

Diane Darling

From: incomingclass-bounces@mailman2.u.washington.edu on behalf of MaryEllin Robinson [maryell@u.washington.edu]
Sent: Monday, August 01, 2011 11:23 AM
To: incomingclass@uw.edu
Subject: [Incomingclass] MCB - Yes - Homework!
Attachments: GRFP_2010_Personal_Statement.pdf; bicexamples.pdf; GRFP2010_Previous_Research.pdf; 1-2CMW_NSFGRFP_PreviousResearchExperience.pdf; 1CMW_NSFGRFP_PersonalStatement.pdf; Untitled attachment 00086.txt; ATT00508.txt

Hello Incoming Class of 2011,

At the end of every academic year, the Director's meet with the 1st year class for an overview of the year and how we can improve ourselves. This project came from last year's class.

During your first Lit Review Class with Dr. Dave Raible you will be writing an NSF grant to submit near the end of the quarter. Last year eight people received three years of support from the NSF grants that were turned in from this class.

Here is Dr. Raible's request:

During the fall MCB Tutorial, we will work on grant writing, using the NSF Graduate Research Fellowship as a guideline. We encourage all eligible students to apply for this prestigious fellowship, due in late November. In class we will work on the scientific part of the proposal, and the rest of the proposal will be done on your own. These include a Personal Statement and a Previous Research Summary. Previous students have suggested that it is helpful to get started on these parts early.

To help you get thinking about these, I attached some information and examples.

We all look forward to seeing you in just over a month!

Dave Raible
Co-Chair
MCB Program

and

MaryEllin

~ Personal Statement (Essay) Guide Sheet ~

Here's what the reviewers will need to learn (or infer) about you in these 2 pages:

- ✓ How motivated you are to pursue graduate studies/become a researcher.
- ✓ How you have demonstrated your potential as a leader *and* a team member.
- ✓ Your intelligence, insight, candor, creativity, and ability to communicate.
- ✓ Extraordinary efforts that you have made to enhance your knowledge and skills.
- ✓ Transferable skills & qualities you possess that will make you an exemplary professional.
- ✓ Your career aspirations and/or long range goals as a researcher.
- ✓ How you have applied your knowledge and skills to help others, support diversity, share scientific knowledge and/or benefit society.

A Suggested Outline for the GRFP Personal Statement

I. Introductory Paragraph: In three to five sentences, make an interesting point about you, your research interests or your vision. Your writing must convince the reader that you are intelligent, innovative, articulate, and dedicated--uniquely qualified to receive this fellowship. Avoid clichés and the mundane.

II. Next Section: Describe any personal, professional, or educational experiences or situations that have prepared you and contributed to your desire to pursue advanced study in your field.

II. Next Section: Describe your competencies, team/interdisciplinary skills, and evidence of leadership potential. Use tangible examples of your work in research settings, if possible.

IV. Next Section: Discuss your career aspirations and how the NSF fellowship will enable you to achieve your goals.

V. Next Section: Address Intellectual Merit and Broader Impacts criteria.

VI. Concluding Paragraph: In three to five sentences, draw an interesting conclusion. Reflect on what you have learned, what your research means, or where you are headed. Bring closure to your essay.

TIP: The judicious use of **bold face** attracts the reviewers' eyes to key points. One strategy is to use paragraph subheadings such as "Goals." Another strategy is to use bold face for words like "encourage diversity" and "benefit society" to highlight your broader impacts. This helps assure that the reviewer does not overlook your efforts!

10-Step Strategy for Writing this Essay

- Step 1.** Go to [NSF-GRFP Fastlane](#) page. Carefully review this year's program announcement instructions. Study the two judging criteria, "intellectual merit" and "broader impacts." Register and login to **Fastlane**. Go to the section to **find specific instructions on the personal statement** (essay). Note: The specific essay instructions are found only AFTER you login. Copy the essays instructions and save them. You will want to study the instructions, make a few notes and reflect on your ideas and experiences.
- Step 2.** Begin writing a first draft. Start with an engaging introductory paragraph. Set the tone or "theme" of your essay. Your goal is to convince the reviewers to continue reading your essay.
- Step 3.** Initially, develop just one or two paragraphs per required section. Use poignant examples to illustrate your ideas.
- Step 4.** Create transitions between paragraphs for reading "flow."
- Step 5.** Your final paragraph should tie the sections together, but avoid summarizing what you have written.

- Step 6.** Now go back and re-read each section. As space permits, add richness and details. Make logical breaks in lengthy paragraphs.
- Step 7.** Ask a friend, family member, study partner, or writing tutor to read your work for clarity and conviction. Did he or she find that your writing is compelling? Ask how you can improve it!
- Step 8.** Set your essay aside for several days. Reflect on your writing again. Will a stranger who reads it come to know the “real” you? Have you demonstrated your intellectual abilities (merit)? Your leadership potential to contribute to your profession? Will readers be convinced that you can have a broad impact on society? How does your essay set you apart from other highly-qualified fellowship applicants?
- Step 9.** Re-read and edit your entire essay. Make sure that your writing is succinct and intelligent, but lively!
- Step 10.** Make certain that you avoid repetition across the three GRFP essays, but that your tone and content is complementary.

Be subtle, but also weave in: Personal characteristics that will lead to your success (e.g. motivation, self-direction, dependability, persistence, communications, leadership, team player). Don't make claims or assertions - use examples! This essay establishes the overall impression you want to create with reviewers.

Writer's Block?

Here's a few potential topics to illustrate your “Intellectual Merit” and “Broader Impacts:”

- Reflect on key experiences (negative & positive) that shaped your career/research interests.
 - Don't dwell on failures or negative experiences; *but* certainly use them to illustrate how you've changed, persevered, or overcome odds.
 - Who are you mentors? Whose work do you follow? Why is this work important?
 - How long have you been intrinsically motivated to conduct self study or your own research?
 - What are your standards, values, and/or commitment to ethical research practices?
 - What pressing research problems, social needs, or international issues capture your attention? Why?
 - Leadership: How have you helped others? Did you work with someone or a group to address a problem?
 - What are your “lessons learned” from working with your mentor? From internships? Group projects?
 - Share your goals and/or vision for the future. What do you want to accomplish? How do you intend to contribute to your profession?
 - How has volunteering or service learning changed your thinking or goals?
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IMPORTANT: NSF's Page Formatting Requirements

“Applicants must follow the instructions in the user guide and applicant module for completing each section of the application. The essays must be written using standard 8.5" x 11" page size, 12-point, Times New Roman font, 1" margins, and must be single spaced or greater. The Personal Statement, Previous Research Experience, and Proposed Graduate Study essays each have a maximum length of two pages, including all references, citations, charts, figures, and images. The Optional Program Eligibility essay is limited to one page. Failure to comply fully with these requirements could eliminate the application from consideration by review panels. Additionally, applications that are incomplete (missing required transcripts and/or reference letters, or that do not have "submitted" status by the application deadline) are ineligible for panel review. Applicants are advised to submit applications early to avoid possible FastLane system delays on the deadline dates.”

Source: 2010 NSF GRFP Announcement

Created for the MU Graduate School by Robin G. Walker, PhD walkerrob@missouri.edu updated 08.21.09



Merit Review Broader Impacts Criterion: Representative Activities

Proposals submitted to the National Science Foundation are evaluated through use of two merit review criteria, which all proposals must address explicitly. Experience shows that while most proposers have little difficulty responding to the criterion relating to intellectual merit, many proposers have difficulty understanding how to frame the broader impacts of the activities they propose to undertake.

The examples provided below are organized by the set of potential considerations used in assessing the broader impacts of the proposed activity. They illustrate activities that, when successfully incorporated in a project description, will help reviewers and NSF program staff address the broader impacts criterion in the review and decision process.

The list is not intended to be exhaustive, nor is any particular example relevant to all proposals. Proposers can draw from the examples but are urged to be creative in their approaches to demonstrating the broader impacts of their projects. Proposers already undertaking similar kinds of activities should carefully consider how to link these examples to the research and education projects they are proposing for funding. Proposers also should consider what types of activities best suit their interests, while enhancing the broader impacts of the project being proposed.

The components of the broader impacts criterion as defined by the National Science Board are listed below. The list is followed by short sections on each component that provide background information and representative activities.

Broader Impacts Criterion: What are the broader impacts of the proposed activity?

- How well does the activity advance discovery and understanding while promoting teaching, training and learning?
- How well does the proposed activity broaden the participation of underrepresented groups (e.g., gender, ethnicity, disability, geographic, etc.)?
- To what extent will it enhance the infrastructure for research and education, such as facilities, instrumentation, networks and partnerships?
- Will the results be disseminated broadly to enhance scientific and technological understanding?
- What may be the benefits of the proposed activity to society?

Advance Discovery and Understanding While Promoting Teaching, Training and Learning

Background:

Integration of research and education is one of "three core strategies that guide [NSF] in establishing priorities, identifying opportunities, and designing new programs and activities.... Effective integration of research and education at all levels infuses learning with the excitement of discovery and assures that the findings and methods of research are quickly and effectively communicated in a broader context and to a larger audience" (NSF GPRA Strategic Plan 2001 - 2006)

Examples of Activities:

- Integrate research activities into the teaching of science, math and engineering at all educational levels (e.g., K-12, undergraduate science majors, non-science majors, and graduate students).
- Include students (e.g., K-12, undergraduate science majors, non-science majors, and /or graduate students) as participants in the proposed activities as appropriate.
- Participate in the recruitment, training, and/or professional development of K-12 science and math teachers.
- Develop research-based educational materials or contribute to databases useful in teaching (e.g., K-16 digital library).
- Partner with researchers and educators to develop effective means of incorporating research into learning and education.
- Encourage student participation at meetings and activities of professional societies.
- Establish special mentoring programs for high school students, undergraduates, graduate students, and technicians conducting research.
- Involve graduate and post-doctoral researchers in undergraduate teaching activities.
- Develop, adopt, adapt or disseminate effective models and pedagogic approaches to science, mathematics and engineering teaching.

Broaden Participation of Underrepresented Groups

Background:

One of NSF's five-year strategies is to "broaden participation and enhance diversity in NSF programs. At present, several groups, including underrepresented minorities, women, certain types of academic institutions, and some geographic areas are less than full participants in the science and engineering enterprise. NSF is committed to leading the way to an enterprise that fully captures the strength of America's diversity." (NSF GPRA Strategic Plan 2001-2006)

Examples of Activities:

- Establish research and education collaborations with students and/or faculty who are members of underrepresented groups.
- Include students from underrepresented groups as participants in the proposed research and education activities.
- Establish research and education collaborations with students and faculty from non-Ph.D.-granting institutions and those serving underrepresented groups.
- Make campus visits and presentations at institutions that serve underrepresented groups.
- Establish research and education collaborations with faculty and students at community colleges, colleges for women, undergraduate institutions, and EPSCoR institutions.
- Mentor early-career scientists and engineers from underrepresented groups who are submitting NSF proposals.
- Participate in developing new approaches (e.g., use of information technology and connectivity) to engage underserved individuals, groups, and communities in science and engineering.
- Participate in conferences, workshops and field activities where diversity is a priority.

Enhance Infrastructure for Research and Education

Background:

The NSF Act of 1950 authorizes and directs the Foundation "to foster and support the development and use of computer and other scientific and engineering methods and technologies, primarily for research and education in the sciences and engineering;..."

"NSF investments provide state-of-the-art tools for research and education, such as instrumentation and equipment, multi-user facilities, ... telescopes, research vessels and aircraft, ... Internet-based and distributed user facilities, ... research networks, digital libraries and large databases." (NSF GPRA Strategic Plan 2001-2006)

Examples of Activities:

- Identify and establish collaborations between disciplines and institutions, among the U.S. academic institutions, industry and government and with international partners.
- Stimulate and support the development and dissemination of next-generation instrumentation, multi-user facilities, and other shared research and education platforms.
- Maintain, operate and modernize shared research and education infrastructure, including facilities and science and technology centers and engineering research centers.

- Upgrade the computation and computing infrastructure, including advanced computing resources and new types of information tools (e.g., large databases, networks and associated systems, and digital libraries).
- Develop activities that ensure that multi-user facilities are sites of research and mentoring for large numbers of science and engineering students.

Broad Dissemination to Enhance Scientific and Technological Understanding

Background:

"NSF advocates and encourages open scientific communication. NSF expects significant findings from supported research and educational activities to be promptly submitted for publication.... It expects PIs to share with other researchers, at no more than incremental cost and within a reasonable time, the data, samples, physical collections and other supporting materials created or gathered in the course of the work. It also encourages grantees to share software and inventions . . . and otherwise to make the innovations ... widely useful and usable." (GPG; NSF 01-2a)

Examples of Activities:

- Partner with museums, nature centers, science centers, and similar institutions to develop exhibits in science, math, and engineering.
- Involve the public or industry, where possible, in research and education activities.
- Give science and engineering presentations to the broader community (e.g., at museums and libraries, on radio shows, and in other such venues.).
- Make data available in a timely manner by means of databases, digital libraries, or other venues such as CD-ROMs.
- Publish in diverse media (e.g., non-technical literature, and websites, CD-ROMs, press kits) to reach broad audiences.
- Present research and education results in formats useful to policy-makers, members of Congress, industry, and broad audiences.
- Participate in multi- and interdisciplinary conferences, workshops, and research activities.
- Integrate research with education activities in order to communicate in a broader context.

Benefits to Society

Background:

NSF is committed to fostering connections between discoveries and their use in service to society. The knowledge provided by NSF-funded projects offers a rich foundation for its broad and useful application. For example, projects may contribute to understanding the environment, commercial technology, public policy, health or

safety and other aspects of the public welfare. (NSF GPRA Strategic Plan 2001-2006)

Examples of Activities:

- Demonstrate the linkage between discovery and societal benefit by providing specific examples and explanations regarding the potential application of research and education results.
- Partner with academic scientists, staff at federal agencies and with the private sector on both technological and scientific projects to integrate research into broader programs and activities of national interest.
- Analyze, interpret, and synthesize research and education results in formats understandable and useful for non-scientists.
- Provide information for policy formulation by Federal, State or local agencies.

~ Previous Research Experience (Essay) Guide Sheet ~

Here's what the reviewers will need to learn in these 2 pages:

- How much you have been engaged in rigorous research activities (e.g. conduct experiments, collect and analyze data, interpret findings, present data to others).
- Your willingness and ability to work collaboratively on research teams and in interdisciplinary settings; your active role on research teams to date.
- Your ability to conduct independent research (e.g., self direction, monitor progress, problem solving, resourcefulness, contingency planning)
- What technical knowledge and skills you possess that show you will make an outstanding researcher (i.e. understanding of rigorous research methods & responsible conduct of research)
- Efforts you've made beyond required course work to enhance your knowledge and skills (extra work shows motivation, commitment, perseverance, & self direction)
- Your analytical skills and insight about current trends & emerging issues in your field
- Demonstrated potential as a scientific leader--how you have used your knowledge and skills to help others, support diversity, share scientific knowledge, or benefit society.

A 10-Step Strategy for Writing Your Previous Research Experience Essay

Step 1. Carefully read NSF's instructions for this essay which are available in FastLane.

Step 2. Create a few notes about your research experiences. For your convenience, use the "work sheet" provided on the last page of this handout. When you are finished, reflect on these experiences. Ask yourself: Which ones best demonstrate my knowledge and skills? Which experiences were the most challenging? The most meaningful? How did I broaden my skill repertoire? Increase my knowledge depth?

Step 3. Review NSF's description of "intellectual merit" and "broader impacts" in the program solicitation. These are the judging criteria & this essay contributes to the overall impression you will make!

Tips: The **intellectual merit criterion** looks for evidence of your intellectual ability and potential for scholarly scientific study and leadership in your field. Examples include the ability (1) to plan and conduct research; (2) to work as a member of a team as well as independently; and (3) to interpret and communicate research findings. Panelists consider your GPA, the rigor of your research plan, description of previous research experience, references, GRE score(s), and how your institution of choice can support your research. The **broader impacts criterion** examines how you make societal contributions and integrate research with education. Examples: hands-on learning with children; sharing research findings with the scientific community; and communicating the importance of findings with the public. Include your past efforts to reach diverse audiences by gender, race, income, and/or ethnicity and how you plan to do this in the future.

Step 4. Decide how you want to approach writing is two-page essay. For example, you can describe your experiences chronologically, or select your most meaningful experiences to discuss. Also think about how you can develop each paragraph, such as:

- Describe a research experience, then summarize what you learned.
- Discuss a skill that you acquired or lesson your learned, then offer concrete examples.

- Step 5.** Do not attempt to write your introductory paragraph until you have finished describing your experiences, for this reason: As you are writing, you will discover an overall message or theme for your introduction. Remember that your introductory paragraph must be powerful and engage your reader! Note: Writing the introduction last can also prevent “writer’s block.”
- Step 6.** Keeping within the 2 page limit, list your publications and presentations. Include national and regional professional meetings and be sure to indicate if it was a refereed selection process.
- Step 7.** Now re-read the entire essay. Make certain that you created transitions between paragraphs for reading “flow.” Does your final paragraph tie the sections together? Does your introduction engage the reader and “set the tone” for the balance of the essay?
- Step 8.** Ask a friend, family member, study partner, or writing tutor to read your work for clarity and conviction. Did he or she find that your writing is compelling? Ask how you can improve it!
- Step 9.** Based on their feedback, begin re-writing. Strive for a high degree of clarity and conviction in your writing. Ask yourself: Will this essay convince a stranger of my potential?
- Step 10.** As you write the other two essays, make certain that you avoid repetition with this one.

Other points you might make:

As space permits, list specific skills you gained--processes, methods, and equipment. How did you demonstrate your “soft” skills -- communications, self direction, motivation?

If you need to demonstrate additional experience, you may include research roles in courses and labs, literature reviews, group projects, etc.

As space permits, you may also include presentations and poster sessions during summer research programs, science fairs, or other similar events.

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Source: 2010 NSF GRFP Announcement

Worksheet on Your Previous Research Experiences

Instructions: This chart is intended to help you think about all that you have accomplished. Just make a few notes - do not write extensively. Place one project in each row. Jot down a few key points under each column. When you are finished, reflect on these experiences. Which ones best demonstrate your knowledge and skills? Which experiences were the most challenging? The most meaningful? How did you broaden your skill repertoire? Your knowledge depth? These are illustrative topics you may use to develop your research experience essay.

Research Purpose & Your Specific Role	Methods, Equipment Procedures	Findings, Interpretation & Implications	Skills Gained & "Lessons Learned"	What this means or How this "fits" with my future research
Purpose: Role: <input type="checkbox"/> Undergrad <input type="checkbox"/> Grad			Individual: Team:	
Purpose: Role: <input type="checkbox"/> Undergrad <input type="checkbox"/> Grad			Individual: Team:	
Purpose: Role: <input type="checkbox"/> Undergrad <input type="checkbox"/> Grad			Individual: Team:	
Purpose: Role: <input type="checkbox"/> Undergrad <input type="checkbox"/> Grad			Individual: Team:	