure to check these before your revise and resubmit. If you do decide to resubmit a revised application, be sure to address all reviewer concerns. Be diplomatic and polite – if you differ in your opinion, try to courteously convince the reviewers of your point of view (with justifications). Also, pay attention to updating or improving your application in response to new developments in our field. You may get the same reviewers for the revision, but you may also get different reviewers who may have different concerns. There may be a mechanism for highlighting revisions (for instance by using italics) and an opportunity to briefly summarize the revisions you have made. But, this varies across agency so it's important to pay close attention to the guidelines for revisions. Remember, very few proposals get funded the first time they are submitted. **PERSEVERANCE IS ESSENTIAL!**