Suggested Outline for the Graduate Research Statement

**GRFP Instructions:** "Present an original research topic that you would like to pursue in graduate school. Describe the research idea, your general approach, as well as any unique resources that may be needed for accomplishing the research goal (i.e., access to national facilities or collections, collaborations, overseas work, etc.) You may choose to include important literature citations. Address the potential of the research to advance knowledge and understanding within science as well as the potential for broader impacts on society. The research discussed must be in a field listed in the Solicitation." Source: NSF

**Basic Outline from Instructions**

- Research Idea
- General Approach
- Unique Resources
- Intellectual Merit.
- Broader Impacts
- Literature Citations

*Suggestion:* Modify the basic outline so that it is appropriate to your discipline and tailored to your study.

**Best advice:** Work closely with your mentor on this statement. You should (a) work from an outline, (b) write in a scholarly fashion and (b) approach this statement like a two-page research abstract.

**One Example of a Modified Outline**

**Introduction**
- Research aim (2-3 sentences that spark the reviewer's interest)
- Background (literature review)
- Research questions (or hypotheses, as appropriate to your discipline)

**Methods (or general approach)**
- Introductory statement (state that this will be a quantitative, qualitative or mixed methods study)
- Data collection or data sources
  - Sub-points as appropriate to discipline
- Data analysis or interpretation
  - Sub-points as appropriate to discipline
- Other factors you might consider:
  - Compliance, animal welfare or human subjects (as appropriate to the study)
  - Timeline
  - Evaluation (monitoring progress toward completion)
  - Limitations & Contingency (if research does not go as planned)

**Unique Resources**
- Specialized equipment, supercomputing, etc
- Big-ticket items (international travel, field work)
- Explain how costs will be covered (by the institution, a grant, etc.)

**Intellectual Merit (this is required)**
- How this study will advance knowledge with and across disciplines
- Specifically state how you will actively share the findings from this study

**Broader Impacts (this is required)**
- BI inherent to the research itself (how the research findings will benefit society)
- BI resulting from the research process (who benefitted from being engaged in the study)
- Proposed BI activity related to the project (List specific methods, audiences, venues or technologies you will employ to improve the public's scientific literacy.)

**Conclusion**
- How does this research fit with your academic and career goals?
- How will your research efforts help the NSF accomplish its goals?

**Literature Citations**
Notes:
- Your rationale for selecting a particular research topic should be informed by the literature.
- Consider a graduate research topic that relates to your stated career goals.
- The scope of the subject matter must be doable for a graduate student's research project.
- Be realistic about the resources you need and how your expenses will be covered.

Formatting Requirements. Strictly adhere to the essay formatting guidelines found in Fastlane GRFP. Do NOT alter the margins, line spacing, typeface or font sizes because you will be disqualified from the competition. Do not exceed 2 pages. Citations may be in 10 point font.

Citations. One way to maximize space in your essay is to number your citations. For example
1. Smith, AJ; Thomas, RM; & Bradley, CT. (2009)...
2. Hoover, FN; Smith, AJ; Bradley, CT and Fernandez, JA. (2008)...
3. Wyatt, GP and Fernandez, JA (2006)...
Then in your narrative, use the numbers to cite the references at the end of the sentence (instead of surnames in parenthesis). Example:

Anomalies in sea surface temperatures in the Equatorial Pacific are attributed to unusually cold or warm ocean temperatures [1, 3].

When the reader turns to the citation section, it shows that the authors of [1] and [3] are the sources of that information. While this citation style is common in many science journals, do not use it if your mentor advises against it.

For your Consideration
1. Reviewers understand that quite often, students work on lab teams funded by external grants. If your graduate research topic is part of a larger research project, make certain that you explain this. Be clear about your role and responsibilities. Specify how your topic relates to the overall research project.
2. DO NOT copy and paste sections from a grant proposal - that is plagiarism.
3. Rest assured that reviewers also understand that students need to build research skills. If your proposed research topic will be a challenge with your current skill level, insert a sentence about how you will acquire the necessary skills to conduct your research (e.g., graduate courses, summer research, and/or mentoring.)

Questions a Reviewer Might Pose Related to this Statement

Intellectual Merit

Has the student presented a well-organized statement?
Is the writing clear? Definitive?
Is the topic innovative or potentially transformative?
How did the student justify the need for this research topic?
Is the "general approach" appropriate for the topic? Are methods rigorous?
Has the student identified possible pitfalls or limitations with this topic?
Is this student ready conduct a graduate research project on this topic?
What is the mentor's expertise and how strong is the mentor's support of this research?
Do the references letters confirm that the student will have adequate research resources?
Will the student publish and present scholarly findings within and across disciplines?
If the student proposed international research or field study, is it relevant?
How will this research help the student acquire new knowledge and skills?
Potentially, how might this research advance knowledge within and across disciplines?

Broader Impacts

How will society directly benefit from this research?
How will society indirectly benefit from this research?
What groups will be reached and how will they benefit?
How will the researcher engage people from underrepresented groups in the research process?
How will the researcher engage people from underrepresented groups in research-related activities?
How will this applicant propose to teach lay audiences and improve the public's scientific literacy?
Are the proposed BI activities realistic? Sustainable?
Does the topic address a significant global problem, societal need or NSF priority?
Does this applicant express an interest in becoming a scientific leader, either within or across disciplines?
How does this applicant propose to collaborate with international researchers?
Might this study enhance research and education infrastructure (e.g., facilities, instrumentation, networks, and partnerships)?
If the GRFP makes an investment in this student, how will this student help the NSF achieve its goals?
Statement Instructions: "Present an original research topic that you would like to pursue in graduate school. Describe the research idea, your general approach, as well as any unique resources that may be needed for accomplishing the research goal (i.e., access to national facilities or collections, collaborations, overseas work, etc.) You may choose to include important literature citations. Address the potential of the research to advance knowledge and understanding within science as well as the potential for broader impacts on society. The research discussed must be in a field listed in the Solicitation." Source: NSF GRFP User Guide

Step I. Talk with your mentor(s). Even if you have decided on a research topic, it's a good idea to consult with the experts. Why? Faculty mentors stay informed about recent discoveries, research trends, and emerging issues. They can point you to gaps in the literature, the need for follow up study, and new topics to investigate. Mention that your research topic must have the potential to advance knowledge and benefit society.

Step II. Literature Review. Read broadly and synthesize what you learned. Identify 2-4 key findings from the literature that point to a problem you would like to address. Document how the topic can advance knowledge and benefit society. If the topic is interdisciplinary, include references from other disciplines. If possible, use nationally known researchers in the area(s) of study. Record the complete citation.

1st finding:
Citation:

2nd finding:
Citation:

3rd finding:
Citation:

4th finding:
Citation:

Step III. Summarize Preliminary Work. If your research interest stems from work that you and/or your mentor(s) have accomplished previously, summarize the findings - even if preliminary or inconclusive.

Note: If you have published/presented on your research, list in your citation(s) in the GRFP application.

Note: Be sure to describe your research roles in the other GRFP statement. Emphasize what you learned and how your experience has readied you for graduate study. Include independent, collaborative, team, interdisciplinary or international work.
Step IV. Problem Statement. Clearly and succinctly, state a specific, researchable problem that you intend to address. This must be logically connected to the results of your literature review.

Step V. Research Question and/or Hypothesis. Although no longer a requirement, you may wish to consider adding a research question or hypothesis if appropriate to your field of study.

Step VI. General Approach (Research Methods). Your lit review should help you identify a general approach to your research topic. Consult with a mentor or a statistician on your methods and methodology. (Reviewers will look for methods that are rigorous and appropriate.) List steps below. Add rows as necessary.

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Step VII. Identify Unique Resources. Explain how your future program has the lab space, equipment, and supplies (e.g., chemicals, instruments, tools, etc.) that you will need to conduct this research. Will you need funds for field research or travel abroad? (Reference letters should confirm available resources.)

**Other considerations for your general approach:**
- **Ethics & Compliance.** Have you completed training on RCR (research ethics) or scholarly integrity? As appropriate, how will you protect human subjects and/or adhere to animal welfare regulations?
- **Timeline.** How long will it take you to conduct this study, analyze and report the findings?
- **Evaluation.** How will you monitor your progress toward the study’s completion?
- **Limitations & Contingency.** What happens if you experience problems or unexpected results during your study?

Step VIII. Intellectual Merit (IM). You are required to address the potential of your research to advance knowledge and understanding within science. To do this, go back to your literature review (Step II). What knowledge gaps did you find? How might researchers in other disciplines apply this new knowledge? Include how you will actively communicate findings to the scientific community within and across disciplines and industries - - in the US and beyond.

Step IX. Broader Impacts (BI). You are required to address the potential of this research for broader impacts on society.

a. Reflect on (a) which groups will benefit and (b) how they will benefit. Quantify whenever possible (e.g., magnitude of the problem; how many people; projected cost savings; % growth; % reduction, etc.) Will your research help lead to enhanced infrastructure for research and education?

b. What activities can you conduct to involve people from underrepresented groups in your research? Teach diverse public audiences about your research? Will you inform policymakers about the importance of research and/or your area of inquiry? (List specific methods, audiences, venues or technologies you will employ for your proposed BI activities.)

Step X. Write a conclusion. Might you pursue this line of study as a dissertation topic? Might you pursue this research strand as part of your long range career goals? Could you move into interdisciplinary study? Why should the NSF make an investment in your future? How will you help the agency accomplish its goals?

Copyright by Robin G. Walker, PhD - updated 08.21.13 2
**Chart for Organizing your Previous Research Experiences**

**Instructions:** This chart can help you organize your experiences. Just make a few notes - do not write extensively. Place one project in each row. Write key points in each column. When you are finished, reflect on how these experiences have prepared you for future research. How can you best demonstrate your knowledge and skills? Which experiences were the most challenging? How did you broaden your skill repertoire? What do you need to learn? Always follow the specific essay instructions. Address Intellectual Merit and Broader Impacts.

<table>
<thead>
<tr>
<th>Research Purpose &amp; Your Specific Role</th>
<th>Methods, Equipment Procedures</th>
<th>Findings, Interpretation &amp; Implications</th>
<th>Skills Gained &amp; “Lessons Learned”</th>
<th>Intellectual Merit Broader Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purpose:</td>
<td></td>
<td>Individual:</td>
<td>Team:</td>
<td></td>
</tr>
<tr>
<td>Role:</td>
<td></td>
<td>Individual:</td>
<td>Team:</td>
<td></td>
</tr>
<tr>
<td>☐ Undergrad ☐ Grad</td>
<td></td>
<td>Individual:</td>
<td>Team:</td>
<td></td>
</tr>
<tr>
<td>Purpose:</td>
<td></td>
<td>Individual:</td>
<td>Team:</td>
<td></td>
</tr>
<tr>
<td>Role:</td>
<td></td>
<td>Individual:</td>
<td>Team:</td>
<td></td>
</tr>
<tr>
<td>☐ Undergrad ☐ Grad</td>
<td></td>
<td>Individual:</td>
<td>Team:</td>
<td></td>
</tr>
<tr>
<td>Purpose:</td>
<td></td>
<td>Individual:</td>
<td>Team:</td>
<td></td>
</tr>
<tr>
<td>Role:</td>
<td></td>
<td>Individual:</td>
<td>Team:</td>
<td></td>
</tr>
<tr>
<td>☐ Undergrad ☐ Grad</td>
<td></td>
<td>Individual:</td>
<td>Team:</td>
<td></td>
</tr>
</tbody>
</table>

Copyright by Robin G. Walker, PhD updated 08.07.12
One Possible Format for the 2014 GRFP Graduate Research Topic Statement
(Limit is 2 pages. Work closely with your mentor on this statement!)

<table>
<thead>
<tr>
<th>Research Idea.</th>
<th>am fugit voluptat fugias consequamet incetas moles mos rem coreiur molorec usciis illaborporum reperum et quiative sit atiandit pedis evendae nest.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Background.</td>
<td>Obis exeris et, offictio moditas amet endi blacera inveliquae pra simoluptae[1]. Natium sunt valor sim et moloreh enditec tistem que mollum. Et la iduciatius [2, 3], se prerehentis seque a di ist laborro Reperum [1, 4]. erem volessequ nos remporempor aut que latet pro magnatium.</td>
</tr>
<tr>
<td>Research Question or Hypotheses.</td>
<td>Plicti ut dolupta si omnis dus endem et, offictem arcitatus quo bearum reperem derfercis molar facias re res rectur? Quisciumqueet pererem latume veriorest, odis utetur, venis ratibus adis conserverum</td>
</tr>
<tr>
<td>General Approach.</td>
<td>uam fugit voluptat fugias consequamet incetas moles mos rem coreiur molorec usciis illaborporum reperum et quiative sit atiandit pedis evendae prerehentis seque a di ist laborro. Reperum erem volessequ nonest.</td>
</tr>
<tr>
<td>Data Collection.</td>
<td>Voluptate omnisque nulparchil intia qui rrovid ma aut harchil esciendi tet pa qui que recaboruptas earibus aut autem. Ullore poresti conest, natlis iditionseque volupta tectorporrum dolum sent. prerehentis seque a di ist laborro. Reperum erem volessequ nos prerehentis seque a di ist laborro. Reperum</td>
</tr>
<tr>
<td>Data Analysis.</td>
<td>Obis exeris et, offictio moditas amet endi blacera inveliquae pra simoluptae. Natium sunt valor sim et moloreh enditec tistem que mollum. Et la iduciatius se prerehentis seque a di ist laborro. Reperum erem volessequ nos remporempor aut que latet pro magnatium. prerehentis seque a di ist laborro.</td>
</tr>
<tr>
<td>Needed Resources.</td>
<td>icti ut dolupta si omnis dus endem, offictem arcitatus quo bear um reperem derfercis molar facias re res rectur. Quisciumqueet pererem latume veriorest, odis utetur, venis ratibus adis conserverum</td>
</tr>
<tr>
<td>Intellectual Merit.</td>
<td>moles mos rem coreiur molorec usciis illaborporum reperum et quiate sit atiandit pedis evendae nest, rrovid ma aut harchil esciendi tet pa qui qu recaboruptas earibus aut autem. Ullore poresti conest.</td>
</tr>
<tr>
<td>Broader Impacts.</td>
<td>omnisque nulparchil intia qui rrovid ma aut harchil esciendi tet pa qui que recaboruptas earibus aut autem. Ullore poresti conest, natlis iditionseque volupta tectorporrum dolum sent. uptas earibus aut autem. Ullore poresti conest,</td>
</tr>
</tbody>
</table>
| Literature Citations | 1. Names date title journal  
2. Names date title journal  
3. Names date title journal |

Copyright Robin G. Walker, PhD 09.10.13
# Through the Eyes of a Reviewer: What’s your Reaction?

<table>
<thead>
<tr>
<th>Sample 1: At the age of six I started volunteering weekly at the Ronald McDonald House in my hometown. It was at this moment that I can recall first experiencing the enjoyment of giving back to my community.... In provoking me to volunteer, I truly admired my mother’s actions. She had just exited an abusive marriage that I unfortunately witnessed first-hand. Additionally, post-divorce we had no other option than to move into my grand-parents house. This meant that we had to share a single bedroom for five years, until I was ten years of age. Still, she thought it important to volunteer and help those that could not afford housing at all. After over 300 hours volunteering at the House I knew, even at a young age, that I needed to pursue something in my life which would see me give back to the World.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>What are your reactions?</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sample 2: Education has always been important to my immediate family even though it has never really seemed as important with my extended family. This has been evident to me since I was a kid when and my dad would work nights and have to drop me off at summer school in order to finish his degree....I started college with the idea that I was going to become a doctor. If you are good at science in high school, that just seems like the appropriate path: Go to college as pre-med, become a doctor, and save the world from all the diseases. However, I quickly realized that this was not the right path for me. A variety of factors led me to that decision. One of which as that I had no real desire to plunge my arms into somebody else’s guts and perform surgeries.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>What are your reactions?</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sample 3: So far I have lived in two countries, seven cities, and moved a total of thirteen times. The socioeconomic status of my family has also changed from when we lived in India and moved to this country with almost nothing, to now, when we have a house in the suburbs and a comfortable life. The experiences I've had in these different cultural environments have made me realize that I want my profession to improve the lives of others by finding solutions to the grand challenges we face as a society.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>What are your reactions?</strong></td>
</tr>
</tbody>
</table>

Critique Exercise: Examples of opening paragraphs for GRFP statements.