

Utah State University

DigitalCommons@USU

---

All Graduate Theses and Dissertations

Graduate Studies

---

5-2011

# Understanding the National Science Foundation CAREER Award Proposal Genre: A Rhetorical, Ethnographic, and System Perspective

David M. Christensen  
*Utah State University*

Follow this and additional works at: <https://digitalcommons.usu.edu/etd>



Part of the [Rhetoric and Composition Commons](#)

---

## Recommended Citation

Christensen, David M., "Understanding the National Science Foundation CAREER Award Proposal Genre: A Rhetorical, Ethnographic, and System Perspective" (2011). *All Graduate Theses and Dissertations*. 923.  
<https://digitalcommons.usu.edu/etd/923>

This Dissertation is brought to you for free and open access by the Graduate Studies at DigitalCommons@USU. It has been accepted for inclusion in All Graduate Theses and Dissertations by an authorized administrator of DigitalCommons@USU. For more information, please contact [digitalcommons@usu.edu](mailto:digitalcommons@usu.edu).



UNDERSTANDING THE NATIONAL SCIENCE FOUNDATION CAREER AWARD

PROPOSAL GENRE: A RHETORICAL, ETHNOGRAPHIC,

AND SYSTEM PERSPECTIVE

by

David M. Christensen

A dissertation submitted in partial fulfillment  
of the requirements for the degree

of

DOCTOR OF PHILOSOPHY

in

Theory and Practice of Professional Communication

Approved:

---

Ryan Moeller  
Major Professor, Committee Chair

---

Charles Waugh  
Committee Member

---

Christine Hult  
Committee Member

---

Kimberly Sullivan  
Committee Member

---

David Hailey  
Committee Member

---

Byron Burnham  
Dean of Graduate Studies

UTAH STATE UNIVERSITY  
Logan, Utah

2011

## ABSTRACT

Understanding the National Science Foundation CAREER Award Proposal Genre:

A Rhetorical, Ethnographic, and System Perspective

by

David M. Christensen, Doctor of Philosophy

Utah State University, 2011

Major Professor: Dr. Ryan Moeller

Department: English

With tightening university budgets, never before has the activity level of research grant proposal writing been more intense. With increased proposal numbers, including for the National Science Foundation's (NSF) prestigious CAREER award, has also come increased competition and decreased funding rates. This dissertation has searched for successful and unsuccessful characteristics from funded and unfunded CAREER proposals.

The research focused on a study of two key subjects: 1) a corpus of 20 texts that included 12 funded proposals and 8 unfunded proposals from across NSF programs, and 2) an ethnographic analysis comprised from interviews with 14 NSF program officers (PO) from varying programs. Coding elements with the texts to uncover topical chains of content, rhetorical, and document design strategies revealed sound rhetorical moves and rhetorical mistakes. The study also illustrated evidence of adherence to or neglect of NSF-mandated writing/formatting conventions as connected to the likelihood of

receiving funding. Moreover, the study revealed conventions that have developed for the genre that are not prescribed by NSF but that, nevertheless, seem to be expected.

Through genre field analysis, the study's interviews with program officers (PO) revealed a system of genre-agents and player-agents that interact together in a highly rhetorical and social system. This system, comprised of locales in which a multitude of play scenarios can be enacted to exert influence, operates within fairly exact rules of play. Such rules may be published by NSF or simply be "understood," yet principal investigators (PI) are held accountable for them regardless.

The ethnography created from interviews with POs revealed multiple genre field elements (e.g., genre- and player-agents, transformative locales, play scenarios, penalty conditions) as well as common mistakes and best practices. A complete mapping of the CAREER award proposal preparation, submission, and review process resulted from the study, which mapping has offered insightful strategies to expand PI (and other agents') influence on the funding process.

The dissertation concluded by offering investigators a step-by-step process to identify and map the elements of the proposal genre field in which they operate.

## ACKNOWLEDGMENTS

During this often intense course of study and many hours of research and focused writing, as always, I have enjoyed and have been very thankful for the sweet encouragement and support of my best friend and wife, Mara. I am equally appreciative of the strength my precious children, Carsten and Jessica, provide me. They all have shared in my dream and passions, and they have collectively and graciously sacrificed great time and comfort on my behalf. This accomplishment is ours together. My parents deserve thanks as well for instilling in me a drive and work ethic. I also readily acknowledge God in leading me to and through this endeavor.

I cannot thank my major professor and committee chair, Dr. Ryan Moeller, enough for helping me order my thoughts and for pushing me to success. He has truly been a mentor, colleague, and friend. Likewise, my committee members, Dr. Christine Hult, Dr. David Hailey, Dr. Charles Waugh, and Dr. Kim Sullivan, have thoughtfully shared their wisdom throughout my work. I greatly appreciate Dr. Mark Zachry and Dr. Kelli Cargile Cook's initial direction and the help of so many other faculty members. I owe the ADVANCE grant great thanks for providing valuable research opportunities. I express many thanks to several program officers at the National Science Foundation for their time and perspectives as well as many CAREER principal investigators who have kindly shared proposals and reviews. Finally, I thank Dr. Byard Wood for his confidence in me and the pertinence of my research. Working with him and the Mechanical & Aerospace Engineering Department's faculty has given me the opportunity to apply my research as well as the final impetus and time I needed to finish this work.

David M. Christensen

## CONTENTS

	Page
ABSTRACT .....	ii
ACKNOWLEDGMENTS.....	iv
LIST OF TABLES .....	vi
LIST OF FIGURES.....	viii
 CHAPTER	
1. INTRODUCTION .....	1
2. LITERATURE REVIEW .....	18
3. RESEARCH METHODS .....	49
4. RHETORICAL AND GENRE ANALYSIS OF CAREER AWARD PROPOSALS .....	72
5. MIXED METHODS ANALYSIS OF THE NSF PROPOSAL PROCESS ..	111
6. CONCLUSION.....	165
REFERENCES .....	180
APPENDICES.....	189
APPENDIX A.....	190
APPENDIX B.....	196
APPENDIX C .....	197
APPENDIX D.....	198
APPENDIX E .....	199
APPENDIX F.....	202
CURRICULUM VITAE .....	203

## LIST OF TABLES

Table	Page
1 Highlights of broader impact strategy occurrence .....	81
2 Highlights of education activity integration strategy occurrences .....	83
3 Highlights of canonical strategy occurrence .....	87
4 Highlights of graphics features and graphics management strategy occurrence .....	102
5 Highlights of page feature strategy occurrence .....	103
6 Highlights of document structure strategy occurrence .....	109
7 Step 1 to effective genre field analysis mapping: Open the box .....	170
8 Step 2 to effective genre field analysis mapping: Read the rules .....	170
9 Step 3 to effective genre field analysis mapping: Identify the agents .....	171
10 Step 4 to effective genre field analysis mapping: Identify and map transformative locales .....	173
11 Step 5 to effective genre field analysis mapping: Strategize play scenarios ....	173
12 Step 6 to effective genre field analysis mapping: Continually update the map .....	174
13 Content analysis coding identification table .....	190
14 Rhetorical analysis coding identification table .....	192
15 Document design analysis coding identification table .....	195
16 Broader impact strategies occurrences .....	196
17 Education integration plan strategies occurrences .....	196
18 Canonical strategies occurrences .....	197
19 Document design elements occurrences .....	198

20	Inter-rater/reliability tester coding identification table .....	200
----	--	-----



## LIST OF FIGURES

Figure	Page
1 CAREER proposal submissions received over the past seven years across seven directorates (source: NSF Salt Lake City Workshop, October 25-26, 2010) .....	4
2 CAREER proposals awarded over the past seven years; **ARRA funds: American Recovery and Reinvestment Act (source: NSF Salt Lake City Workshop, October 25-26, 2010) .....	5
3 NSF organizational chart of research directorates (source: <a href="http://www.nsf.gov/pubs/policydocs/pappguide/nsf10_1/ex1.pdf">http://www.nsf.gov/pubs/policydocs/pappguide/nsf10_1/ex1.pdf</a> ) .....	7
4 Engineering directorate organization chart showing divisions; e.g., CBET (source: NSF Salt Lake City Workshop, October 25-26, 2010) .....	7
5 Chemical, Bioengineering, Environmental and Transport Systems division and subsequent program areas (source: NSF Salt Lake City Workshop, October 25-26, 2010) .....	8
6 Distribution by average reviewer ratings for awards and declines, FY 2010 (source: NSF Salt Lake City Workshop, October 25-26, 2010) .....	30
7 Diagram of this study's mixed methods' inter-relatedness .....	52
8 "Ideal" CAREER award proposal structure .....	108
9 Hierarchy of interviewees' responses relative to proposal content common mistakes and best practices .....	144
10 Interviewee responses relative to NSF administrative/programmatic requirements common mistakes and best practices .....	145
11 Interviewee responses correlation between writing/mechanics common mistakes and best practices .....	146
12 Genre Field Analysis mapping version 1.0 of a typical approach to the proposal process genre field .....	152
13 NSF's depiction of the proposal review process (from NSF Salt Lake City PI Workshop, October 25-26, 2010).....	157
14 Genre Field Analysis mapping version 2.0 of expanded PI agency in the	

proposal process .....	159
15 IRB letter of information for study participants .....	203

# **CHAPTER 1**

## **INTRODUCTION**

Universities and their faculty have long engaged in grant writing as a means of securing funding for research, infrastructure, and graduate students. Perhaps such activities have never been more important than today as those institutions are increasingly subjected to budget trimming. California's Legislative Analyst's Office, for example, reported that the state's two public university systems—the University of California and the California State University—together “receive \$4.9 billion in General Fund support, or about 5.7% of the total General Fund expenditures”; however, that share of the state budget has declined from about 11% in the mid 1980s (Boilard & Simbol, 2010). Similar budget reductions for higher education have found their way through many states over the past years, particularly through the recent recession.

Universities collect substantial overhead rates from grants from large, federal agencies (e.g., National Science Foundation, National Institutes of Health, Department of Defense) to satisfy both academic and operational financial needs. For example, Penn State (a sizeable land grant university) reported in its 2009-10 fiscal year budget that 16.9% of the overall university budget is accounted for with restricted funds, which include “grants and contracts from private sources, primarily for research.” While 16.9% may not seem like a large number, that percentage represents more than \$637 million (Total Budget, 2009)—a sum the university would sorely miss if absent or reduced dramatically. Private institutions, most with little to no public funding, also rely heavily on grants and contracts. Thirty percent of Stanford's \$3.72 billion projected revenues for

2009-10 will come from sponsored projects/research funding (Budget Plan 2009/10, 2009).

Researchers in science, technology, engineering, mathematics (STEM) fields, likewise, find such grants to be their lifeblood, not only in terms of research funding, but also in terms of securing promotion and tenure. Faculty at research institutions focus their time and effort generally among three activities: research, teaching, and service. The service aspect is an expectation to spend one's time in committee work, mentoring students, and possibly professional development activities that benefit both the individual and institution. Teaching requirements can vary among universities and may come with various course loads and expectations. Activities in both areas are intrinsic to academic life. As part of the research expectation, publishing books and journal articles is often a result of a faculty member's classroom experiences and/or research activity. The responsibility to initiate and find funding for research, however, is generally initiated by individual faculty members themselves. Though faculty often (and increasingly so) collaborate within and across departments, colleges, and universities on research projects, it is most commonly an individual enterprise, the results of which are intended to bring in financial resources. Faculty in the Mechanical and Aerospace Engineering Department at Utah State University, for example, are expected to have annual research expenditures of between \$150-300,000 per year. Assistant professors still in the tenure track face even greater production expectations (B. Wood, personal communication, January, 2010).

Experience pays dividends for successful researchers. Rarely will a more junior faculty member win "center-level" grants worth millions, but such achievement is also rarely the expectation. Most federal agencies offer ample opportunity to conduct

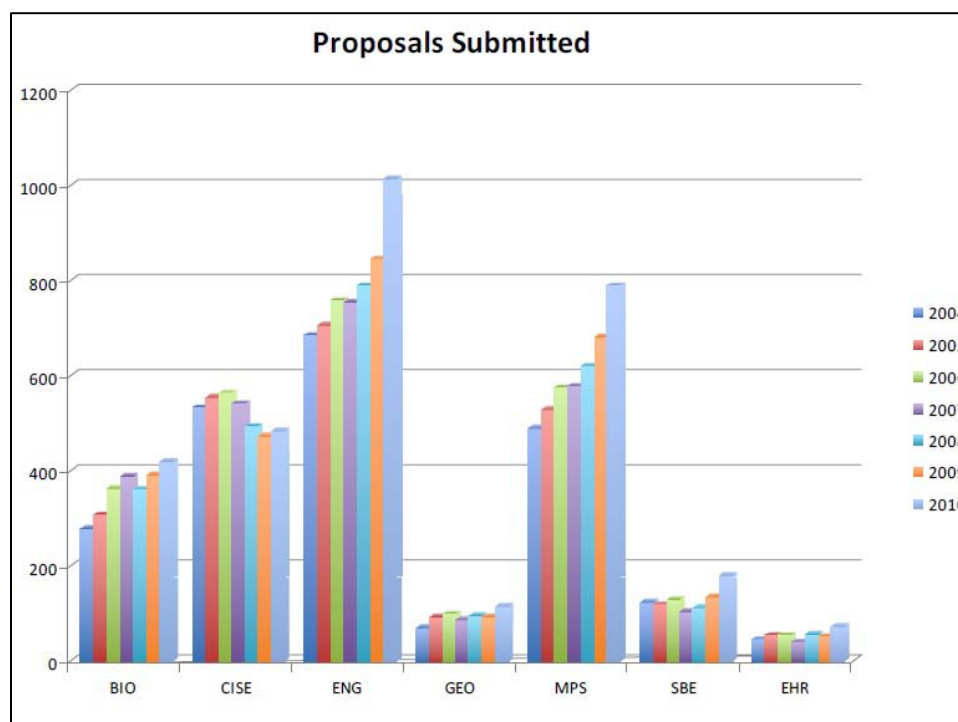
sponsored research in the level of tens of thousands to hundreds of thousands of dollars per year. A realistic scenario for assistant professors working toward tenure in a STEM department at most universities would be to write and receive several smaller grants (\$100k-\$300k) in the first few years in a tenure track position along with maybe a few in the half million dollar range funded over 3 to 5 years.

This study focuses multiple theoretical lenses on a singular research proposal of this latter type—the National Science Foundation’s (NSF) Faculty Early Career Development Award (CAREER). The CAREER grant (funded at around \$400,000 to \$500,000 over 5 years) is substantial enough to be important for a new faculty member financially, and it also carries a fair level of prestige because it is a highly competitive award.

### **The CAREER Proposal and the National Science Foundation**

As difficult economic times trim state-funded as well as private universities’ budgets, institutions will continue to look more seriously at faculty-written research grants (in part to collect overhead and to fund graduate students). Not only do universities collect substantial, federally negotiated overhead rates (typically around 40 to 50%) from grants from large federal agencies, researchers, likewise, find such grants to be critical for their professional survival, not only in terms of research funding, (e.g., providing them with graduate students, summer salaries, and equipment) but also for securing promotion and tenure. Moreover, NSF publishes hundreds of pages of proposal constraints and guidelines investigators must navigate and adhere to. In such a highly structured and

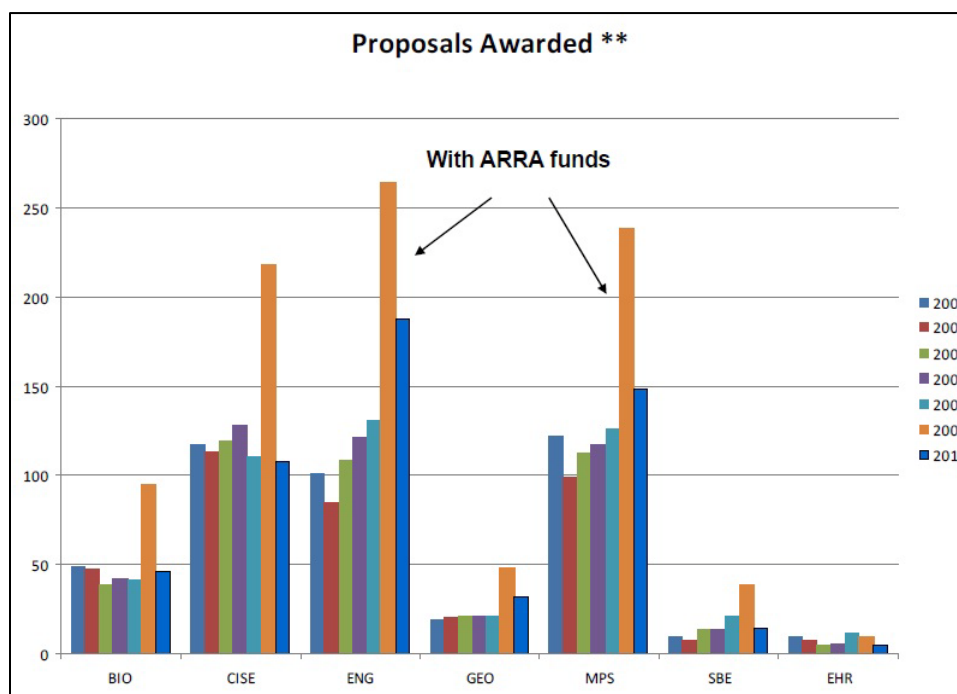
competitive field of play, those entering it would do well to know as much as possible about the program to increase chances of funding.



*Figure 1.* CAREER proposal submissions received over the past seven years across seven directorates (source: NSF Salt Lake City Workshop, October 25-26, 2010).

The NSF CAREER Award is one of the more highly sought after NSF grants available to assistant professors in the sciences. Success rates for CAREER submissions are slim depending upon the directorate to which they are submitted. In 2008, out of 478 CAREER proposals submitted to NSF's Computer & Information Science & Engineering Directorate 23% were funded, while only 11% of 365 proposals submitted to the Biological Sciences Directorate were funded (National Science Foundation, 2009a). Figure 1 presents the trend over the past 7 years from 2004 to 2010. NSF has received a continually increasing number of CAREER submissions over this period. Though the American Recovery and Reinvestment Act of 2009 increased overall NSF funding as

well as CAREER grants temporarily, Figure 2 confirms that average funding rates for CAREER proposals have remained fairly steady at around 20%.



*Figure 2.* CAREER proposals awarded over the past seven years;  
 \*\*ARRA funds: American Recovery and Reinvestment Act (source: NSF Salt Lake City Workshop, October 25-26, 2010).

NSF dedicates \$80 million annually just for CAREER award funding (National Science Foundation, 2008a). Because promotion and tenure in STEM fields depends on both publishing as well as the quantity, type, and dollar amounts of grants secured, successfully funded CAREER proposals can become a determining factor for faculty members' attaining tenure (or even remaining employed while in the tenure track).

While other agencies also have similar programs aimed at early faculty career development (e.g., Department of Energy's Early Career Research Program for \$150,000 per year for 5 years, Defense Advanced Research Projects Agency Young Faculty Award for \$150,000 per year for 2 years), the NSF CAREER award is the topic of this study

because NSF receives more than 3,000 submissions annually across its multiple disciplinary directorates. Studying proposals and the proposal system from a program of this size with such a broad participation across several disciplines in STEM fields should lead to conclusions that are generalizeable and applicable to other grant writing contexts.

Though a CAREER proposal's submission is comprised of several documents (including project summary, project description, budget, and department head and collaborator letters), the proposal review process focuses largely on the 15-page project description, which I will refer to generally as the proposal. The proposal's technical content, of course, is situated within the principle investigator's (PI) academic discipline and describes the PI's research to be funded over the ensuing 5 years. It is generally expected that the research area of this project would become or already is the research focus for the next several years of the PI's career. Moreover, the CAREER also expects PIs to integrate education activities into research plans. Proposals are submitted to NSF through online portals (i.e., grants.gov or fastlane) and are ultimately trafficked to the appropriate program officer (PO), at which point the PO finds subject matter reviewers to evaluate the proposal's content.

A breakdown of NSF's organizational hierarchy may be instructive to understand the submission (and later, review) process. Figure 3 shows NSF's larger organizational hierarchy, which includes multiple directorates (e.g., BIO for Biological Sciences, ENG for Directorate of Engineering). Directorates are further subdivided into divisions (e.g., CBET for Chemical, Bioengineering, and Transport Systems).

Figure 4 shows the Engineering directorate's divisions and its current division directors. Divisions can be further broken down into clusters (e.g., within CBET can be



found Transport and Thermal Fluids Phenomena). Such clusters then may contain multiple programs (e.g., Interfacial Processes and Thermodynamics).

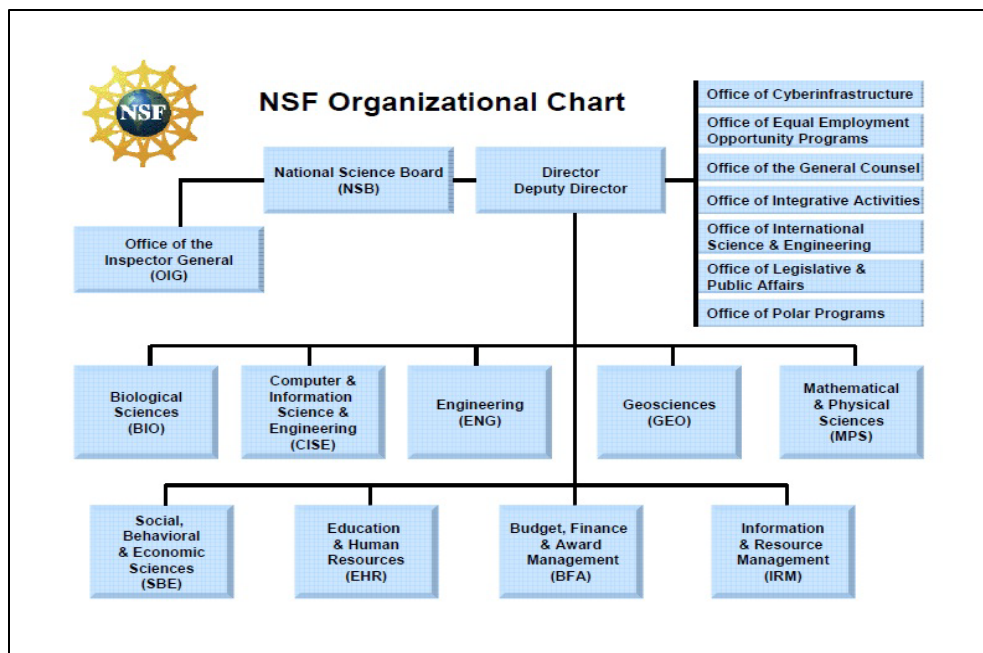


Figure 3. NSF organizational chart of research directorates (source: [http://www.nsf.gov/pubs/policydocs/pappguide/nsf10\\_1/ex1.pdf](http://www.nsf.gov/pubs/policydocs/pappguide/nsf10_1/ex1.pdf)).

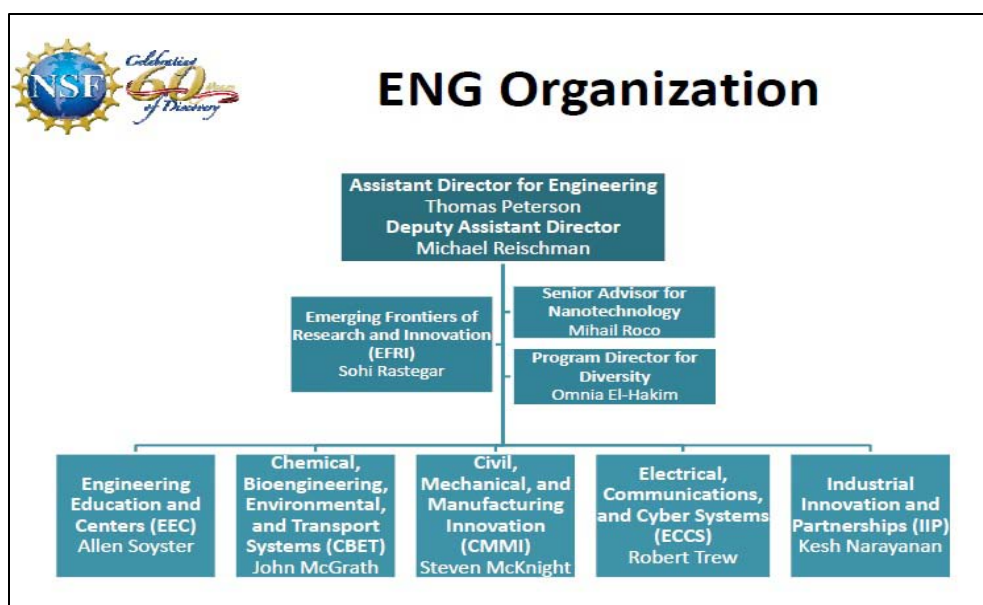


Figure 4. Engineering directorate organization chart showing divisions; e.g., CBET (source: NSF Salt Lake City Workshop, October 25-26, 2010).

The CBET division's programs are shown in Figure 5 with accompanying POs. Once a proposal has arrived at the program level, a PO is assigned to check proposals for completeness as well as compliance with NSF's *Grant Proposal Guide* (GPG) and the particular award's solicitation (if the proposal has been submitted to a solicited funding award). Narrowing down the sheer volume of proposals received annually by NSF makes a non-compliant proposal a good candidate for a PO to return without review.

If a PO determines that a proposal meets the criteria for compliance (some of this, particularly relative to form and inclusions, is done in fastlane), she then moves it toward peer review. Program officers engage a number of methods to maintain sufficient reviewers, and a PI may even suggest his own possible reviewers during the proposal submission. Researchers seeking NSF funding might consider volunteering as a reviewer

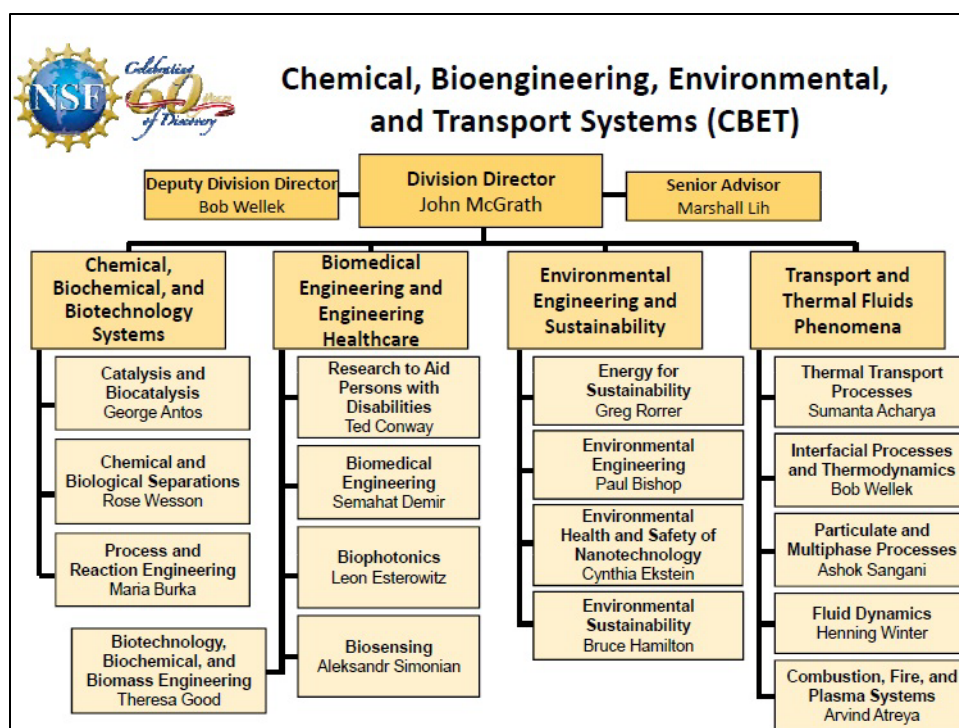


Figure 5. Chemical, Bioengineering, Environmental and Transport Systems division and subsequent program areas (source: NSF Salt Lake City Workshop, October 25-26, 2010).

to gain valuable insight into the process and make critical contacts with program managers who may receive researchers' future proposal submissions. Reviewers for CAREER and other award proposals are selected by NSF POs for their expertise with specific STEM research areas as well as STEM education and outreach. Reviewers may include both experts in the PI's academic area as well as other scholars with more broad expertise but no less critical skill. The task before reviewers is to evaluate proposals across several considerations with primarily two overarching Merit Review criteria:

1. *Intellectual merit*—How important is the proposed activity to advancing knowledge and understanding within its own field or across different fields? How well qualified is the proposer (individual or team) to conduct the project? (If appropriate, the reviewer will comment on the quality of prior work.) To what extent does the proposed activity suggest and explore creative, original, or potentially transformative concepts? How well conceived and organized is the proposed activity? Is there sufficient access to resources?
2. *Broader impact*—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? (National Science Foundation, 2009b, III-1)

Proposal reviewers determine how well a proposal matches the first measure based upon their knowledge and expertise. The second standard, broader impact, however, constitutes a trickier area both to propose and judge, particularly with CAREER since education activities are expected to be integrated into the project. In all cases at NSF (and most federal agencies), inclusion of underrepresented groups has become important for broader impact and education activities. At the completion of the review process, which at NSF takes about 6 months, POs make recommendations to fund or decline proposals and then

send their decisions on to division directors for a concurring vote. Other federal funding agencies also employ variations of this review process.

Other factors outside of a PI's, reviewers', or even PO's control can also affect the funding outcome of any given proposal submission. Researchers frequently feel that they have written excellent project descriptions and have included all the necessary elements in research activities as well as proposal submission packages to gain funding and, yet, are declined. Some limiting factors may include rotating POs (who bring different foci to research areas); NSF agency-wide, division, and program budgets that vary from year to year; or the total number of submissions within a certain directorate or program for a certain award. Often, PIs even claim that luck may have something to do with being funded (e.g., possibly being matched with reviewers who have a particular research interest that aligns with a proposed project). Though PIs often see these types of factors as reducing the percentage of awards made, the same factors can work to their benefit. Even political climate (i.e., change of presidential administrations) or economic conditions can influence funding rates. The year 2009 saw an increase of awards across several agencies with the American Recovery and Reinvestment Act, which distributed much of its funding through competitive research grants.

Because the CAREER award was established “in recognition of the critical roles played by faculty members in integrating research and education, and in fostering the natural connections between the processes of learning and discovery,” its PIs are expected to develop activities that “have an integrated research and education plan at their core” (National Science Foundation, 2008c). Other CAREER award documents suggest that CAREER plans should be creative and integrative and that NSF looks for

“risky” or, at least, novel research. Though the interpretation of *risky* and *novelty* may differ across programs and directorates, it generally includes research that promises a high return in terms of scientific advancement with success.<sup>1</sup> The agency also especially encourages the inclusion of women, members of underrepresented minority groups, and persons with disabilities in research and educational activities. Simply put, PIs must situate their research within NSF criteria and rhetorically articulate plans for their efforts in the proposal document to meet reviewers’ expectations, receive favorable reviews, and ultimately gain funding.

### **Problem Statement**

This introduction has presented multiple factors that exert some degree of influence on whether or not a proposal is funded. More broadly categorized, these general elements would include document production constraints and strategies, social and cultural influences, and economic environments. These groups can be broken down even more specifically (e.g., document production might include document features, treatment of generic conventions, rhetorical moves, and other considerations). Narrowing down these “telling” areas throughout this exploration focuses much attention on understanding the CAREER genre primarily at a document level, which includes rhetorical choices made by proposal writers with textual conventions and features as well as content presentation.

---

<sup>1</sup> A word NSF has been emphasizing more recently, since much of the basic research for this dissertation was conducted, is *transformative*. Again, though there may be varying interpretations across programs of that concept, NSF has stated, “NSF also explicitly calls for potentially transformative proposals to help ensure that NSF and the research community maintain a focus on the frontiers of science and engineering” (National Science foundation, 2010).

Examining the subject at this level, however, does not preclude considering other factors that also influence a CAREER proposal's creation. First, a document artifact<sup>2</sup> (e.g., a CAREER proposal written by professor so and so), as a document type or genre, does not exist in a vacuum but is, rather, influenced greatly in both its form and function by a variety of surrounding documentation (e.g., GPG, solicitations, NSF's informational website). The scope of this study, accordingly, also considers the influence exerted by a genre's attending documentation (or, attending genres). This expanded view of a document and its attending documents constitutes what some theorists have termed genre ecologies (Spinuzzi, 2002, 2004; Spinuzzi & Zachry, 2000). Second, genre ecologies might simplistically be seen as a collection of documents that facilitate or represent a particular context of human communication, but the important point is that they do operate within systems of human influence. Because such ecologies would never come into existence without human, or social, initiation, it is impossible to separate them entirely from each other, and it would be underproductive to study them in isolation. In the case of CAREER proposals, the aforementioned surrounding documentation and the proposal itself are both created by human agents within a social context and are inherently influenced by that sociality (e.g., by POs, reviewers, collaborators—agents that surround, produce, and work with the documentation).

The problem statement driving this research, then, is how a researcher can locate and employ the most advantageous and effective means of communicating research goals and plans to multiple audiences (namely the program director and reviewers at NSF as

---

<sup>2</sup> Nardi (1996) explained that an artifact in this context “may be physical tools or sign systems such as human language” (p. 7). A proposal document designed as a tool with which one proposes a research project to be conducted on a behalf of NSF's research priorities qualifies as such a tool as do the other types of documents that both accompany and surround the proposal.

well as colleagues and administrators at the home institution). Being able to do so should improve a PI's likelihood of drafting a successful CAREER grant proposal, given the economic, political, social, and generic milieus surrounding this complex process.

### **Research Questions**

Knowing that NSF receives approximately 3,000 CAREER proposals every year and funds fewer than a quarter of them, one should not simply assume that the unfunded submissions were just poorly written proposals. CAREER proposal writers are, by requirement, junior faculty members in tenure track positions (i.e., they have earned PhDs in their respective fields, have likely held post-doc positions during which they were involved in grant proposal writing, and are working within the first years of faculty appointments), which means that they are intelligent, competitive, and motivated. By virtue of their faculty station, one can assume that the majority of CAREER writers are capable of proposing “good science”<sup>3</sup> and that they are capable of articulating their research intent according to standard American-English expectations. One might also assume that PIs would be familiar with NSF's primary review criteria and would have at least attempted to demonstrate the intellectual merit of the research project and have made some level of effort to describe its broader impact. With those general assumptions, and knowing that a PI has about a 1 in four chance of being funded, an edge for

---

<sup>3</sup> Determining what is good science and judging any given proposal's intellectual merit is outside the scope of this research. As a non-technical observer, this element is not only out of my control but also outside of my expertise. Though I recognize that proposals may not receive funding because their technical content does not meet either the review criteria or may be outside a program's funding emphasis, I have to acknowledge researchers' intelligence and scientific integrity. I proceed under the assumption that PIs who would submit a CAREER proposal are at least well versed in their relevant scientific conversations and, from a scientific perspective, submit proposals that have a reasonable chance of being funded. Also important at this juncture is to state that I am an observer, and I ask forbearance from NSF insiders for any misinterpretations I may make throughout this study.

CAREER proposal writers would be to know what factor (or factors) puts a proposal into the funded percentile.

Since I am essentially seeking to demystify the CAREER proposal process by exploring and bringing to light the factors that help make a successful proposal, the **overarching research question** growing out of this problem statement is as follows:

What are the factors that lead to a successful CAREER proposal? Are they conventionally textual, content, rhetorical, or more systemic (both genre and/or social) oriented?

Several *subordinate research questions* will lend further focus and include three primary areas: conventional and rhetorical elements, influencing variables outside generic considerations, and general application to other proposal types and funding agencies.

**First**, can conventional and rhetorical elements of the genre be identified and how can they be evaluated from a rhetorical perspective? If conventional and rhetorical elements in proposals can be identified, what are the most critical to convincing reviewers and POs to fund the proposal? As a control for validity of the study, can evidence be found of attention to specific conventions in funded as opposed to unfunded proposal documents?

**Second**, do any other influencing variables outside generic (conventional and rhetorical) considerations (e.g., social, cultural, economic environment, political influences) affect the funding process and funding success? Considering potentially fertile fields for answers to that question, what insight into the CAREER proposal and NSF funding system can be provided by those who actually work inside it and make funding decisions (e.g., NSF program officers)?



**Third**, can findings about what makes a CAREER proposal successful or not be applied generally and reliably to other NSF grant proposals and/or grant proposals for other agencies/funders?

### **Dissertation Chapter Outlines**

This study explores conventions (typical document characteristics) and rhetorical moves made by successful CAREER grant proposal writers as well as how these moves are deployed in the NSF funding system. The research findings should lead to identifying best practices applicable not only to the CAREER award but also other grant writing generally.

In chapter 2, “Literature Review,” I outline the discussion in professional communication literature that positions grant proposals as rhetorical artifacts. Throughout professional communication literature, the topic of grant proposal writing has been covered lightly and primarily by genre and rhetorical analysis. Often, such discussions are relegated to anecdotal accounts. Still, scholarship about grant proposal writing from a more critical and theoretical basis has seen a moderate increase over the past two decades. The literature review highlights some of the most recent scholarly work dealing with theoretical perspectives that blend fairly static genre views with much more dynamic social system thinking. This multi-method research strategy sheds light on how documents exert influence on and are influenced by larger genre and social systems. The review also suggests that some post-social frameworks show promise to further illuminate the form and function of grant writing artifacts in addition to the genre and social structures they are products of and within which they operate.

In chapter 3, “Methodology,” I present an overview of the research methods employed for this study. This overview includes a discussion of applied genre and rhetorical analysis, both qualitative methods used in this work and presented with a slightly quantitative flavor. The chapter also outlines a mixed methods approach that incorporates these first analysis tools with genre ecologies, an ethnography, and genre field analysis.

In chapter 4, I rhetorically examine a collection of both funded and unfunded CAREER proposals. The chapter examines the criteria required by NSF of a CAREER PI and, through coding and tabulating common writing strategies used from among the study corpus, it shows how PIs might best respond to those criteria from conventionally textual, content, and rhetorical perspectives. With both funded and unfunded proposal documents in the study corpus, I graphically illustrate the comparisons between the two groups of rhetorical effects among several conventional, organizational, and strategic elements.

Building on the analysis of the document artifacts themselves, in chapter 5, “Mixed Methods Analysis of the NSF Proposal Process,” I expand on the concept of genre ecologies and play theory, and I detail my findings from applying genre field analysis (Christensen, Cootey, & Moeller, 2007). Part of the purpose of that analysis form is to reveal the multiple players (or stakeholders), artifacts, fields of play, and influences involved in writing successful CAREER grant proposals. Taking the overall analysis broader and deeper, I review an ethnographic landscape developed from multiple interviews I conducted with NSF POs. The meat of the chapter is found in the presentation of genre field maps—first of a typical proposal process, and second, of a

much more developed proposal genre field with expanded agency on the part of the PI that results in greater and more deliberate influence on the proposal system.

I conclude the study in chapter 6 with a discussion of how the methods and findings have addressed the research questions. I also discuss how this study has made a contribution not only to the field of professional communication but how it also represents a bridge to better connect that field with science disciplines that depend so greatly on grant funding. Generally, from this research the professional communication literature stands to gain a deeper, theoretical discussion of a less studied but quintessentially rhetorical communication artifact and process. Following an outline of how the study might be duplicated in other contexts, I also discuss who would stand to gain from applying the research findings. Finally, I acknowledge some limitations of this study and suggest possible directions for further research.

## **CHAPTER 2**

### **LITERATURE REVIEW**

Two groups may be equally interested in this study's findings. First, because the academic grant proposal is an easily identifiable genre artifact of an inherently rhetorical nature, it fits well within the study of professional communication. This particular genre, however, has not been studied nearly as extensively as its more familiar relatives, such as business proposals, science and business reports, and scientific/scholarly journal articles. Second, research grant writers (i.e., researchers, especially those pursuing CAREER awards) will find the study's findings of interest as giving them a possible strategic advantage for their own grant proposal writing endeavors.

This chapter first presents a literature review of the scholarship surrounding proposal writing generally in the professional communication field as well as the relevant literature from various proposal writers/commentators from the sciences. The discussion, in part, addresses the relatively light scholarly work (i.e., quantitative and/or qualitative research) specifically about research proposal writing from a communication perspective. This review also lays out a theoretical foundation from the professional communication conversation that will inform the study's key research methodologies including genre analysis, rhetorical analysis, and genre field analysis. Because NSF CAREER proposals operate in such a highly complex system of multiple document types that also includes the potential influence of multiple social factors, the study incorporates all these lenses to help give a multifaceted view of the entire proposal process field of play.

## Why Proposal Writing

This study will expand the current discussion of a rhetorically noteworthy genre—the scientific research grant proposal—in professional communication scholarship. Even within the scientific community’s science writing scholarship, much conversation has focused on the research article, while the academic research proposal has received little scholarly attention. Like the professional communication conversation, however, some academics in science writing scholarship have aimed lenses at proposals to include the research grant proposal as a type of scientific writing of value for further study. Apparently, science writing researchers have seen that the other science writing genres essentially depend upon the success of research proposals—if there is no research funding, there is little data to publish in reports or research articles.

Myers (1990) explained the value of studying proposals as a type of scientific writing stating that they are the most rhetorical and foundational of the science writing genres and that, generally speaking, other types of science writing, including research articles, often begin with a successfully written and funded research proposal (41). Pedagogically speaking, Kennedy (1983) recommended proposals as a genre for general classroom instruction in technical writing classes because it is little understood as a technical communication genre and also because it has a practical/workplace application. Rude (1995) touched on the valuable role proposals play relative to reports for decision making: “The report, in essence, presents the results of an investigation to determine what to do; the proposal offers a detailed plan for how to do it” (p. 83). A variety of texts, many scientific in scope and audience, fit under the umbrella of professional

communication. Among those, Myers (1990) also stated most succinctly why academic grant proposals are worthy of study in this context:

Proposals are a promising place to begin a study of scientific texts in that they are the most obviously rhetorical genre of scientific writing: both writers and readers know that every textual feature of a proposal must be intended to persuade the granting agency. The rhetoric can be finely calculated because proposals are written for a very small audience. (p. 41)

One way this kind of genre and audience savvy comes is with proposal writing experience. A seasoned research grant proposal writer and former NSF PO told me that to really understand the world of academic grant writing, one just really “has to get into it.” His meaning, of course, was that to be successful over the long term requires much practice with writing proposal documents as well as making efforts to gain a deeper understanding of processes and the environment surrounding grant writing. These are elements that I will later characterize as composing the genre field. This study is, in part, informed by my personal experience with grant writing as well as multiple conversations with researchers and POs—people deeply involved in the process. Considering the experience I draw from, both personal and borrowed, I have discovered that even those whom I consider experts in the pursuit say they are still learning how to do it. Throughout this work, I draw upon my ethnographic work and professional experience to place the voices of other experts alongside the *literature* of the field.

### **Of Passions and Priorities**

A sort of chicken and the egg question arises relative to research funding: which comes first (and which is more important), an investigator’s research passion and project or the research funding agency’s research priorities and agenda? Seasoned researchers

and POs alike can offer some insight into that question. Chapin (2004), for example, received his academic training in linguistics and later became NSF's first director of the agency's linguistics program in 1975 and served there for 25 years. From a long-time researcher and funder perspective, he suggested that a PI should first identify a research project that aligns with his overarching research agenda and couple it with a detailed research plan to beget a good proposal. "The proposal will flow naturally and logically" when taking this approach, Chapin maintained, but also, "writing a proposal before working out the project plan first is an exercise in frustration and constant rewriting" (p. 13). The ideal of trying to get funding for a one and only true research love, however, can seem impractical, particularly to hungry assistant professors feeling tremendous pressure to secure research funding and, thus, move toward tenure.

One overarching constraint of writing grant proposals to large, usually federal, funding agencies is that these agencies maintain clear research agendas. This is not to say that they want to dictate the direction of all research proposals submitted, which would be self-defeating, but agencies do have areas in which they will (by preference or mandate) funnel funding budgets. Even within NSF, which has agency-wide priorities that include broadening scientific impact among underrepresented groups, most directorates, divisions, and programs also have very detailed portfolios of research interests. Since POs do not actually do the research themselves, "It's the program officer's job to balance all of the various considerations in putting together a selection of grant awards that collectively do the most to advance the field that the program represents" (Chapin, 2004, p. 73). Most often program managers at varying levels have responsibility to establish and maintain those directions.

In the real world, the fact that PIs need sponsored funding to support research activity is often in conflict with the ideal of forming their own projects first and then seeking funding to fit that form. They often do tailor their research to a funder's agenda. Moreover, funding agencies have limited budgets (as mandated by congress for federal agencies or as determined by other economics for private funders). Agencies divvy up budgets and portion allocations relative to agency mandates and research agendas (e.g., American Recovery and Reinvestment Act initiatives, the president's *State of the Union* announcement that we need to pursue more nuclear energy research and development). To reconcile this conflict, academics in proposal writing have suggested that savvy investigators, regardless of research area, will do the homework necessary to bring to light a funder's research needs and reconcile those with their own funding needs (Chapin, 2004; Friedland, 2000; Johnson-Sheehan, 2008; Myers, 1990). If an identified "program's portfolio is light in its representation of a particular area within the field, then a strong new proposal in that area is likely to get funded" (Chapin, 2004, p. 71). Of course, this is one possible explanation for well written proposals that do not get funded—they may simply not be reconciled with funders' needs.

The best research idea and project get nowhere without funding, and the grant proposal process is the mechanism by which most of that sponsored funding is secured. Though they may not actually refer to rhetoric, investigators and program managers alike would generally agree that the primary task of the proposal writer is to present a research idea to a potential funder "in a convincing manner so that [the] proposal will earn scores of 'Excellent' or better from both the reviewers and the panelists or program officers who read it" (Blackburn, 2003, p. 9; see also Chapin, 2004; Friedland, 2000; Hall & Howlett,



2003; Johnson-Sheehan, 2008; Yang, 2005). That is, the primary task of the proposal writer is to craft an argument; it is rhetorical. And while so many things need to be done correctly, so many things can and do go wrong.

All agencies have some sort of evaluation ranking or a review score continuum, often ranging from scores such as Superior or Excellent to Very Good and Good down to Fair and Poor. When the proposal has, indeed, gone wrong, reviewers score the proposal at the lower end of the scale. Multiple practitioners list a variety of elements that will move a proposal down the scale including a poor research plan, inappropriate prose and style, lack of focus, vague budgets, lack of detail, too much detail, poor methods or analysis, inattention to submission rules, frustrating readers/reviewers with poor textual choices, and so forth (Blackburn, 2003; Chapin, 2004; Friedland, 2000; Johnson-Sheehan, 2008; Yang, 2005). Although the goal is to receive Excellent scores that push a PI toward funding, a Very Good, for example, “is a score that reviewers use to convey the encouraging message that the proposal is basically sound and potentially fundable” (Blackburn, 2003, p. 92) but that it is not quite there yet—however, with some revising it could be. That revision could come in the content and/or the writing of the proposal itself.

In seeking the Excellent score, how one produces (writes and rewrites—revising and resubmitting is common in this arena) the proposal document itself occupies much of a writer’s effort. To understand more deeply the nature of a proposal document’s structure and influence in the granting process, and specifically relative to the CAREER Award, a more theoretical framework will need to be outlined and applied. This literature review has, so far, been appropriately centered on scholarship from those who actually write, read, and assess grants for funding. Those who examine and comb through such

documents “under the microscope” looking for theory-based perspective need to engage a more actively academic discussion.

The sources in the following sections present the relevant discussion from the professional communication literature about research grant proposal writing specifically as well as theoretical lenses that will help to see the proposal genre more clearly.

Proposal writing is a highly rhetorical activity, and the professional communication field draws heavily upon both classical and contemporary rhetorical criticism and analysis as its theoretical underpinnings. Those scholars who possess understanding of rhetorical principles can shed bright light on this research site. An understanding of genres—what they are and how they work, for example to facilitate or even regulate communication and resulting meaning within a specific context—is an understanding of a largely rhetorical concept. A genre is a typified response—in this, as in many cases, a communicative response—to a recurring situation. Again, in this case, that situation includes the need for funding and the persuasive communicative activities engaged in within the system that grants it. Various approaches to genre analysis, then, help uncover the dynamics of that situation and its genre artifacts under this study’s view. The smattering of social perspectives included in this review illuminate how the social systems in which genres operate both influence and are influenced by the genres they engender.

### **Mixed Methods**

On the surface, proposal writing seems to be a very practical pursuit, yet to understand it best takes the application of theory. Indeed, Lewin (1951), who pioneered

research in complex social phenomena, said, “There is nothing so practical as a good theory” (p. 169). For this work, I draw on rhetorical theory, genre theory, and select insights from social theories.

Studying proposals relative to the rhetoric of strategic “moves” or the rhetoric of stylistic choice certainly helps understand what the CAREER proposal document is, what it does, and to a degree what choices writers make for rhetorical effect. However, adding genre theory perspectives shows how the CAREER proposal document has developed as it has into a rhetorical response to both the need and call for funding. Moreover, newer thought in genre theory that includes genre ecologies reveals the document structures that surround a CAREER proposal and the functions they perform individually and collectively. Still, because proposals at this level operate within very complex social structures, additional theoretical perspectives are needed to further gain insight into the social aspects of proposal writing. Play theory is an excellent candidate in this case since proposal writing can be viewed as a highly competitive field of play and because there are extensive rules proposal writers must follow to play the game successfully. This theory includes identifying and examining the spaces in which competition takes places (e.g., genre ecologies and social structures), why and how players engage in competition, and the rules of such play.

This combination of theory represents a novel contribution to current professional communication scholarship. Such combined theoretical lenses help reveal both elemental aspects as well as larger picture functions of the CAREER proposal and the structures it works in. It also reveals how the genre responds to and even exerts influence within its genre and social systems. Because mixed perspectives on genre/social systems are

relatively new,<sup>4</sup> this area-specific literature is not extensive. Consequently, in addition to citing technical communication scholarship, I also draw from scholars in discourse and composition studies.

A final theoretical method employed in this study, genre field analysis (Christensen et al., 2007; Christensen, deWinter, Moeller, & Sherlock, 2009; Moeller & Christensen, 2010), combines genre, rhetoric, posthuman perspectives, and play theory together to achieve that deeper and broader perspective needed to see what transpires in the entire field of play and with all its players. Through this framework and collection of lenses, proposal writers can identify and understand the roles of genres as agents of influence as well as human (or player) agents, the “play scenarios” engaged by those agents, and the “transformative locales” where play scenarios as well as meaning mediation transpire (Moeller & Christensen, 2010, p. 71). Mediation in this context refers to how the agents (including the tools and sign systems of the genre artifacts as well as the activity of players) within a system negotiate meaning and further activity (Nardi, 1996). Such understanding allows investigators to more conscientiously make better proposal writing decisions because they begin to see the proposal document they are producing not as an isolated artifact but as an influencing and integral part of a larger system of activity.

### **Rhetorical Analysis**

To understand the concept of genre, I take the discussion first to the elements of rhetoric. Both classical and contemporary rhetorical theory reveals a view of what a

---

<sup>4</sup> I suggest that Spinuzzi and colleagues, whose discussions of genre ecologies are cited often in this work, are among the pioneers working with these combined perspectives within the past ten years.

particular genre “is” and “does” as well as the strategies, or “moves,” employed by writers to make it “do” what it does. Swales (1990) and Paradis (1991), for instance, placed genre analysis in a rhetorical context as they discuss the actions that specific genres initiate among human actors. Going much further into history, a reading of Aristotle’s *On Rhetoric* might help us see how genres are developed and how artifacts respond to genres. From this reading, I employ the elements of invention, arrangement, style, memory, and delivery as a lens to examine genre development. Working through these canonical steps, rhetoric, then, can be seen as the energy inherent in emotion and thought, transmitted through a system of signs, including language, to others to influence their decisions or actions (Kennedy, 1983, p. 7). That a grant proposal must succinctly present the case that a single investigator or group of researchers should be given large amounts of money to conduct research on an agency’s behalf is the quintessential exercise of Aristotle’s elementary rhetorical function of employing the best available means of persuasion in each case (p. 35).

If rhetoric is the use of various symbols (including words, images, and other textual cues including presentation through formatting strategies), rhetorical analysis “enables us to become more sophisticated and discriminating in explaining, investigating, and understanding symbols and our responses to them” (Foss, 2004, p. 7). The next logical step beyond explaining, investigating, and understanding would be selection and deployment of tactics for specific rhetorical intent. In essence, rhetorical analysis “is an effort to read interpretively, with an eye toward understanding a message fully and how that message is crafted to earn a particular response (Selzer, 2004, p. 282). Though a grant proposal writer may not be an expert in rhetorical analysis, her application of

rhetorical examination (whether formally or informally, whether knowingly or naively) will lead her to study and evaluate the prescriptive documents surrounding a funding solicitation. She will also examine the social structure from which those documents arise and within which they operate, and, as importantly, the form, format, and function of the proposal document she has produced in response to those will lead to more deliberate and effective texts (Bazerman & Prior, 2004). In reality, whether they know it or not, with every exploration into the NSF website and other documentation to try to find out how to write a proposal that will win funding, PIs perform a rhetorically evaluative task.

To cite a contextual example, just as much as investigators expect to view an NSF website that responds to their needs and that facilitates their success, NSF POs and reviewers alike expect to receive a proposal document that succinctly addresses their needs and is responsive to their constraints. “Users do not care about systems that reflect a designer’s perspective: they want a system that is familiar and sensitive to their own perspective of the technology and its ends” (Johnson, 1998, p. 30). This matching of needs can be termed an *identification*, which becomes an important reconciliation of understanding between the entities and concepts. If PIs and their proposed project and needs can be identified “with” POs and their agency expectations and needs, they can be seen as consubstantial (even as being able to understand each other because of the identification). As Burke (1950) explained, “You persuade a man only insofar as you can talk his language by speech, gesture, tonality, order image, attitude, idea, *identifying* your way with his” (p. 55).

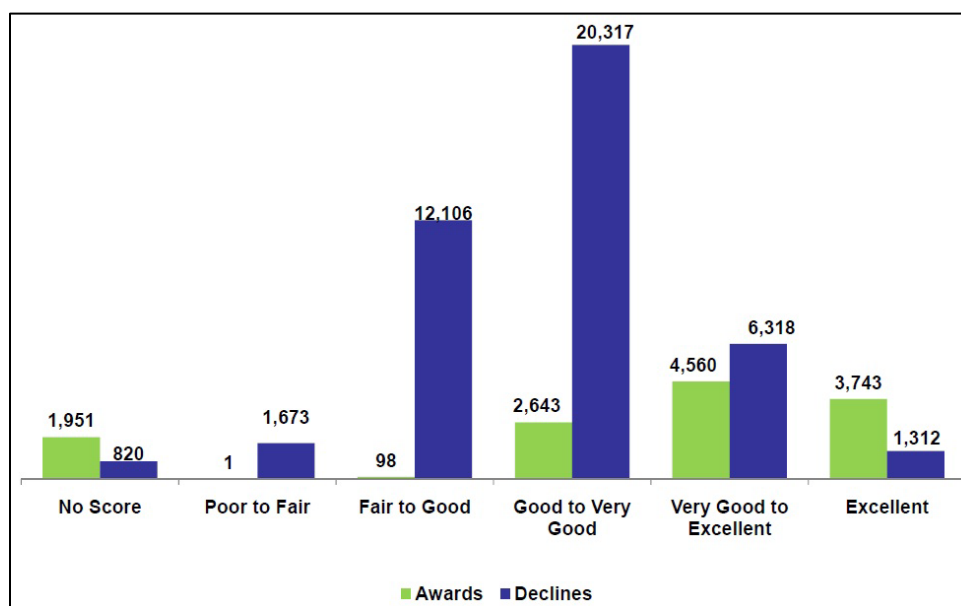
Perhaps a good way to see how a consubstantial proposal writing stage might be set relative to scientists as communicative performers comes from Yore, Hand, and

Florence's (2004) study that revealed that scientists generally see writing about science as a tool to accomplish or achieve something rather than as a discovery method—knowledge telling rather than knowledge building (p. 346). Though the study doesn't address grant writing specifically, it provides valuable insight into working with scientists who are writing grants. Often they have attitudes about writing that neglect (or even negate) the rhetorical realities, function, and opportunities of writing. One challenge facing investigators relative to working effectively with genres and the powerfully heuristic principles of rhetoric (or even the necessity to understand that there is such a thing as genre or rhetoric) is that they do not understand or do not see the need to understand that they exist within multiple complex rhetorical situations themselves (Flower & Hayes, 1980) and that they must reconcile their research and needs with those of the funding agency. Poor writers, or more correctly those who simply craft poorly written proposals, may "possess verbal and rhetorical skills which they fail to use because of their underdeveloped image of their rhetorical problem" (p. 30). However, a proposal writer who has developed a rhetorical sensibility has an advantage in terms of simply being able to identify the strategic moves available to her at any given time (e.g., Swales, 1990).

### **Rhetorical "Moves"**

PIs can certainly produce poor proposals: for example, a PI may not effectively establish the general significance of her work and link it logically to the project (Friedland, 2000, p. 35). Most academic grant proposal writers know their subject material well enough to conduct effective and meaningful research given the funding to do so, and most researchers can present their research subject and approach well enough

to at least compete for funding. However, as Figure 6 illustrates, even though reviews of Good and Very Good can receive funding, Excellents are also declined. As will be illustrated in chapter 4 of this work, researchers are generally able to follow a reasonable line of logic in presenting their ideas in a proposal's project description (Chapin, 2004, p. 63); however, unsuccessful proposals often make errors beyond just less interesting science. Those errors might include mechanical or conventional errors, omission of key



*Figure 6.* Distribution by average reviewer ratings for awards and declines, FY 2010 (source: NSF Salt Lake City Workshop, October 25-26, 2010).

sections, or perhaps jumbling their expected order—all of which might offer reviewers an excuse to give a proposal a less-than-excellent score.

Without a doubt, it is the content—the research project and plan—that ultimately is funded by funding agencies. Yet, often a researcher will say that her proposal was funded rather than acknowledge that it was her description in that proposal of the project's research efforts and scientific advancement that won the funding. Of course, that is what researchers mean, but it is also significant that they often maintain the former



assertion about their proposals. In essence, they are giving rhetorical agency to their proposal documents—the documents become agents on their behalf to do the work for them. More precisely, the agency exhibited by the document is evidence of the rhetorical “moves” the writer has made. Thus, it is the cumulative rhetorical effect of the proposal document itself, the moves made within it, and the arena it plays in that warrants this study of the proposal genre and what makes it do (or not do) what the writer wants it to do—namely, secure funding. Assuming that several CAREER proposals, for example, are received by a PO in an NSF program and all things regarding content across those proposals are of similar strength (project ideas, research plans, intellectual merit, broader impact, etc.), one might reasonably ask what increases the likelihood of a proposal landing in the funded stack.

In pursuit of that *Excellent* review AND funding, investigators may be tempted to simply think that “dressing up” a proposal document will do it. With most funding agencies having moved to electronic submission (both of documentation and application forms), gone are the days when nice binding, quality paper, color on pages, and hand delivery, and so forth could significantly set apart one document from another. Of course, with content being king, it is arguable whether those things ever even did have such an effect. One study on the effect of proposal appearance on evaluation scoring from as far back as 1977 debunks the idea that, even then, “slick and spicy” means very much in evaluation<sup>5</sup> (Dycus, 1977). On the other hand, that source and several others published

---

<sup>5</sup> The Dycus (1977) paper, “The Effect of Proposal Appearance on the Technical Evaluation Scoring of Government Proposals,” is as applicable now as when it was published and concludes that “spice” in a proposal to government agencies can be beneficial with “proposals to new agencies” with “new hires” who may lack experience closely examining content as well as with proposals for larger procurements that employ greater numbers of evaluators. The argument might be made that proposals written to NSF program areas (or other agencies) with rotating program officers (those who serve for just a few years) might do

since recognize the tremendous value of “professional appearance” and “craftsmanship” in differentiating content of similar quality in proposals (Bowman & Branchaw, 1992; Chapin, 2004; Dycus, 1977; Grove, 2004; Johnson-Sheehan, 2008; Yang, 2005). Moreover, in terms of ethos, “whether fairly or not, sloppiness in presentation inevitably raises the question in a reviewer’s mind as to whether the PI may also tend to sloppiness in the laboratory” (Chapin, 2004, p. 97).

Addressing a document’s appearance is only one of countless possible “moves” a proposal writer might make to better position her argument for research money. By moves, I mean those deliberate choices made to find the “best available means of persuasion” (Aristotle, 1991, p. 35) and to reconcile a funder’s and a researcher’s understanding of each others’ needs (Burke, 1950). Rhetorical principles clearly come to bear on a proposal document and its efficacy in conveying a researcher’s intent concerning a research project. Researchers apply these rhetorical principles in order to influence decision makers in order to secure funding. How we can see these principles applied and the effects of rhetorical moves will be discussed below from a more theoretical perspective. Multiple examples of moves (both good and bad) and how they can be identified and incorporated will be discussed in chapter 4. It is worthwhile here to present a brief academic discussion of the concept of rhetorical moves.

Myers (1990) explained the value of studying proposals as a type of scientific writing stating that they are the most rhetorical and foundational of the science writing genres and that other scientific genres essentially depend upon the success of proposals

---

better with more spice. However, NSF’s panel review system has been designed, in part, to eliminate such inconsistencies because it is impossible for proposers to know who will serve on review panels, and panels themselves are made up of both less experienced and veteran researchers. Dycus’s overall conclusion is that “The safe approach in competitive contract proposals is ‘nice’ cosmetic packaging” (p. 292).

(p. 41). He discussed at length classical rhetorical strategies and how proposal writers must balance appeals, particularly logos and ethos. He also discussed persona/ethos and how researchers must place themselves “just right” in the field, the literature, and as a researcher relative to those considerations (p. 59; see also Chapin, 2004, p. 9). In summation, Myers (1990) stated, “One must persuade without seeming to persuade. And yet almost every sentence is charged with rhetorical significance” (p. 42).

Connor and Mauranen (1999) studied research grant proposals in the European Union in the late 90s. To paraphrase the study, these researchers focused on several different rhetorical moves made by investigators in proposals to European Union funding agencies. One of the more common moves was to establish ethos by reporting of one’s own previous research (p. 56) to position oneself in the field’s knowledge and conversation as well as to position a researcher or research team’s members as well qualified to execute the project (p. 58). Another common move was to articulate how the project is situated in the field of research (p. 53), which would seem to go without saying as a move toward establishing the general intellectual merit of a project. What qualifies as intellectual merit for one agency, however, may vary from other agencies. Many researchers have told stories of having their proposals turned down in one program or agency only to have the exact same proposal funded in another. Accompanying that move was the tactic to situate the project in the world outside of the research (p. 53), clearly a move toward showing broader impact of the research. Researchers’ establishing intellectual merit of a project was also found in moves that included pinpointing the exigency of the project, identifying where the proposed research fills a gap in the field, and making claims about the project’s importance and/or novel nature (p. 54; p. 58).

Further evidence of presenting broader impacts included outlining specific benefits to the research field as well as outside communities.

A split occurs here in this work's application of the literature. On the one hand, the analysis examines the rhetorical effect of writers' moves, such as inclusion or placement of content or deploying appeals to logos or ethos. On the other hand, the analysis identifies the rhetoric of stylistic choices, such as professional appearance and craftsmanship focusing largely on moves made with elements such as fonts, headings, graphics, and other formatting concerns. Both, of course, are elements of the rhetorical canon, and both are employed in a persuasive mode. Bowman and Branchaw (1992) confirmed, "If two proposals are nearly identical in every respect except appearance, readers are psychologically predisposed to favor the proposal with the better, more professional appearance" (p. 119), especially if that appearance has been designed deliberately to draw attention to key points or, better yet, lead time-pressed reviewers to them. Much of the literature discusses writers' stylistic choices as well as how they do or do not effectively design or organize their documents. Generally, the literature discusses content appeals and stylistic moves and assumes PIs' intent is to create documents that are persuasive with a specific audience. This focus leads to a deeper discussion of genre to grasp better what the proposal document is, how it does what it does, and how it functions relative to other documents within its genre and social system.

### **Genre**

A fair amount of discussion has taken place over the past 30 years in the professional communication literature about the proposal genre. Analyses of proposals

have included examinations of their conventions relative to their rhetorical work (Bazerman, 1994; Rude, 1995). Scholars have also used more broadly focused and mixed method lenses such as genre ecologies (Bazerman, 1988; Spinuzzi, 2002, 2003; Swales, 1990) to investigate conventional, rhetorical, and social influences of a larger variety of proposal types including business, engineering, and research (Zachry, Spinuzzi & Hart-Davidson, 2006; Yates & Orlikowski, 2007).

Many rhetoric and composition scholars have contributed genre definitions. Among those definitions, the common features are clear: a genre, in the rhetorical sense, is a distinctive, typified rhetorical a) action crafted to address a recurring purpose or b) response to a recurring social situation (Miller, 1984; Yates & Orlikowski, 1992, 2007). Genres are both determined and maintained by certain conventions in style, format, arrangement, delivery, and so forth. Examples of conventions in this context as determined by NSF include requiring the use of 1 inch margins, page numbers, and specific fonts and type sizes. An understanding of the principles of genre analysis helps a writer know that “Conventions create a stable landscape in which to manage . . . complexities” (Kostelnick & Hassett, 2003, p. 78) and that “readers rely on these well-worn paths for interpretive survival” (p. 74). The absence of that understanding creates miscommunication and misunderstanding (Ornatowski, 1997; Paradis, 1991).

Though much study in genre focuses on textual conventions and structural features relative to purpose and context, genre research also concentrates on how genres exert influence on user aspects, such as how writers adapt and modify generic forms to meet a rhetorical exigency, which affects how genres are formed within social institutions (Bazerman, 1994; Berkenkotter & Huckin, 1995; Miller, 1984). An example here would

be how conventions of the internal memo document type have formed both in response to intra-organizational communication needs and as a progression from previous forms of similar communication; e.g., the business letter (Yates & Orlikowski, 1992). In this perspective, document types are not seen as neutral, but rather as social constructs. Examining genres under the lens of social construction requires an examination of the discourse community surrounding those genres: “in studying both how the ideology of the communities that own the genres is reflected in the rhetorical construction of these genres and how genres help to construct social structures” (Luzon, 2005, p. 287). Though much work with genres concerns the form and conventions and rhetorical moves made within those parameters, Rude (1995) explained that to understand genre we need to see them as situated socially: “The difference in the genres can be explained in part by the type of problem they tackle and the means of inquiry required for solving that particular type of problem” (p. 74). Chapter 4 of this study addresses the former, the generic conventions, while chapter 5 examines such rhetorical and conventional moves in the context of the genre’s system, which includes multiple other genres and a complex human agent social structure.

In laying a foundation to describe what genre is and what genres do, I draw upon two earlier works. Miller (1984) described genre as “a complex of formal and substantive features that create a particular effect in a given situation . . . pragmatic, fully rhetorical, a point of connection between intention and effect, an aspect of social action” (p. 25). Swales (1990) further offered, “The rationale behind a genre establishes constraints on allowable contributions in terms of their content, positioning and form. Established members of discourse communities employ genres to realize communicatively the goals

of their communities” (p. 52). In the context of proposal writing, funding agencies deploy multiple genres (e.g., GPG, solicitations, websites) to manage prescriptive information about research agendas and funding opportunities and to streamline management of grant application processes. Similarly, proposers deploy specific genres (e.g., the grant proposal, white papers, budget narratives) as the conventional (i.e., typified) response to the social context and systems that have developed around the granting process.

Berkenkotter and Huckin (1995) dealt with genre at the level of disciplinary and professional culture and maintained that genre performs two functions: 1) constitutive in that genres grow from and help maintain social meanings and structures; and 2) generative as they facilitate meaning in the same. This insight is helpful in light of writing grant proposals: researchers incorporate experience with genres from other contexts into a social knowledge that orients them “to create an appropriate rhetorical and conceptual context (p. 13), which, in turn, helps them create a proposal that best positions their own research in a competitive funding process.

Bazerman (1988) pointed out how genre perspectives help us see the rhetorical and social realities of science knowledge creation and of writing, rhetoric, and social interplay as the influences and tools of that knowledge making. As we as human players gain understanding of our location and operation within a system relative to the genre tools we have at our disposal, and as we become increasingly deliberate and strategic with the way we use those tools, “we can start to understand what we can achieve rhetorically at any moment, and what we cannot, and how. . . . Through an understanding of the genres available to us at any time we can understand the roles and relationships open to us” (Bazerman, 1994, p. 99).

The need to understand the form, conventions, context, and use of multiple genres, as Miller (1984) explained, grows out of “an objectified social need” and “social motive” (p. 30). The primary motive of investigators is to secure funding for research (and, thereby, the attendant benefits of tenure, advancement, recognition, etc.).

Constraints funders deal with include a mandate to advance a specific area of science and technology and doing so by allocating a certain amount of funds (i.e., budget) among investigators who have attempted to present the best evidence that their research will match agency agendas and mandates. Program managers also often feel the need to fairly divvy up budgets among research areas as well as geographical areas. These collective motives are, at once, economic, pragmatic, and strategic, and most importantly in this context, exist within and because of elaborate social constructs. Thus, genres afford clear navigation points through those constructs. “It is through the process of typification that we create recurrence, analogies, similarities” (Miller, 1984, p. 29); therefore, “genres serve as keys to understanding how to participate in the actions of a community” (p. 39). Specifically for this study, genres help investigators understand how to participate within communities of funding agencies, POs, reviewers, investigators, collaborators, and so on. Knowing what genres do within their contexts (e.g., rhetorically, organizationally) and how they act as keys to understanding is of great interest to investigators/proposal writers needing any edge possible in an extremely competitive arena. Understanding the influence genres either inherently have or that which has been given to them by examining their form and what they are intended to do is a key component of genre analysis.



## Genre Analysis

Miller (1984) found that understanding the conventions of genre and situating those as typified reactions to the social situations that spawned them helps understand the social action itself. “Genre analysis should begin with the context in which the genre functions rather than with the form” (p. 72). I might recall the previously mentioned examples of the memo (Yates & Orlikowski, 1992). Genre analysis might first identify the context of such a document as an internal communication within a particular organization. Further, insight into its purpose and audience could be gained from examining the content of the “From,” “To,” and “Subject” lines. A connection exists between this example and many of the practitioner-oriented proposal writing books, few of which actually call upon writers to understand either the purpose (i.e., of the research solicitation) or the audience before drafting the proposal document as a persuasive tool for “social action.”<sup>6</sup> Many of the “how to” books focus on the how to of the writing and formatting mechanics without understanding first why and really to whom they’re writing a proposal (which seems akin to a mechanic “fixing” a car without running diagnostics or even talking with the owner/driver to discover symptoms as a clue to what needs to be fixed—in both cases most often resulting in wasted time and money). This “mechanic” example fits best in line with the rhetorical aspect of convention and form, though its principle can and should be equally applied to the appeals made regarding content (e.g., logos and ethos, as discussed).

Genre analysis can tell us that a particular document is, indeed, a funding solicitation or a grant proposal—that it fits within a certain set of conventions and

---

<sup>6</sup> Some examples of how-to and textbooks that do appropriately address such rhetorical exigency include Bowman & Branchaw, 1992; Chapin, 2004; Johnson-Sheehan, 2008.

expectations—and how it is at least anticipated to work within a particular genre and/or social system. It is more important for the purposes of this study to understand what a particular genre artifact does relative to those conventions and expectations and the social action it is intended to elicit (Bazerman, 1988; Miller, 1984; Rude, 1995). Because “The genre not only embodies but also directs the approach to knowledge making” (Rude, 1995, p. 78), those crafting an artifact of a particular genre (e.g., a grant proposal) can think more strategically in terms of crafting it in terms of what it does rather than just what it looks like.

### **Genre Assemblages**

By this point, it should be well established that individual genres do not operate in isolation. They exist within social systems that contain multiple other genres, and these systems work within larger social systems (Swales, 1990). For example, Bazerman (1988) discussed the rhetorical and social realities of the science article genre in science knowledge creation and of writing, rhetoric, and social interplay as the influences and tools of that knowledge making. Miller (1994) suggested, “We cannot fully understand genres without further understanding the system of commonality of which they are a constituent, without exploring further the nature of the collectivity” (p. 72), thus tying together the concept of genre again with the social structures and rhetorical situations that produced them.

The topic of genre assemblages, ecologies, or systems, has been quite popular in academic circles over the past two decades (Bazerman, 1994; Paré, 2000; Spinuzzi, 2002, 2004; Spinuzzi & Zachry, 2000; Yates & Orlikowski, 2002; Zachry, et al., 2006). Their

popularity rises primarily from the limitations of more traditional genre theory to understand the rhetorical work genres do within their larger systems. Spinuzzi (2002), for example, accounted for the reality that genres do not exist in isolation but rather as sets, systems, or ecologies of multiple genres (some deliberate and some situationally-reactive in nature). His model focused on the mediatory relationships between genres as they function in social contexts. In a study of the evolution of the memo genre, Yates and Orlikowski (1992) described how genres can be *maintained*, *elaborated*, and eventually *modified* to “conform” to social need (p. 306). If a genre can conform to social needs and, indeed, can be manipulated to do so, adapting genres to most effectively and strategically work within their systems is equally attainable. In fact, in another treatise on genre ecologies, Spinuzzi (2003) presented the historical view that most genre models (as often used in user- or system-centered design frameworks) position genres as maintaining dominant agency—and, therefore, human agents can be seen as exhibiting limited agency under the control of the dominant genre. Christensen et al. (2007) found, for example, that the proscriptive manner in which a particular set of software development documentation was written actually inhibited developers from making progress. Under Spinuzzi’s rhetorically liberating perspective, an understanding of genre function and strategic use within ecologies initiates users’ capacity to workarounds as users/workers adapt, adapt to, and introduce genres into ecologies seeking solutions, influence, and innovation.

### **Social Aspects**

The multiple POs, panels, and peer review options at NSF (also used in varying forms by other agencies) constitute an inherently social structure proposers must learn to work with and within (Mitroff & Chubin, 1979), let alone the multiple divisions, directorates, and programs at agencies as well as the departments, colleges, research and programs offices at universities. Considering all of the possible social aspects surrounding the genre, writers must learn to navigate the processes and systems to be engaged by realizing that “grant proposals exist only as part of the web of the larger genre system within which grant writers must participate (Tardy, 2003, p. 31) and that “It is through this enculturation process that [proposal writers] can build knowledge of the grant-proposal genre” (p. 30).

Relative to the writing itself, both from a content and form perspective, the rhetorical moves and decisions made in producing a proposal document can be seen as socially constructed (e.g., Bruffee, 1984; Dombrowski, 1992; Lipson, 1988). In other words, proposal writers draw on the social constructs and what they know related to and because of their association within those constructs. This is not only because proposers draw upon the social constructions they are familiar with but also because proposers are attempting to enter social systems they may actually be less familiar with (to influence funding decision makers) and, thus, they attempt to produce documents in a fashion they anticipate is expected by the system’s initiated members based upon what they know of that system. This is evidenced in proposals when investigators position their work and themselves in the field as well as present their own and their institutions’ credentials in an effort to convince those decision makers (Connor, 2000; Connor & Mauranen, 1999).

Further, though hunkering down in an office and hammering out a proposal document may seem the norm, the writing process is, or should be, a social act (Allen, Atkinson, Morgan, Moore & Snow, 1997; Burnett, 1991; Cross, 1994; Trimbur, 1989). It certainly can be so. Whether they take advantage of it or not, most investigators have access to some level of mentoring and collaboration opportunities. Just at NSF, for example, one can access the availability of peer review networks, agency workshops and outreach activities, and several other writing process helps (Chapin, 2004; see also interviews in chapter 5). In the past couple decades, larger institutions, universities, and private and national laboratories that count on much of their sustaining funds coming from grants, have developed complex organizations and systems (e.g., mentors, collaborators, consultants, technical writers, and proposal development offices) as support structures for proposal writing (Yang, 2005; Zachry et al., 2006). Another common practice espoused by any proposal writer with at least a little experience is that of watching others play the proposal writing game (Friedland, 2000; Kennedy, 1983; Myers, 1990; Tardy, 2003) to learn from examining other writers' effective writing practices as well as their failures.

Play theory is helpful in defining those spaces relative to the rules-based, highly competitive, high stakes arena in which the research funding and grant proposal process plays out. Noted play theorist Huizinga (1950) defined the function of play as “a contest *for* something or a representation *of* something. These two functions can unite in such a way that the game ‘represents’ a contest, or else becomes a contest for the best representation of something” (p. 13). Basely put, this is the pursuit of grant writing, which is for a researcher to represent his or her research project in a grant proposal in the pursuit of funding to actually carry out the project.

Play theory can open up the complex competitive arenas under focus here for closer viewing because “the focus is as much on understanding the field of play itself as well as the genres and other agents at play within it” (Christensen et al., 2007, p. 2). I do recognize some limitations in play theory to the application of this work. Caillois’ (1958) six elements that defined play include two that arise in direct opposition to the activity of grant proposal writing—that play is unproductive, “creating neither goods, nor wealth, nor new elements of any kind . . . ending in a situation identical to that prevailing at the beginning of the game” and that it is make believe, “a free unreality, as against real life” (p. 10). Certainly, researchers, who enter this “game” know the stress of being productive; thereby, they experience the reality—both when winning in the system (and receiving funding with which to continue a career) and when the reality hits of having no funding looming over the need for it to obtain tenure. Caillois’ (p. 9) other elements, however, are helpful in defining the type of space and activities involved in pursuing grants:

- that such a competition is *free*, and is not obligatory—a PI can choose to enter or leave any particular granting opportunity space at any time
- that it is *separate*, “circumscribed within limits of space and time, defined and fixed in advance
- that it is *uncertain*, and the outcome cannot be entirely determined before entering the game but that there is “some latitude for innovations being left to the player’s initiative”
- that it is *governed by rules*, as has already been well established in regards to NSF funding system

As a way to gain access to this play space, proposal writing commentators often suggest that watching others play in terms of “interactions in [the proposal arena] system” (Tardy, 2003, p. 32) may be a preferred way to eliminate potential mistakes (Friedland, 2000). These peeks into the proposal arena can lead proposal writers to the comfort level required to “try on” various writing strategies relative to what they know about proposal writing generally and about specific program requirements. Huizinga (1950) would term that activity “dressing up” in which “The disguised or masked individual ‘plays’ another part,” (p. 13) which a PI can comfortably do until he feels comfortable actually being that part in reality.

The PI determines, often by his own level of success, whether he will watch or participate in the granting system spaces. These social, political, rhetorical spaces, (e.g., NSF’s website, proposal preparation activities, review process) where rules, constraints, players, and play pieces combine might be termed as the playground, a sacred space governed by its own rules (Huizinga, 1950, p. 14) in which “The shaping of meaning is necessarily dependent on the locale in which meaning making events are invoked” (McAllister, 2004, p. 59).

### **Mixed Methods (revisited)**

A research proposal is an exercise of language, and language is a social behavior, “a system of shared values and meanings.” As such, language is not only related to the culture of the community, it also regulates and even excludes some from the community. Language’s “structural conventions incorporate controls and attitudes” (Lipson, 1988, p. 13). As such, communicative performances, such as proposal writing, that incorporate

genres and work within genre systems, such as the proposal writing and funding process, are more complex than we might recognize on the surface, and the effects of any action taken by human actors with and within those systems may be impossible to anticipate by exclusively looking at the artifacts. Historical examples here include documentation surrounding the Space Shuttle Challenger disaster (Dombrowski, 1992; Winsor, 1990), technical documentation surrounding the “final solution” in Nazi controlled Germany (Katz, 1992), and even contemporary software and hardware user documentation (Christensen et al., 2007; Paradis, 1991). These examples provide instances of documentation that either prohibited action that would have avoided tragedy (e.g., Challenger) or enabled action that facilitated tragedy (e.g., final solution).

A broader and deeper framework that incorporates a combination of more theoretical angles of view is required to see all the players and the actions they initiate or inhibit within a system. Even then, those effects might be able to be identified more in hindsight rather than pro-actively. Of course, the value of hindsight is that it lends to the broader and deeper framework as players (such as proposal writers) enter future forays into proposal writing genre and social systems.

Precedence has been set for combining theoretical lenses in the search for more comprehensive understanding of complex systems. Spinuzzi (2007) studied the genre ecologies of a large telecommunications company to identify where communication breaks down and how to improve it. His inclusion of the sociocultural approaches of activity theory and actor-network theory allowed him to trace the activity of phone company policy and practices through the genres of multiple communication tools. I may have incorporated activity theory more into the mixed methods for this study since it



proposes that consciousness (the relations between people and things, such as artifacts or genres) is located in the everyday practice of the activity human agents participate in (e.g., grant proposal writing for researchers) and that such activity is “inextricably embedded in the social matrix . . . composed of people and artifacts” (Nardi, 1996, p. 7). However, activity theory recognizes an asymmetrical level of influence for genres and players, and it focuses on the “importance of motive and consciousness—which belong only to humans” (p. 13), which would not allow for the possibility that the artifacts, or genres, themselves may, indeed, disproportionately exert influence over human agents in any given situation.

In another mixed methods example that hints at activity theory, Tardy (2003) follows the processes of 2 proposal writers. Focusing on genre theory (generally as well as genre sets, systems, and ecologies) as well as discourse theory, she recounts the conceptual phase, writing, and review processes of grant proposal writing. She also comes close to genre field analysis (which possibly represents an evolutionary step since genre field analysis did not surface until 4 years after Tardy’s piece). In many cases she begs the academy for more examination of the social aspects of the proposal genre. Her genre literature foundation rests heavily on Swales (1990) and Bazerman (1988, 1994) (and other genre gurus: Devitt, 1991, 2000; Paré, 2000), though her inclusions from Myers (1990) get more to the scientific discourse community’s thoughts on genre.

These broader and deeper frameworks, like in the present work, also include examination of genre and rhetoric strategies and take advantage of their insights to look beyond what they might individually reveal. Posthuman lenses, for example, add depth to this scope by allowing us to look at the interplay of genres, the social elements, and the

mediating technologies by and through which they are communicated (Hayles, 1999; Mara, 2006). Examining these mediated interactions reveals a certain amount of agency and influence not only on the part of human actors within the systems but also of the genre artifacts individually as well as their collective (Christensen et al., 2007). Whether we view documentation surrounding the proposal process or the technology that may deliver artifacts to and from multiple human actors, “the human and the technical are no longer seen in opposition but as operating together in complex ecologies” (Hawk, 2004)—ecologies in this sense refers to not only the systems of social and genre operation, but also the social, temporal, and technologically mediated spaces in which those systems themselves operate.

I mentioned genre field analysis (GFA) earlier in this chapter to provide a framework for the other research methods outlined herein. As the final theoretical lens to be employed in this study, GFA combines several theoretical perspectives together to help see more clearly the larger picture. Identifying and understanding the roles of genres and humans as agents of influence, the engagement in the system by and through those agents, and the locales where meaning mediation and negotiation transpire allows investigators to more conscientiously make better proposal writing decisions.

### **CHAPTER 3**

## **RESEARCH METHODS**

A CAREER award PI must integrate her research and education activities with the intellectual merit and broader impact criteria for a period of five years in the proposal document. To meet reviewers' expectations, receive favorable reviews, and gain funding, the PI must craft that integration rhetorically to communicate that her project plan (and need for research funding) matches the larger NSF and program research priorities. All this needs to be done within 15 pages of text for the project description and in a manner that leads time-pressed POs and reviewers to key points while avoiding surface distractions. A few attendant documents are also required, including a project budget, a curriculum vitae, letters of support and/or collaboration (as appropriate), and a 1-page summary of the project. These peripheral documents complement the project description rather than expand into additional information. Fifteen pages is a small space to persuasively communicate five years worth of work; consequently, as Myers (1990) pointed out, "every textual feature of a proposal must be intended to persuade the granting agency" (p. 41).

At the same time, any number of factors that are external to a PI's intended persuasive strategies may influence a CAREER proposal's form, feel, and flavor. Those factors may include NSF documents as well as social factors, including collaborators' input, reviewer comments, and conversations with program managers. Determining the most influential factors for writing a successful proposal document—a communication artifact that exists and functions within complex genre and social structures—is a daunting task. A number of human social influences also come into play that a PI may or

may not be aware of, yet which can both advance or hinder a proposal's progress. Such an examination would be best conducted from theoretical perspectives that provide understanding of genres and genre systems as well as the social factors that influence them. Thus, the mixed methodology rehearsed in the previous chapter has been collected for this work to provide understanding of and insights into working effectively with this multi-faceted problem that involves examining document types relative to human agents who work with them as well as the social spaces in which that interplay operates. The preceding literature review presented such perspectives that will serve as the foundation for the methods outlined below.

### **Mixed Methods**

A brief review of this study's research questions recalls my search for evidence of any influential factors on a CAREER proposal that would potentially make it more likely to receive funding. The overarching question asks if factors can be identified that influence funding success relative to the proposal document's production and also that influence the arena the proposal document enters, and, if so, what are they? From a broader perspective these factors would include how to best work with genres, human players, the social spaces in which these play out the funding process, and the elements' interplay itself. Upon closer examination, the factors also include the choices about the genre's appearance and what content elements the PI chooses to include. I also consider in this study how the PI is influenced by other documents and people relative to decision making when producing a proposal.

Because no single method, qualitative or quantitative, rhetorical or social, could possibly account for the multiple aspects of such a complex subject, the mixed methods outlined in the literature review bring clarity to these multiple aspects individually as well as collectively. The view afforded by the combined methods can be analogized to trying to understand what role the players, coaches, referees, fans, cheerleaders, etc. each individually play in making up the entire collective field of activity at a football game.

From a rhetorical analysis perspective, a quarterback could be viewed as the player who may take a passing play sent in from the coaches and then deliberates and chooses (usually within a few seconds) how that play can be best executed as he looks for options of receivers or even contingencies both before and as the play ensues to most effectively deliver the ball for a gain. In the same context, a genre analysis perspective would examine how and where the quarterback lines up, what his primary job is once the play begins, and the expectations of how he is supposed to perform his task. In an expanded genre analysis mode, genre ecologies thought would examine each player and his respective alignment, responsibilities, and expectations relative to the same considerations for the other players on the field, including the quarterback. Social theory perspectives might have analysts examine how, where, and under what circumstances the quarterback was trained to play the position and do the same for other players on both sides and evaluate what the players are doing in relation to other players on the field given those considerations. Such a perspective might be used simply to understand the social context but may also be employed to improve its efficacy. Play theory could be used heuristically to examine the quarterback's motivations to play the game as well as the structure of rules for the game of football and for the quarterback position

specifically. More important, perhaps, is the determination of how the influence from all those agents was exerted during the football game and how that exercise of agency affected not only the outcome of the game but all the attending activities surrounding the game (even including concessions sales, ticket prices, and strategies for the next game).

The combination of these methods could also be seen much like Benjamin Franklin's mythical spectacles used by the protagonist Ben Gates (Nicolas Cage) in the movie *National Treasure*. Gates used the multiple-layered-lenses spectacles to read a map inscribed (invisibly, of course, except for use of the special lenses) on the back of the Declaration of Independence. Each layer of lenses provided more detail and, thus, a more clear picture of the map—a picture that would only give a part of the complete picture were it not for the use of the several lenses. The theory diagram in Figure 7 shows the progression through and interrelatedness of the lenses employed in this study.

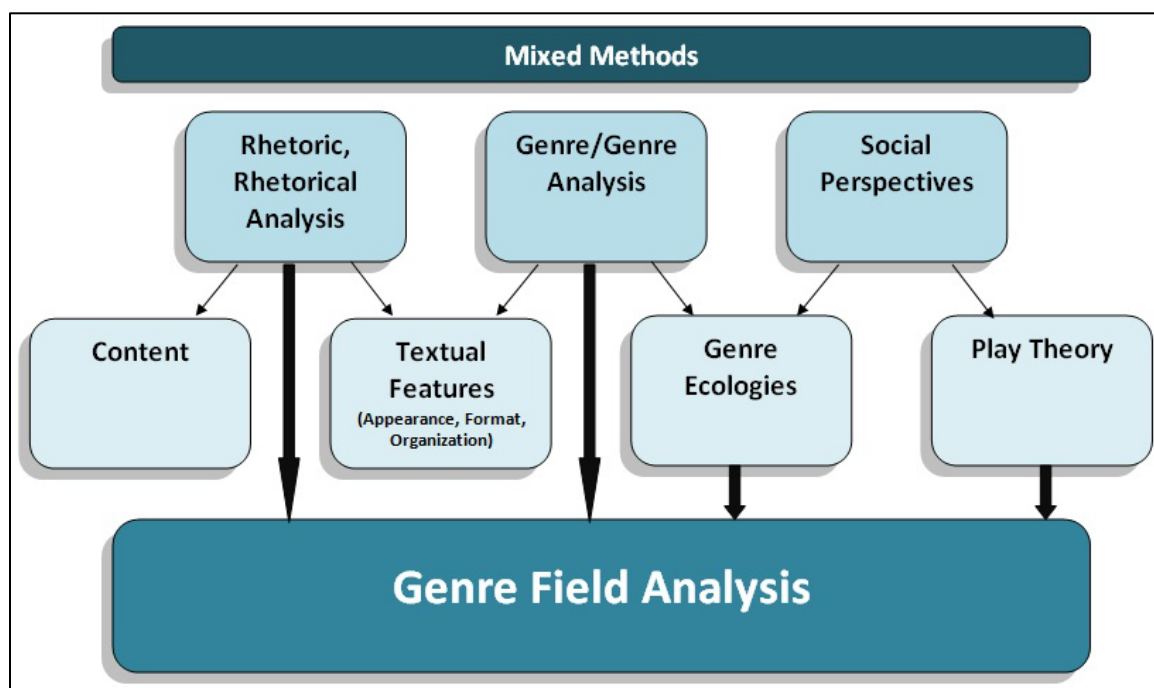


Figure 7. Diagram of this study's mixed methods' inter-relatedness.

Referring to the figure and recalling the mixed methods discussion from the literature review in chapter 2, this study begins by identifying and rhetorically evaluating the content of both successful and unsuccessful CAREER proposal documents (e.g., Bazerman & Prior, 2004). At the same time, rhetorical analysis prompts an evaluation of the proposals' textual features including appearance and formatting (e.g., type fonts, bolded headings, use of italics and/or bold for key words of concepts) as well as organization. Considering these elements will help create a rhetorical map (much like strategies employed to lead users to key information in geographical maps and other visual information). Such a map can lead a reader to key points throughout the document (e.g., Barton & Barton, 1991; Ornatowski, 1997). Both of these aspects are addressed in greater depth in chapter 4.

Thinking in terms of genre conventions and rhetorical moves leads me to want to know what conventions and rhetorical moves show up in funded proposals as compared with non-funded proposals. The first questions I had in mind as I began this study while consulting with various faculty members writing CAREER proposals were what are the genre's conventions and how can I identify those to help produce a document that was, at least, consistent with those conventions? This can be accomplished by identifying the conventions and observable moves and then tracking instances of those in both funded and unfunded documents. When observations reveal recurring evidence of writers' having met document expectations, we might label the manifestations of these evidences as genre conventions. Established conventions can be identified through the review of a collection of document artifacts to see recurring instances of conventional choices by writers across the collection. Rhetorical moves are those deliberate, and sometimes even

unconventional, rhetorical choices made by a proposal writer in a persuasive mode. A more conventional rhetorical move might involve specifically pointing to the fact that a certain aspect of a project is a “novel” contribution to the field by calling it novel in a variety of different ways (see chapter 4). A less conventional rhetorical move might be to not use bold in any instance in a proposal with the exception of bolding 1 word or 1 sentence out of the entire proposal that captures the project’s most salient point. Such moves can be identified in a document by combing through it for regularities and anomalies and evaluating their rhetorical effect. Again, the review of a meaningful corpus of sample proposal documents would reveal consistent patterns of rhetorical moves. It is equally important to find instances of conventions and moves in funded documents and to document their consistent absence in unfunded proposals.

Genre theory and genre analysis similarly examine the appearance, formatting, and organization of the document but do so largely with the purpose of confirming whether the rhetorical choices made are consistent with the conventional expectations of the genre (Kostelnick & Hassett, 2003)—violations of which may, at the least, disrupt meaning conveyed to reviewers and, at the worst, have a proposal returned without review. As genre theory has progressed into study of genre ecologies, this work also looks through genre ecologies to give a framework into which the proposal document as genre can be seen in its relationships with other genres in the proposals process. These genres include the attendant documents (e.g., 1 page summary, biosketch) submitted with the proposal’s project description. They might also include influencing documents like the GPG and solicitations as well as other proposal documents that have been examined by a PI as well as perhaps a white paper that could be sent to a PO for feedback.



Social perspectives, in addition to genre theory, inform the concept of genre ecologies. The reality that elements within any social structure possess agency (or the ability to exert influence) extends not only to the human players within social systems but also to the genres that are put into place by human agents to help make order of and regulate activities within the systems (Spinuzzi, 2003; see also Berkenkotter & Huckin, 1995). That influence is part of what make the genres what they are and perform the tasks they perform. The GPG, for example, has been crafted by NSF personnel over time as a policy document to guide PIs in how to format and submit proposals as well as to forecast the funding and declination processes.

I suggested in the last chapter that genres do not exist in isolation, so we must also look for attending influences, particularly other genre and genre system/ecology elements as well as social determinants co-existing with the genre artifacts. I already mentioned one possibility, that of attending documentation produced by NSF. CAREER writers, however, may be just as influenced in their writing by review of other PIs' proposals, reviewer comments from their own or even others' proposals (both funded and unfunded), and perhaps even influence from workshops or consultants. Seen collectively, all of these possibilities and others not identified here may form parts of a genre system within which a PI operates. That possibility also hints to the reality of social influences on a PI and the proposal document he produces. CAREER writers I personally work with in an engineering department's proposal development office work through a network of influencing "inputs" including the department proposal development office, the college proposal development office, the Sponsored Programs Office, the Vice President for Research's proposal development office, workshop leaders, departmental faculty peers

(including the department head), faculty peer reviewers (before submission), peer reviewers (who review on behalf of NSF), and NSF POs. An attempt to gain information from across that breadth, or perhaps a more in-depth view of at least one of those groups, may bring tremendous insight into the grant writing world entered by the CAREER proposal writer.

A key social theoretical perspective employed in this study is play theory. As discussed in chapter 2, play theory, as a social lens, helps delineate the spaces in which meaning is mediated within the complex and highly competitive arena of the CAREER proposal. Like a playground or an arena of a competitive sport, the world in which the proposal is submitted, reviewed, and funded or not is a “temporary world within the ordinary world, dedicated to the performance of an act apart” (Huizinga, 1950, p. 10). The PI and his activities are certainly located within such a space in which he may engage a number of different tactical engagements of multiple genres and other agents in an attempt to produce the most influential proposal document possible. Play theory also recognizes that these spaces and activities are conducted inside hierarchies of rules, the violation of which, knowingly or not, by the PI can constitute conditions for penalties that may even include dismissal from participating (Caillois, 1958, p. 10).

Finally, Figure 7 demonstrated how these key methods collectively inform Genre Field Analysis (GFA): rhetoric, genre, genre ecologies, and play theory. As will be discussed to a greater length in chapter 5, GFA first identifies the genres and players involved in a process, or system, like the NSF proposal/funding system. It then outlines the mediating spaces in which players may initiate “play scenarios” in an attempt to capitalize on the influence that is exerted by or on other genres and players. A proposal

writer might try to identify the genre-agents and player-agents as those elements that, by the nature of agency, can exert the most positive influence on the drafting of his proposal to place it strategically within a competitive field of play.

### **Rhetorical and Genre Analysis**

The foundational stage of the research includes identifying generic conventions and rhetorical strategies of successfully funded CAREER proposals. Documenting those conventions would help increase a PI's likelihood of writing a successful CAREER award proposal by studying successful use of conventions and moves in similar documents. Still, a PI might consult just a few successful documents and could possibly come away with a few good ideas of content or conventional moves to include in his proposal. What would be most helpful, however, is if a PI knew what content or conventional moves were consistently present across most successful proposals.

To gather a corpus of texts (i.e., a collection of funded CAREER proposal documents) to see if such consistent moves could be identified, I first sent a request to NSF to obtain 20 copies of funded CAREER proposals from the funding fiscal year 2004<sup>7</sup> through the NSF FOIA (Freedom of Information Act) office. I asked the NSF representative, who agreed to help me, to select proposals at her discretion from across divisions, directorates, and programs, which she did. I was informed that I would not be able to get copies of reviewers' comments with these proposals.

While waiting about two months for these proposals to arrive, I also personally contacted successfully funded CAREER PIs (whose contact information is available on

---

<sup>7</sup> I started collecting proposal samples in spring 2007. At that time, CAREER funding for the fiscal year 06-07 would have still been undecided, and I was told by NSF's FOIA office that funding for the 05-06 year was not entirely negotiated and recorded and, therefore, not releaseable.

the NSF website) from the same funding year. I contacted primarily PIs from other universities in the West, again across several NSF divisions, directorates, and programs. I asked those in this personal contacts group for an electronic copy of their project descriptions, summary pages, and reviewer comments. Through this method, I gathered an additional 12 funded CAREER award project descriptions and summary pages. Only a few of those PIs were willing to include reviewer comments.

I also sought out unfunded proposals from the PIs on my personal contacts list. I received three unfunded project descriptions from this method; however, I was more successful gathering unfunded proposals from faculty I was already acquainted with at USU. Between the personal contacts PI list and my USU PI list, I gathered a total of eight unfunded proposals. In both cases, I queried if they would make their unfunded CAREER proposals and reviewer comments available to me. Though PIs at USU were quite amenable to share their unfunded proposals, I continued to experience reticence from PIs across all the categories about sharing their reviewer comments. I assumed the hesitance in this regard stemmed from not wanting to share their imperfections or to share negative commentary about their work.

The corpus of texts that has become my primary research focus for this study includes 12 funded proposals (out of the 32 I originally gathered). I used funded samples from my personal contacts list and from USU PIs, including all those who sent reviewer comments, and others from the samples I had received from NSF. I mixed some from each of the groups to get a better sampling from multiple directorates.<sup>8</sup> Adding in the

---

<sup>8</sup> The total study corpus included proposals from the following seven NSF directorates: 4 from Biological Sciences; 5 from Computer & Information Science & Engineering; 2 from Education and Human Resources; 3 from Engineering; 1 from Geosciences; 2 from Mathematical & Physical Sciences; and 3 from Social, Behavioral & Economic Sciences.

eight unfunded proposals, I have conducted this research with a total sample size of 20 documents. This sample size was sufficiently large to identify patterns and noteworthy trends in CAREER proposal writing (for a more statistically relevant and much larger analysis, a similar number of proposals would need to be examined across each of the dozens of NSF divisions and programs—clearly a goal for further study). I have also incorporated some quantitative comparisons to help illustrate convention trends and emphasis by writers on specific rhetorical strategies. I used no distinct random or stratified method to select the proposals for the study. To do so for the scope of this study would be impracticable since the intent was not to develop a statistically finite case. Rather, I ensured that I had proposal samples representing as many NSF directorates and programs as possible, across both funded and unfunded proposals, from among the proposal documents I had available to me. This method proved to work well to illustrate trends, and such a study could reliably be reproduced by other researchers relative to the content, rhetorical, and document design analyses I would conduct, the results of which are presented in chapter 4.

### **Coding**

Along with genre analysis as a qualitative research method, I have employed content, rhetorical, and document design analysis—all as incremental methods—to identify those trends in features and conventions as well as moves and apparent strategies deployed (or not) by both funded and unfunded CAREER proposal writers. This study has incorporated an essentially qualitative research approach, yet I have been able to illustrate some of that with some meaningful quantitative representations of findings. For

example, when examining proposal texts for instances of conventions or rhetorical moves, I coded and tabulated analysis findings largely to compare occurrence of those instances between and across funded and unfunded proposal documents. Coding this way allowed me to identify and document the consistent forms of content and conventional moves a PI would want to know that exist across all or most successful proposals. As mentioned in a previous example, coding might include looking for instances among proposals of the word *novelty* as well as synonymous words or phrases—thus hypothesizing that if novelty were truly important, that word or forms of it would be found consistently in funded proposals and would potentially be absent from unfunded proposals.

Before doing any coding, I first had to discover and categorize the content (e.g., types of strategies), both conventional and rhetorical, most appropriate to examine. To do so, I assigned each document in the corpus a proposal ID name and then set up coding identification tables (see Appendix A for samples) on which I tracked my initial impressions and discovery of rhetorically crafted elements for each funded and unfunded proposal. For the content analysis of each proposal, I first recorded what I interpreted as a PI's explanation of his treatment of intellectual merit, such as establishment of the project's exigency, pronouncing novelty, positioning research relative to the field's background and/or future, and outlining anticipated outcomes. I also identified and categorized key general instances of deliberate broader impact and education strategies within the proposal including collaborations, dissemination, curriculum design, and advancing opportunity for underrepresented groups. Similarly, for the rhetorical analysis of each proposal, I recorded what I identified as key general instances of rhetorical

strategies (relative to the canonical elements of style, arrangement, etc.), language strategies, and other rhetorical moves. The other moves category included items that could have been recorded within the first two categories but that were done with a particular rhetorical intent that I found instructive to separate out for purposes of the study; e.g., instances of a writer's establishing consubstantiality—a more contemporary rhetorical concept.

My intent for the document design analysis was to examine, in further detail, the documents' conventional features. Though document design is also clearly rhetorical in nature (e.g., arrangement, memory, delivery), to identify adherence to or diversion from conventional norms and possibly even development of conventions, I found it illuminating to examine design elements in more minute detail. The categories I tracked in my coding identification table for document design included graphics, textual features, headings, and other page features. Coding the document design features was much more straight forward than the coding for the former analyses. I simply identified those document design features I found most revealing about CAREER proposal conventions and counted their occurrence in each proposal.

### **Content Analysis**

I have scoured each document in the study corpus for evidence of researchers' addressing key NSF review criteria (e.g., intellectual merit and broader impact, including education integration and broadening participation of women and minorities). In so doing, I coded the documents' key words and phrases in this regard that appeared frequently in the coding identification tables by identifying *topical chains* that relate the

criteria that allow participants in this particular field of communication (e.g., researchers, reviewers, POs) to signal each other that their discourse is compatible (Faber, 2007; Geisler, 2004; see also Burke, 1950). An example of a topical chain that should be found throughout all CAREER proposals would be a section or some other mechanism of education integration with the primary review criteria. One could expect, then, to find in funded proposals the use of words or phrases as topical chains that communicate some form of education integration. Accordingly in this case, one of the topical chains I looked for was section headings announcing education integration. In the absence of an actual section heading, I looked for the words *education* and *integration* and verified whether the document actually did outline an education integration plan of any kind. Coincidental with this step, I also tabulated the number and types of education activities (see chapter 4 for further details). Following coding, I tabulated primary occurrences for later comparison between funded and unfunded proposals. Appendix B contains tables that identify occurrences of types of broader impact strategies and education integration plan strategies in both funded and unfunded proposals.

### **Rhetorical Analysis**

Since genres develop as typified responses to recurring social situations, it is necessary to examine *to what* and *how* artifacts are responding. The *what* they are responding to can on some levels be fairly easily identified. These include the solicitation, NSF funding webpages, the GPG, conversations with POs or collaborators, reviewer comments from previously submitted proposals, etc. The rhetorical situation here is that a call is put out for available funding in a specific program area. Documents



that announce the call are published, and documents that prescribe what must and must not be included in the proposal surround the announcement. All these elements collectively form the rhetorical context, which we might also term the rhetorical situation—or relative to genre theory, the recurrent situation. If the document that is produced by a PI matches the conventional and content expectations of the call and surrounding documents, it too would be considered as matching the proposal genre. For example, if *American Idol* producers were to announce that they would have a special competition for performances only within the country music genre, a performer who gave a rendition of a Led Zeppelin song as Led Zeppelin would have performed it would be dismissed since that performance would clearly not fall within the country music genre. However, if the Led Zeppelin song were performed with the typified voice, sounds, harmonies, instrumentation, etc. of a typical country song, even it may fit into the genre's expectations. Even more surely, a performer who sang a Garth Brooks song in a Garth Brooks style would clearly fall within the country music genre.

Examining the *how*, or the rhetorical responses crafted by PIs to best fit within the recurrent/rhetorical situation, harkens to a simplistic understanding of Aristotle's concept of employing the best available means for persuasion. The CAREER proposal genre is nothing if not persuasive—a researcher must convince a panel of experts and a PO that his research is more fundable than others' research. Rhetorical analysis helps see how this genre of argument becomes social action (Miller, 1984) and influences (one way or another—convincing to fund or not to fund) the players operating within its attending social context. A social context, in light of this study and these methods, can be seen as part of a larger rhetorical situation in that it involves multiple human agents within the

same social system as well as the attending genres. For example, the social system of the NSF CAREER award includes the PI, the PO, reviewers, mentors, readers, collaborators, etc., and it involves all the activities with which they are engaged (including soliciting, writing, reviewing, and declining or funding of grant proposals).

Rhetorical analysis, then, “involves not simply passively decoding a message but actively understanding the designs the message has . . .” (Selzer, 2004, p. 293). Part of rhetorical analysis is to identify and assess the symbols (e.g., words, phrases, images) parties use as they attempt to both communicate (i.e., transfer meaning) and, in this context, influence one another’s meaning and decision making. Rhetorical analysis of the documents’ textual elements might examine canonical strategies, particularly stylistic choices, through a neo-Aristotelian framework (Foss, 2004) as well as identifiable linguistic strategies. The rhetorical analysis of the document’s content examines rhetorical “moves” relative to a writer’s purpose, the audience, and the context (Swales, 1990).

Growing out of the key rhetorical strategies I identified from my coding identification tables, I focused on instances of canonical moves made in each document. Appendix C shows the tabulation for these moves when at least one instance of each move was found in a funded or unfunded proposal. Further discussion and comparison of these findings is found in chapter 4.

### **Document Design Analysis**

Much effort has been spent by academics and practitioners alike understanding and implementing the best possible *design* a document can have as a rhetorical strategy

(e.g., Kostelnick & Hassett, 2003; Norman, 2002). Design may also be viewed as a tool deployed to better empower other textual or linguistic strategies. Examples of document design include use of font styles and sizes, lines, margins, layout, graphics, bold or underline, etc. Though document design analysis is a fairly loose term to apply to a form of analysis, the value of combining textual analysis and visual rhetorical analysis here leads to a better grasp of conventional aspects of the CAREER proposal genre (Chapin, 2004; Friedland, 2000; Johnson-Sheehan, 2008), which helps PIs improve arrangement and delivery of their argument on the printed page.

In terms of generic criticism and examining the design characteristics of the corpus' documents, this analysis identified typical proposal production strategies from a document design perspective: "What is distinctive about a genre of rhetoric is the recurrence of [strategic responses and stylistic choices] together, unified by the same organizing principle" (Foss, 2004, p. 194). The CAREER proposal study corpus provides multiple examples of adherence to and violation of NSF's mandated formatting as well as general design principles, such as choices in varying use of font size, style, and weight for headings; use of boxes or no boxes around graphics (if the choice is even made to include graphics); or highlighting key words or phrases with italicized text. Accordingly, I analyzed the documents' parts for evidence of typified, recurrent design choices in an attempt to pinpoint those more visual features that constitute conventions, whether those conventions are recognized and articulated by NSF (and researchers/writers) or not (Yates & Orlikowski, 2007). Some generic (or conventional) requirements for these proposals are prescribed in the GPG; however, writers clearly employ design strategies that maximize their argument's presentation that are not necessarily prescribed by NSF.

This analysis also looked for evidence of design strategies employed beyond those document constraints writers are instructed to work within by NSF.

Coding for instances of design elements was a matter of identifying the consistently recurring document design elements across the documents. This process was much less interpretive than the content or rhetorical analyses. Appendix D contains samples of the tables created for this part of the study.

### **Reliability Test**

To confirm my coding for the content and rhetorical analysis, I conducted a blind, simple inter-rater test with a PhD student in instructional technology to test the reliability of my coding methods. The student randomly selected one proposal from the funded group in my study corpus (i.e., he selected four as a number between 1 and 12, and I gave him the fourth proposal in my bound collection of funded proposals). I familiarized the student with NSF's written definitions of intellectual merit, broader impact, and education integration, and I provided definitions of the five rhetorical canon elements.

As a specific example of how a proposal writer might describe and point to intellectual merit, for an example of a stylistic strategy, and for practice with the process, I acquainted the student with the concept of novelty. I had him read through the first two pages of a different proposal and circle any instances of words or phrases that in any way represented or were synonymous with the concept of novelty. I compared his identification of novelty synonymous words or phrases with my original identification and confirmed that the student tester found all the same instances I had and three additional instances within the first two of this successful proposal.

Following this practice assignment with coding for novelty, I asked the student to read through the test proposal three times with the definitions I had given him close by. I instructed that the first time he was to locate and highlight key words and phrases that indicated any broader impact strategies. On the second read through, he was to locate and highlight in another color any key words and phrases that indicated any education integration plan strategies. I instructed the student to record his findings on the test coding sheet found in Appendix E.

On the final reading, the student was to highlight in a third color (and record upon finishing) any general or specific strategies (either content or writing/formatting) he could find that would fit into the definitions of the rhetorical canon. The intent of this part of the test was that, even though the student had no formal education experience with the principles of rhetoric, if he could identify elements of arrangement, style, memory, etc. similar to my original findings, then other proposal writers with little rhetorical training could certainly do so (and, as importantly, researchers with insight into rhetoric could do so), thus, further establishing the method's reliability.

Without having ever seen any of my coding or categorizing, the student was able to find multiple instances of both broader impact strategies and education integration strategies in this proposal as shown in Appendix E. One area the student tester highlighted consistently under broader impact was the word *develop* (or words/phrases synonymous with develop). He explained that he included these instances because in his mind the concept of developing a tangible product or a concept was part of creating broader impact. I disregarded these identifications because NSF's CAREER Award is interested in the downstream impact of the research and its integration with education and

not necessarily with the development of a product or method (though that can certainly lead to broader impact).

Relative to the rhetorical canon definitions, the student exhibited a focus on stylistic elements within the proposal, which I attribute to my request for him to highlight words and phrases. However, as I generalized and categorized his notes, I saw that most of the instances he found in the proposal matched two of the key categories I had identified for invention (collaboration and interdisciplinary) and three of the key categories I had identified for style (novelty, pointing arrows, and exigency). He also suggested that the proposal writer's use of structure and headings/subheadings would fit into memory, again consistent with my findings and categorization.

Since the focus of the second tester was to verify the reliability of my coding schema, it was less important for the student to be able to categorize his findings as much as it was for him to be able to identify the same occurrences in broader impact and education integration as well as the rhetorical concepts. Given the opportunity to repeat the second testing for coding across several document, the student suggested that he would be able to consistently find similar instances, particularly given further training with the rhetorical canon concepts.

In summary, from this coding and tabulating, I visualized the data and their generalizable conclusions in table form (see chapter 4). A brief discussion of these three levels of analysis conducted within the larger genre analysis stage of the study follows (more details are provided in chapter 4).

### **Ethnographic Analysis**

To research *other influencing variables* (e.g., social influence, political, economic, and other genres), the next stage of the study moved beyond examining proposal documents as isolated artifacts and examined the contexts in which they are produced and operate (Spinuzzi, 2002, 2003; Tardy, 2003; Zachry et al., 2006). The original problem of this study was to find out what factors made a funded CAREER proposal. The analysis to this point had certainly revealed important elements about the proposal document as an artifact, but it had done little to reveal how a proposal actually persuades or dissuades those who make decisions about funding. Further, the study to this point had likewise done little to illustrate the NSF proposal system as a social system and how proposals work within that system most effectively.

What could be categorized as an entirely separate genre, the solicitation most often initiates writing of CAREER grant proposals. Solicitations are produced by agency officers who have programs to advance and funding to grant but who also have distinct goals and parameters in mind or mandated for funding distribution—which constraints must be addressed and worked within (and satisfied) by proposers. A key influencing agent, the program officer, seems very much removed to the background on solicitations and on NSF's website for a position that plays such a critical role in the funding process. Moeller and Christensen (2010) found an instance in which one investigator did not contact an NSF PO after two CAREER award attempts simply because he never knew that could be done, nor had he readily found contact information on the website. That study also found through interviews with other successful PIs and former NSF POs that, despite an admitted absence of the invitation to contact a PO, it is a practice they all

advised. To move this research beyond an artifact-based study, I assembled an ethnographic picture from a collection of interviews with several POs at NSF to gain insight not available from the agency's website or even from researchers involved in proposal writing.

Most of the interviews with 14 POs took place at NSF's headquarters in Arlington, Virginia. I asked questions about their own proposal writing experiences, what they look for to fund a proposal (outside of appropriate technical content and surface level NSF criteria), what common mistakes they see in proposal documents and pitfalls to avoid, what best practices they recommend, and any other advice they had to be a successful proposal writer to NSF. I received approval from NSF to proceed with the interviews, and I received IRB approval to conduct this ethnographic study on condition that I provide the interviewees with a letter explaining the study's purpose and privacy guarantees (see Appendix F).

Since most of the POs I interviewed had been researchers on the other side of the funding fence, and because they all had insider perspectives on the NSF funding system, the interviews proved extremely valuable. Relative to GFA, the interviews provided a bright light to look inside the NSF proposal system. I had identified the problem of finding as many factors as possible for building successful proposals, and I also had determined that examining proposal artifacts alone would not bring to the surface all those factors. Opening up answers to the problem required a complex understanding of the entire genre field. The interviews, as seen through the lens of GFA, provided that methodology with the missing pieces of the structure to see the entire genre field in function. Rhetorical and genre analysis (as the lenses to see the proposal under sharp



focus) and the ethnography (as the lens to reveal all the players' functions), then, are the tools I used to illuminate the genre field. Much like the previous quarterback example, each new lens added to the examination provides deeper and broader clarity of the proposal preparation, submission, and review process. In the quarterback example earlier in this chapter, I focused my study on the quarterback but needed perspective on all the other players and play pieces to better understand how the quarterback could be most effective. Similarly, this study focuses on the CAREER proposal document, and to maximize its efficacy also requires the combined lenses.

## **CHAPTER 4**

### **RHETORICAL AND GENRE ANALYSIS OF CAREER AWARD PROPOSALS**

I conducted this portion of the study to identify generic conventions and rhetorical strategies of successfully funded CAREER proposals. This chapter will explore the conventional and rhetorical strategies employed by PIs to craft a CAREER grant proposal that most closely matches reviewers' expectations relative to NSF merit review criteria. Such a match should produce favorable reviews and, ultimately, put the proposal in a better position to compete for funding.

Briefly, the research questions for this portion of the study ask first, whether conventional and rhetorical elements of the CAREER proposal genre can be identified. Identifying these elements by applying the research methods to the corpus of 20 proposal document artifacts as detailed in chapter 3, could shed light on the question concerning the most common conventional and rhetorical elements of successfully funded documents. Finally, to further establish the validity of the study, I also sought to find evidence of attention to any specific conventions in funded as opposed to unfunded proposal documents.

Relative to these questions, the previous chapter discussed the research methods incorporated into this study. This chapter outlines this study's research activities and presents results within three theoretical critical lenses: content analysis, rhetorical analysis, and genre-oriented document design analysis. The chapter concludes with a brief discussion of lessons learned. How to implement interventions and best practices based on those lessons for researchers writing CAREER grants are discussed in chapter 6.

I applied the research lenses to a collection of CAREER grant proposals and identified the conventional features (e.g., structural patterns, document design features, and textual and rhetorical choices). This study also necessitated that I examine unfunded proposals to perhaps pinpoint conventional, content, or textual inadequacies and to compare and contrast differences between the successful and unsuccessful documents. Accordingly, I sought out failed proposals for comparison. I received all of these unfunded proposal texts from private sources, and even though some of the funded proposal texts I used were received through NSF's FOIA office, because the unfunded documents' authors requested that I not cite them by name, I have chosen in this dissertation to not cite PIs by their real names.

The following sections comment on the analysis areas as previously outlined stating observations from both a macro view as well as providing micro perspectives from individual documents, often contrasting successful moves and practices from funded proposals in juxtaposition with unfunded proposal documents.

### **Content Analysis**

All NSF proposals are reviewed and evaluated against two overarching criteria: intellectual merit and broader impact. This analysis requires first an understanding of these criteria (which, in essence, become the topic chains I am looking for) to identify where researchers satisfy criteria or are deficient in doing so. Definitions from NSF's GPG for both review criteria follow as well as directive comments regarding education integration and broadening diversity.

#### **What is the intellectual merit of the proposed activity?**

- How important is the proposed activity to advancing knowledge and

understanding within its own field or across different fields?

- How well qualified is the proposer (individual or team) to conduct the project? (If appropriate, the reviewer will comment on the quality of prior work.)
- To what extent does the proposed activity suggest and explore creative, original, or potentially transformative concepts?
- How well conceived and organized is the proposed activity? Is there sufficient access to resources?

#### **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?

NSF staff will give careful consideration to the following in making funding decisions:

#### **Integration of Research and Education**

One of the principal strategies in support of NSF's goals is to foster integration of research and education through the programs, projects and activities it supports at academic and research institutions. These institutions provide abundant opportunities where individuals may concurrently assume responsibilities as researchers, educators, and students, and where all can engage in joint efforts that infuse education with the excitement of discovery and enrich research through the diversity of learning perspectives.

#### **Integrating Diversity into NSF Programs, Projects, and Activities**

Broadening opportunities and enabling the participation of all citizens, women and men, underrepresented minorities, and persons with disabilities, are essential to the health and vitality of science and engineering. NSF is committed to this principle of diversity and deems it central to the programs, projects, and activities it considers and supports. (National Science Foundation, 2009b)

Because I cannot claim to be an expert in the subject areas of the individual proposals I studied, I rely largely upon reviewer comments as objective evaluation of

whether or not a proposal has satisfied the intellectual review criterion. Because the study corpus includes reviewer comments primarily for the unfunded proposals within it, the findings I present from reviewer comments relative to intellectual merit more precisely focus on its absence. Further, I assume in this study that if a proposal received funding that its technical content and research plan did meet the overarching review criteria. Unfunded documents may not have been funded for a variety of convention violations or for project inadequacies that would include deficient treatment of the review criteria; however, unfunded proposals may also have met some or all of the review criteria, so part of the purpose of this larger work is to discover why those would still not be funded or, alternatively, to determine possible ways to move such a document into the funded category. Finally, I also rely upon the rhetorical clues that become evident across multiple funded proposal documents to help see, in context, successful versus unsuccessful research plans as such.

Understanding the review process relative to these criteria can equip CAREER writers with a possible edge over the competition (NSF annually funds approximately 1 in four proposals of all types received). Chapter 2's introduction presented a brief discussion about NSF's review scores, stating that receiving consistent *Excellent* reviews is the goal. In the document "Note to Reviewers of CAREER Proposals" found on the NSF website publications pages, reviewers can find a peek into NSF's intent for CAREER proposals specifically. Following a brief reminder of the two overarching review criteria's definitions, reviewers are instructed in fairly broad terms of what to look for in proposals:

Successful PIs will propose *creative*, *integrative*, and *effective* research and education plans, . . . which will build a firm foundation for a lifetime of integrated

contributions to research and education.” (National Science Foundation, 2008c)  
(italics added for emphasis)

In effect, *NSF the organization* leaves a fair amount of interpretation of both intellectual merit and broader impact’s definitions open to CAREER reviewers and POs; i.e., those who come from and, for purposes of the review, represent a particular research community.

It is the multiplicity of research communities served by NSF that necessitates some interpretation of the review criteria, especially broader impact. Because CAREER is an agency-wide program, its solicitation has to be general enough to include the needs of all the scientific communities represented at NSF. The agency can certainly encourage communities to varying degrees to address its program priorities (e.g., including underrepresented groups or integrating education activities into research). Because of inherent differences in those communities, however, NSF and the CAREER award especially avoid prescribing how those priorities are to be addressed. Moreover, because NSF’s personnel come from the various scientific communities, those communities’ norms are also pushed into the agency’s directorates and programs.

Knowing how to best address the overarching review criteria relative to the norms and expectations of individual scientific communities becomes a critical rhetorical consideration if a PI is to be successful. A particular education strategy, for example, may be successful for the Biology directorate while the same strategy may mean nothing in Engineering. As regards the CAREER award, I submit that part of the purpose of the program is to help new investigators more acutely learn the values of their respective

communities. The point is that PIs would do well to know the expectations of the scientific community.<sup>9</sup>

What CAREER proposal writers can know up front is that some aspects of evaluating review criteria are much more directed and applied generally. Administrators at NSF, for example, do want researchers to propose research that moves in creative, novel directions. In fact, on a page under the publications section of the NSF website, a webpage titled “Merit Review Facts” lists the following (National Science Foundation, 2008b).

**1. FACT: NSF Program Officers are encouraged to recommend “risky” science and engineering for funding.**

**DISCUSSION:** NSF Program Officers are encouraged to recommend for funding proposals that have high potential or payoff, even though they may be considered as being ‘risky’ by external reviewers.

While pushing novel research is an integral part of a PI’s research and classroom efforts, NSF also clearly stresses inclusivity in the effort. The document “Merit Review Facts” lists the following:

**DISCUSSION:** NSF promotes broadening participation in science and engineering fields. This includes increasing the participation of underrepresented minorities and women, and persons with disabilities.

From just this brief summation of NSF’s review criteria, it is clear that NSF expects a CAREER proposal to

- establish *intellectual merit* (as interpreted by reviewers and POs—those who represent the PI’s research community), particularly in *novel and creative science*

---

<sup>9</sup> Another point that will be further discussed in chapter 5 is that reviewers should also find out if their proposal will have an ad hoc, panel, or some other type of review. For an ad hoc review sent only to experts in the field, the PI would want to focus on more technical aspects. For a panel review that may include both experts and those less initiated in a particular area, the PI would need to position the program as well to someone outside his or her field.

- bear out strong *broader impact*, and as a part of doing so, articulate clear plans to *integrate educational activities* into research that ideally *includes women and other underrepresented groups* in science and engineering fields

With the review criteria expectations foundation laid, it is these items I might have expected to see in the following content analysis.

### **NSF Criterion: Intellectual Merit**

I acknowledge briefly one limitation of this portion of the study: as mentioned, I have no credentials to evaluate the intellectual merit of chip multiprocessor architectures, frameworks for unified treatment of quantum and classical information theory and thermodynamics, or even honey bee communication (a few of the research topics from my study corpus). It is instructive, however, to pass on the insights gained from reviewer comments relative to intellectual merit. I received only two sets of reviewer comments for funded proposals and most reviewer comments for declined proposals. Had I been able to secure more reviewer comments for funded proposals, the insights may have added a slightly richer conversation about *how* reviewers judged intellectual merit; regardless, I am satisfied that funded proposals did at least satisfy the criteria.

Of the two reviewer comments I received for funded proposals, reviewers indicated in both cases that the proposals were sufficiently “risky,” or at least adequately creative. In these two cases, reviewers left comments such as, “the researcher proposes novel . . . tools and . . . technologies . . . in the research architecture.” It could be assumed that since the other proposals were funded that they also met reviewers’ expectations for creativity in intellectual merit. The concept of novelty as a rhetorical strategy appears



prominently in this work's rhetorical analysis section. I will discuss the concept of novelty in greater depth in the rhetorical analysis section of this chapter.

Even more revealing in this aspect are the comments found in unfunded proposals' reviewer comments. Representative "complaints" about these documents' content inadequacies follow (*italics added for emphasis*). Unfunded researchers were generally told by review panels that they had insufficient experimental detail as the following review excerpts illustrate.

- "*insufficient technical detail* to allow . . . a clear idea of possible outcomes"
- "It was not easy to determine the intellectual merit . . . *not described in enough detail*"
- "proposal *methods not adequately described* . . . needs to have more experimental detail"
- "proposal itself *lacks sufficient detail* of the specific methods, statistical tests and significance criteria"
- "Application of the frameworks promised, but *details remain grossly underdeveloped* throughout . . ."

Six researchers were told their plans lacked novelty and creativity as seen in the following comments.

- "Overall, the proposal seems to *lack a vision for significant innovative work*"
- "proposal methods *would not significantly advance the field*"
- "The proposal seems *too narrow to bring exciting results*"
- "The methods proposed are *standard* and it *lacks innovative developments*"

Four proposals were found by reviewers to actually be too risky,<sup>10</sup> not because methods would push the state of the art, but because of the lack of preliminary data/results and the PIs' inability to locate the research within the larger field of study to justify both its methods and its need—for example:

The applicant should provide some preliminary data . . . the danger is that if [he can't] then the rest of the experiments . . . cannot be performed . . . This could represent a potentially fatal flaw . . .

Three documents were criticized for having no timeline, and three were criticized for having no evaluation or assessment of methods built in.

### **NSF Criterion: Broader Impact**

A few reviewer panels of unfunded proposals recognized the potential for broader impact (most often as part of the education integration plan) but still did not recommend funding. In one case, reviewers said that a proposal contained “one of the best teaching/mentoring plans;” yet, they also pointed to the lack of both experimental detail and a vision for innovative work. To be clear, not even the best laid plan for integration of education with research or other broader impact will outweigh anemic intellectual merit. In other unfunded cases, the details of the broader impact simply weren't adequately presented. One reviewer said, “The PI clearly has broader impact in mind,

---

<sup>10</sup> Since I completed this dissertation's research, NSF has placed additional emphasis on the directive that funded projects should pursue “transformative” science; i.e., research that advances science at new levels and new directions rather than just incrementally advance a particular process, understanding, or field. As one former NSF PO explained to me, a proposal for risky, or transformative, research, can be positive when it appears likely to significantly advance a field or perhaps join two or more fields in a way previously not done and when it is based on a solid, well described research plan. My own experience suggests that, even though NSF calls for it, this approach may be less common as researchers often seem more prone to propose incremental, and perhaps in their minds, “safer” research. Risky can be a negative when the outcome would be at risk because of inadequately described or designed projects, which situation is also common in proposals—a reality discussed in Chapter 5.

though he is unclear about the specifics of how, where, when, etc. of that [broader impact].”

Table 1 compares a frequency of topic chain occurrences in areas of broader impact issues addressed in the study corpus (highly contrastive or significant data are highlighted). In the following tables, the left column indicates the topic chain under discussion and the right two columns indicate the occurrences I counted as I observed them in each document. The totals listed in the two right hand columns indicate each document that contained at least one developed mention of each issue listed. The columns also indicate that 12 funded proposal documents were reviewed and eight unfunded proposals. The cell found in the second row of the second column in Table 1, for example, shows that seven out of 12 (or 58%) of funded proposals had at least some level of developed discussion about the project’s collaboration with or effect on industry.

Table 1

*Highlights of Broader Impact Strategy Occurrence*

<b>Broader impact issues</b>	<b>Funded (12)</b>	<b>Unfunded (8)</b>
Collaboration with or effect on Industry	7 (58%)	0
Dissemination: (papers/conferences, websites, collaborations, other)	11 (92%)	3 (37%)
Dissemination: (textbooks, distributable curriculum)	3 (25%)	5 (62%)

One potential outcome of research at this level is impact on industry. Just over half of the successfully funded researchers anticipated and outlined that kind of impact. This number is significant considering that proposal samples represent multiple STEM disciplines, not just engineering where one might naturally think of industry impact. Dissemination is also a broader impact concern outlined by NSF—if nobody but the

researcher and closer colleagues are aware of research results, effecting positive impact on industry or academia becomes unlikely. As the data in this table show, it is not that the unfunded researchers did not concern themselves with dissemination, but their focus for dissemination was limited and, when included, consisted of more obvious approaches, such as publishing articles in academic journals. Such a dissemination strategy was often included in funded proposals, but the strategies only began there and went on to include much more creative approaches (discussed below). It also seems that reviewers found writing of textbooks of less interest as a broader impact strategy, nor, as is illustrated later in this chapter, is it viewed as a preferable education integration activity.

The primary focus for broader impact, as far as NSF is concerned, lays heavily with educational strategies and their integration into the proposed career research plan. The most obvious integration strategy, and one that NSF promotes in its online documentation, is development of curriculum and courses and, importantly, involvement of students in those courses at the researcher's home institution. Ten of the 12 successfully funded proposers, as illustrated in Table 2, outlined such a strategy, and the two who did not, actually did include students in more direct research or lab opportunities developed specifically for the CAREER proposal. Incidentally, among funded proposals, undergraduate student involvement was the most common level of curricular involvement (83%), followed by graduate students (58%), and then high school students (25%). Several proposals included student involvement at all education levels.

Since broadening participation of women and underrepresented groups is stressed by NSF, I expected to see a corresponding incidence in the study corpus. Predictably, that incidence was quite low among unfunded proposals; still, it only occurred in just over

half of funded projects. In the rhetorical analysis section, however, I propose that deliberate inclusion of these groups as an educational strategy may be done more as a rhetorical move rather than one intended as an essential element of an educational plan.

Table 2

*Highlights of education activity integration strategy occurrences*

Specific Education Integration Issues		Funded (12)	Unfunded (8)
Integrated coursework		10 (83%)	5 (62%)
Integrating women and underrepresented groups		7 (58%)	3 (37%)
Number of detailed education integration strategies	None	0	1
	One	0	2
	Two	1	3 (avg)
	Three	3	0
	Four	4 (avg)	2
	Five	2	0
	Six	2	0

Perhaps the most enlightening data regarding education integration concerns the numbers of strategy types. Education integration strategy topic chains I identified in the sample documents include the following:

- curriculum development
- workshops/tutorials
- interdisciplinary curriculum
- online collaboration
- outreach
- lab involvement
- campus/community service

- mentoring
- assessment/evaluation of strategy effectiveness
- inclusion of women/underrepresented groups (most often incorporated into the other activities listed here)

Table 2 shows that the average number of detailed education strategies in funded proposals was four, reaching as many as six. Inclusion of two strategies was the average for unfunded proposals. Moreover, much of that proposed by unfunded researchers was, again, absent of specific details or of meaningful student involvement as evidenced by this reviewer's comment, "The plan for the participation of undergraduate students in the research seems to be limited to tasks such as solution preparation and dishwashing."

### **Rhetorical Analysis**

Examining the sample documents from a rhetorical perspective aims to uncover language choices and how those choices are ordered and deployed within a document that attempt to situate its content in the most persuasive light possible (e.g., convincingly stating "here's what I propose to do and here's how I'll do it").

### **Rhetorical Canon as a Lens to CAREER Proposal Writing Strategies**

A classical rhetorical framework that includes the canonical elements—invention, arrangement, style, memory, and delivery—works well here as a framework to identify meaning making scaffolding used in proposal writing. Such a scaffolding metaphor represents the building of a proposal from the ground up while building a continual support structure as the document takes shape. Well-formed rhetorical scaffolding should

be found undergirding and surrounding the rhetorical structure of a funded proposal, whereas unfunded documents may reveal some shaky points in that framework. Though the classical rhetoric I use here as a framework stems from the oral tradition, written communication has the same need for finding the best available means of persuasion, particularly with a high stakes document such as an academic grant proposal that needs to be persuasive without coming across as a sales pitch.

In the invention and arrangement stages of fashioning a grant proposal, a PI would make choices about which of the most important content elements of a research project to include. This stage would also see a PI determining how to best formulate a research project to appeal to the needs of the agency. The PI would also strategize positioning of that research as a significant contribution to the PI's field of study and accompanying literature. Throughout these stages, the proposal would reveal evidence of appeals to *logos*, *ethos*, and *pathos*.<sup>11</sup> As would be expected in the context of a proposal, appeals to logos throughout the document appear as a writer fashions a research agenda into an argument justifying the request for funding. Though pathetic and ethical appeals, at least in Aristotle's tradition, are often evidenced more commonly in the introduction and conclusion, we might see efforts by PIs to establish ethos throughout all elements of a proposal document. In its most successful form, a CAREER proposal document should be at the same time a presentation of the logos, "this is WHAT I intend to do," a presentation of the pathos, "this is what my research means to YOU," and the presentation of the ethos "this is WHY you (NSF) should give ME the money to do it."

---

<sup>11</sup> From an Aristotelian perspective, *logos* would emphasize communication strategy on the message or the evidence itself, such as the intrinsic merits of a research project. *Ethos* would focus on the author specifically, i.e., perhaps on his or her credibility to be able to carry out a research project and produce promised results. *Pathos* would emphasize an appeal to the reader and would communicate in terms that evoke, for example, emotional responses intended to create a simpatico relationship.

Examining invention also follows lines of argument through *topoi*, or modes such as compare and contrast or cause and effect, which may be of some interest to watch for as strategies employed by funded PIs. Though this study did not specifically look for evidence along those lines, I do point out some rhetorical moves that follow such rhetorical modes.

Looking for elements of style (classical rhetoric's third canonical element) in these documents would mean looking for language that formulates "ideas in figures and ornamenting arguments [to] make them structurally more understandable, memorable, and convincing" (Bizzell & Herzberg, 1990, p. 6). This doesn't imply simply scouring texts for ornamental language or word candy; rather, it implies that perceptive PIs will use language and formatting that best *moves* readers (i.e., reviewers and POs) to understanding, remembering, and convincing.

Finally, the classical rhetorical canon contains the elements of memory and delivery. Though some discount these in a written context, looking for instances of their use can reveal effective navigation and cognition strategies.

Table 3 shows the five most commonly observed strategies relative to key canonical elements across all the proposals documents included in the study corpus. Following the table is a brief discussion of these rhetorical elements as well as their application to the observed proposal strategies.



Table 3

*Highlights of canonical strategy occurrence*

Canons	Observed strategy	Funded (12)	Unfunded (8)
Invention/Logos	Discussion of collaboration (w/ industry, colleagues, institutions)	11 (92%)	3 (37%)
Style	Phrases/words synonymous with novel	11 (92%)	4 (50%)
Delivery	Dedicated section or sub-section (w/ heading) to Education Plan	11 (92%)	5 (62%)
Style	Phrases/words promoting the research's exigency	7 (58%)	1 (12%)
Delivery	Dedicated section or sub-section (w/ heading) to Broader impact	7 (58%)	2 (25%)

**Invention.** Effective collaborations of all types including international, industry/academic, inter-university partnerships—especially those that promote the broader participation of women and minorities—are strongly encouraged by all NSF program directorates. Accordingly, this admonition to collaborate on research and dissemination of research findings with colleagues and other institutions is a hot button for proposal reviewers/POs and, therefore, warrants serious consideration from a researcher as a valuable line of argument. A disclaimer about collaboration relative to the CAREER award is important to mention here. The CAREER award is a single-PI program, and as such cannot include collaborators as co-investigators. NSF does realize, however, that today's scientific and engineering challenges are often of a complex and multi-disciplinary nature and, therefore, encourages collaboration with labs, industry, and other institutions (domestically and globally) for needed expertise. Part of invention may very well include determining which appeals would be most effective at various points in the proposal considering the audience and purpose.

In terms of the analysis, forming a successful collaboration and detailing how it will work within a research project is an activity that, by its nature, has to take place during the invention stages of writing a proposal. If evidence of collaboration could be found in the plan, I could determine that a proposal writer was rhetorically considering early on—in the invention stage—which activities to include in a project. This is not to say that if a PI did not include collaboration that he or she was not engaged in early proposal writing activities, but this is at least evidence that a proposal was rhetorically engaged at an early stage. Including collaboration as part of a research plan is also an appeal to logos—by so doing, a researcher implies that he or she has thought through the research project enough to know that expertise is needed from an outside source to accomplish the research task.

All but one of the funded PIs (Table 3) included discussion in their proposals of collaborating with industry partners, colleagues from within and without their own institutions, and other universities generally or organizations within other universities. The one funded PI who did not specifically outline collaboration as an integral part of his research plan did mention that his research was of interest to and had potential impact on specifically named entities in industry. Conversely, scarcely one third of the unfunded PIs included any mention of collaboration as part of their research plans.

Other frequent examples of funded PIs' invention strategies include building inter-disciplinarity into research, mention of being (or being associated with) women and/or minorities and other underrepresented groups, and research outcome evaluation or assessment plans.

**Arrangement.** All the sample proposals begin with an introduction section, and many (though surprisingly not all) include in that section a clear problem statement, thesis, and a document outline—all of which would fall into arrangement. The importance of attention to deliberate arrangement is illustrated vividly in some unfunded proposals' review summaries. Reviewers in the case of one unfunded proposal said, "It would also have been better if the PI put forward a thesis as to what the experimental studies were supposed to teach us before diving into the details of the study," and in the case of another unfunded proposal, "the logical progression is difficult to follow." Funded PIs who seemed to better grasp the idea of good arrangement also included introductions in each major section to forecast that particular section's content.

**Style.** In his treatise *On Rhetoric*, Aristotle considers *Lexis* (translated from Greek as style) as a matter of diction, language, or expression. More specifically, he said in this regard, "it is not enough to have a supply of things to say, but it is also necessary to say it in the right way . . ." (1991, p. 217). A frequently employed stylistic strategy among successful proposals was the use of phrases or words synonymous with novel. Researchers are strongly encouraged by NSF to engage in novel, if not even risky research. Not surprisingly, 92% of funded PIs (Table 3) repeatedly folded into their project descriptions phrases and words to present a pervasive feeling of novelty, such as the following examples from funded CAREER proposals:

- new idea; new perspective; new path; new way to look at existing analysis
- innovative strategies; innovative contributions and approaches
- proposed work is unique
- blaze new directions

- novel insights; novel mechanisms
- next generation
- emerging area

Another oft-employed stylistic strategy used by funded PIs is similar to the first. Seven of the 12 (Table 3) successful proposals repetitively included phrases placed in key locations such as sections' introductory or summative text (occasionally italicized or bolded—a strategy to be discussed below) that stress the research exigency (and, either overtly or by implication, the need for funding). Such phrases include the following examples:

- “relatively little is known”
- “[research area] has been postulated but not shown”
- “Current methods are not able to systematically increase [research area] accuracy.”
- “There is a serious lack of understanding of all the factors that influence [research area].”
- “With modern technology requiring more and more advanced materials, the demand for the scientists who are well-trained in the preparation and characterization of [research area] is increasing . . . Most of these scientists will be recruited from university research labs.”
- “[research area] expected to reveal previously unobservable phenomena in the physical world . . . currently attracting considerable attention.”
- “Still, we seem to be lacking high-level principles . . . In this proposal a high-level alternative is advocated.”

- “presents many opportunities and challenges that have never existed before . . . Our results will certainly help determine . . . future architectures.”
- “If we wait [on research area] . . . we can expect millions of dollars in lost productivity.”

Clearly, these energy-charged style choices not only create a sense of urgency, they also quicken the overall tone of the proposal. Not coincidentally, only one unfunded PI included similar phrasing, and that one PI ultimately submitted a successfully funded proposal in a subsequent funding year.

**Memory.** Memory in practice includes mnemonics and associations that aid both communication senders and receivers to improve recall and retention. One third of funded PIs employed the memory strategy of repetitive subheading patterns. For example, in one proposal is found the subheadings Motivation, Proposed Work, Relation to Previous Work, Evaluation, and Long-term Vision—with that pattern repeated three times within one section. Another proposal similarly has the subheadings Project overview, Near-term objectives, Mid-term objectives, Outlook, and Broader Impacts—again, repeated three times within a single section. Only one unfunded proposal contained similarly patterned subheadings. Repetitive headings and narrative features are often complemented by repetitive textual features as well, such as patterns found with bold and italics. Another common memory feature employed often in this study’s funded documents was to follow a pattern of introduction, body, and conclusion not only for the whole document but in each section throughout the document. This strategy may be particularly important now that readers have become so accustomed to reading hypertext, which is structured this way by default. Effective introductions in the funded proposals

also would forecast more often the content of the document of sections and then present the content in the same order as outlined in the introduction narrative.

**Delivery.** This canon is the tricky one. In classical rhetoric, a predominantly oral tradition, delivery is mostly referred to as “presenting the speech with effective gestures and vocal modulation” (Bizzel & Herzberg, 1990, p. 4). Though Aristotle did not actually have much use for delivery because he thought it was merely acting, other rhetoricians felt that “voice, gestures, and facial expressions materially affect the impact of all that has gone into the composition” (p. 7). The connection I make in this light to a written as opposed to an oral composition is when a proposal writer deliberately makes a textual gesture as if to “point” to something to give it special attention. This is a tricky jump to make because delivery can also be so closely identified with arrangement and stylistic choices. I believe that jump works in this study, however, because I did identify some instances of textual pointing that affect the overall impact relative to the rest of the artifact. One case in point is a commonly employed strategy by successful proposers to include dedicated sections with accompanying first level headings for education activities and their integration with broader impact. Broader impact is one of the two primary review criteria, but education is an expectation added to the CAREER award. Eleven of 12 (92%) of funded PIs included a specific education section.

### **Effective Rhetorical Moves**

As discussed previously under Content Analysis, the best rhetorical move researchers can make is to give POs and reviewers well-articulated, well-documented, and relevant content. To be funded, that content, of course, would have to satisfy

expectations of the intellectual merit criterion. Additionally, NSF's broader impact criterion necessitates at least a good education plan (incidentally, education integration and broader impact are often equated as the same thing by both PIs and reviewers as evidenced in proposal sections as well as comments in review summaries). Within that education plan, NSF encourages researchers to involve women and underrepresented groups. It is significant that in this study 50% of funded PIs included strategies focusing on women and 67% included strategies focusing on underrepresented groups in their education plans. For unfunded PIs, that inclusion was only 37% and 50%, respectively. Though it is not an absolute, clearly, PIs can be passed over for funding for not reconciling, or identifying, their research and education plans with NSF's overarching priorities.

For two entities to identify with each others' philosophical and practical purposes would, as Burke (1950) has explained, allow them to become "joint participants in common principles." This melding of "common sensations, concepts, images, ideas, attitudes that make them consubstantial" (p. 55) or, in other words, existing conceptually in the same context, might be viewed as a rhetorical summit reached by the researcher/proposer. An excellent example of consubstantiality can be seen in two paragraphs from the section *Proposed Education Plan and Rationale* in the subsection (a) *[Undergraduate] Research in the PI lab* from one successful CAREER proposal:

The proposed budget will support two UG researchers full-time over the summer months and ~ 10 hours/week during the academic year. I will use effective, established programs to make every effort to recruit minorities, especially Native Americans, to fill these positions. I plan to pursue NA students in numerous ways: through announcements in undergraduate classes, by advertising through the Native American Studies Program, and through the NIH-supported BRIN (Biomedical Research Infrastructure Network) program. I will also contact three individuals who are connected with [the state's] Tribal Colleges and who may be able to identify transfer students ready for research: . . . our . . . minority recruiter; . . . a science faculty member at [a tribal college] and director of a

TCUP project (Tribal Colleges and Universities Program); and . . . the director of the American Indian Research Opportunities program . . .

Successfully mentoring NA students requires an understanding of their culture to make them feel comfortable in lab. I have received such training from faculty of the [state's] Tribal Colleges during our joint meetings supported by the BRIN program. Thus, I am well-prepared not only to **recruit** NA students, but to **retain** them. Since my arrival at [the university] two years ago, I have mentored two UG researchers from [the state's] Indian Reservations. Both students are now pursuing advanced science degrees, including [a student], who will continue research in my laboratory. [She] has several years of experience in mentoring incoming NA science majors. Her presence in the lab will augment my own abilities to guide the progress of NA students.

A brief rhetorical analysis of these two paragraphs grants further insight into the consubstantial moves this writer made. She proposed that education integration should involve “community outreach,” extending inclusion to an otherwise marginalized group—in this case, Native Americans. This outreach comes from a researcher representing the dominant white majority in academic scientific research to the Native American community surrounding the university. Considering NSF’s emphasis on including underrepresented groups, the author clearly seeks reviewers’ approval through identification with NSF’s concerns.

There is a risk, however, in how she positions herself and her project relative to the racial minority. The very term *outreach*, though it denotes inclusion, also carries a connotation of one group’s position of power relative to another. Indeed, the term might substantiate that one group is currently in a position of domination, or at least cultural if not physical separation. The PI recognizes and avails herself of that separation. She states, “Successfully mentoring [Native American] students requires an understanding of *their* culture to make *them* feel comfortable in lab” (emphasis added). Though she details her training from Tribal Colleges in preparation to both prepare and recruit Native American students and also “*retain* them,” her use of the pronouns *their* and *them*, as



well as use of the pronoun *we* set up in contrast to *their* and *them*, risks accentuating the distance. Moreover, recognition of traditional Native American culture, or how that cultural value may benefit the scientific community, is largely ignored.

The argument succeeds, however, likely because this construction effectively consubstantiates interests of the proposal submitter, tribal interests, and NSF as the funding agency. The PI founds her inclusive efforts on individuals in, social networks surrounding, and institutions set up by the underrepresented group. Though she acknowledges the environment of domination, through her outreach with individuals and organizations already existing within the minority community, she creates bridges and opportunities that are mutually beneficial for and acceptable to both groups.

Ultimately, the PI successfully creates consubstantiality with NSF/reviewers by illustrating how both the PI and the local Native American Community receive benefits of cultural and scientific growth from the project's funding. The proposal's reviewers can conclude that an underrepresented group will have increased access to and opportunity within scientific research, which is an NSF objective.

The proposal writer appeals to her NSF audience that she will be able to achieve the audience's objectives, namely that her project will advance science while empowering a group that has traditionally been underrepresented in the sciences by granting greater access to both education and the scientific research academy. Although those in this minority community could certainly find avenues into scientific research without such an intervention (indeed, for any number of reasons they may decline the outreach offer), their opportunity for inclusion has been increased as a result of the

proposed strategies. Other examples of rhetorical moves found in this study's successfully funded documents that are worthy of notice follow.

The first sub-section in the introduction of one funded PI's proposal indicates that the proposal had been submitted the year prior, and that because it was not funded, the PI had made the following changes based on the prior proposal's reviewer comments: "As suggested I have simplified the proposal; refocused on the basic biology; collecting the necessary preliminary data; education plan is described in greater detail; new components to improve undergraduate instruction." This unique move, despite the unparallel list structure, provided the PI with both a boost in ethos as well as an effective "memory" device.

Relative to including women and underrepresented groups and broadening participation, one successful proposal's education plan even discussed "tutoring home-schooled students (including racial minorities) in mathematics."

One funded PI who understood the value of collaboration as well as the principle of ethos wrote of a collaborator, "Dr. [Smith], one of the founding fathers of [research area] and a close collaborator of the PI . . ."

A hypothetical also can be a valuable and powerful rhetorical tool because it invites a reader simply to consider a different reality without immediately having to accept that alternate reality. Indeed, a hypothetical might prove to be a useful tool that helps reviewers commit funding to a potential outcome. One funded PI skillfully set up a hypothetical as follows: "For example, consider a network of temperature sensors deployed throughout a building to detect and track the spreading of fire . . . This example motivates the proposed development and analysis of distributed methods for signal

processing of localized phenomena.” The PI crafts the hypothetical with strong pathetic appeals (i.e., fear of the spreading of fire) as well as stylistic power (“This example [hypothetical] motivates the proposed” research/funding).

### **Rhetorical Faux Pas**

Obviously, none of the documents studied in this analysis is perfect, but it may be beneficial for future writers for me to point out rhetorical missteps to avoid, notably from unfunded proposals. (A closer look at these types of missteps can be found in chapter 5.)

The Research and Education Objectives section of one unfunded proposal contains a sub-section titled “On Being a New Professor,” which outlines the plan to write an article on the PI’s “experience as a first-year professor.” Though likely interesting, neither the section nor the described article has anything remotely to do with the balance of the proposed research, the PI’s future career research agenda, or the education section’s objectives relative to the subject matter.

An unfunded PI wrote, “Wherever possible I will involve students.” Unfortunately, the PI who wrote this line failed to provide any more specific explanation of exactly where and how those students will be involved. Though there is no reason to doubt the intent of the PI to do so, the lack of further detail as well as the words *wherever possible* fail to promise a deliberate, consistently executable education plan.

In the second paragraph of a project description’s introduction I found this lead sentence, “For my career proposal I suggest . . .” This uninspiring lead into the PI’s plan initiates the entire discussion with an incorrect reference to the CAREER (all caps) award. Moreover, it reads more like the introduction to a secondary school essay (e.g.,

For my summer vacation essay, I would like to write about . . . ) than it does a scholarly research plan. Finally, the words *I suggest* should be replaced with a stronger alternative (e.g., I intend; or better yet, I propose).

One unfunded PI includes no mention of specifically involving any underrepresented group in the proposal's education plan, though that was clearly both a missed opportunity and a rhetorical slight in that the entire project dealt with research of persons with a certain physical disability. What better opportunity could there be to recruit and involve members of that underrepresented group into research that actually revolves around and affects them most personally?

Inaccurate technical content would definitely place a CAREER proposal in the non-funded stack. Similarly, correctness and consistency, or the lack thereof, are two other areas that reflect well or badly on a researcher. Though the content of a proposal should be the basis for reviewers' judgment, reviewers who trip and stumble through a document because of typos and poor punctuation may have more difficulty excavating key points, let alone evaluating those points while fighting through a document's surface noise. The potential effects of such noise drives home an important point PIs need to understand: every bit of their writing, even down to punctuation and spelling, has a rhetorical consequence, whether writers realize it or not. Two unfunded proposals are especially noteworthy examples. In the first, the PI's attention to spelling, grammatical, and punctuation correctness is at best inconsistent. Just on page 1, I counted two spelling errors, 1 grammar infraction (comma splice), seven punctuation errors, and four "other" errors (including omitted words or letters and inconsistent capitalization). What's worse, many of the errors, in other places, are actually done correctly on the same page if not in

the same paragraph. Similar errors are made consistently throughout the entire document. If I were a reviewer, even if I found the content of interest, I might wonder about the researcher's ability to attend to detail in the grant's execution.

In the second instance, the PI obviously speaks English as a second language. Though that fact is not a disqualifying factor (several proposals in this study come from ESL PIs), and though the researcher is able to use English well enough to articulate the project description, the incorrect grammar, punctuation, spelling, word order, etc. is so noticeable that it becomes a readability issue. What makes matters worse for this PI is another poor rhetorical move that crosses over between style and document design. Not only is style poorly used, memory and delivery are compromised by badly inconsistent use of heading styles and sizes, paragraph indentation, image captions, image quality, underlining/bolding/italicizing, and line spacing. Reviewers' comments on this proposal showed that they were obviously bothered by its general inconsistency and challenging readability (let alone its lack of polish).

### **Document design**

Lest a PI should think that reviewers do not pay attention to a document's surface features, a panel summary for one unfunded proposal concluded, "The structure of the proposal also could be improved with better organization and better utilization of allocated space to provide sufficient technical detail." Apparently, not only had reviewers indicated insufficient detail outlining the PI's research plan in this instance, they were also bemoaning the difficulty of sifting through what was there.

Understanding and incorporating effective document design principles results in document features that enhance readability, improve navigation to and through key points, aid cognition and retention, and have an overall positive rhetorical influence by enabling PIs to create at least a rapport with reviewers (Imagine a reviewer saying, “Ah, finally someone who can write well.”) and at best by allowing PIs to purposefully lead time-pressed reviewers to the most important content features. Though this section may somewhat overlap the rhetorical analysis (e.g., arrangement, style, delivery), there is a value to dissecting document design elements to understand the value of more surface level document detail.

Though researchers who write CAREER award proposals are smart people, they are not necessarily experts in document design principles. Important lessons can be learned from those who have been through the process, both successfully and not. The following paragraphs describe identifiable expected design conventions within this genre, other effective document characteristics, as well as a few design blunders made by CAREER writers.

## **Graphics**

All 12 of the successfully funded proposals in this study included graphic elements (e.g., images, graphs, charts, tables). Reviewers on any review panel have stacks of proposals to read and comment on in a very brief time. Effective use of graphics can give a proposal document a competitive advantage by supporting the document’s textual content with visual elements that enable quick information absorption,

particularly complex information that may, by its nature, be otherwise explained only through very dense text.

Table 4 shows a general analysis of basic graphics management techniques found in the study corpus. Some of these techniques include captioning graphics and including figure or table numbers within those descriptive captions. I also examined PIs' treatment of referencing (and often commenting on) graphics within introductory text by the graphics' figure numbers (as opposed to referencing their relative position on the page; e.g., the image above, or the table below). This study shows that all of the funded PIs followed these techniques to the letter, while only half of the unfunded PIs included captions with numbers or referred to graphics in-text.

Where graphics are placed on a page is both a design and a rhetorical decision. From a rhetorical perspective, stand-alone graphics, or those with no attending text other than a caption are emphasized by the surrounding white space. All the funded PIs primarily included graphics of this stand-alone nature, while half of them also included some graphics (generally smaller images or charts) with wrap around text. The unfunded column of Table 4 indicates that a good portion of those PIs did include stand-alone graphics, but two unfunded PIs included no graphics at all. Additionally, in two unfunded proposals, the graphical elements included were so small or accompanying text within the graphics was of such an unreadable small font that their content and significance could not be determined.

Since the content of graphics should be the guiding principle on whether to include them or not, extremely complex graphics (i.e., graphics that attempt to show multiple concepts in one view) may not prove to be the best approach with time-pressed

reviewers. The data for funded PIs also show that, even though three of them included some very complex images, all 12 included more non-complex graphics (i.e., a single concept per graphic), and nine of them included only non-complex graphics. In contrast, though four unfunded PIs also included non-complex graphics, and two included none whatsoever, two included only very complex graphics. It would seem, then, that there is a point of diminishing returns—using graphics when the graphics move from the intent to explain quickly to visualizing extremely complex technical concepts.

Table 4

*Highlights of graphics features and graphics management strategy occurrence*

<b>Graphics management/feature</b>	<b>Funded (12)</b>	<b>Unfunded (8)</b>
Captions with figure numbers	12 (100%)	4 (50%)
In-text reference to graphics	12 (100%)	4 (50%)
Stand-alone graphics	12 (100%)	6 (75%)
Text-wrapped graphics	6 (50%)	0
Non-complex graphics	12 (100%)	4 (50%)
Complex graphics	3 (25%)	2 (25%)

## Page Features

The *Grant Proposal Guide* unequivocally stipulates several generic features for all NSF proposal documents. This includes using specific fonts, total page numbers (limit of 15 for the project description), and margin sizes (1 inch all around). Though these document parameters are rigid, a PI still has much discretion relative to page and textual features. For example, though font styles are limited by NSF to Arial, Courier New, or Palatino Linotype in 10 points or larger, Times New Roman at 11 points or larger, or Computer Modern fonts at 11 points or larger—both serif and sans serif options—all but



1 of the PIs for all 20 documents in the sample corpus used a serif font.<sup>12</sup> (PIs' preference for serif over sans serif fonts may be attributable to either tradition or the anecdotal holding that serif fonts are easier to read on paper and sans serif fonts are better used for contrasting headings and for reading online—perhaps a topic for future study). Variation becomes more evident with font size, however, as illustrated in Table 5. Six (50%) of the funded PIs employed an 11pt. font. None of the unfunded PIs used 11 point, which was the more commonly used font for successful proposals.

Table 5

*Highlights of page feature strategy occurrence*

<b>Page (text, navigation) features</b>	<b>Funded (12)</b>	<b>Unfunded (8)</b>
10 pt. font	4 (33%)	3 (37%)
11 pt. font	6 (50%)	0
12 pt. font	2 (17%)	5 (62%)
Italicized key words	9 (75%)	2 (25%)
Page #s bottom center	11 (92%)	2 (25%)
Page #s bottom right	0	2 (25%)
Page #s top right	1 (8%)	1 (12%)
Right justified margin	10 (83%)	3 (37%)
Non-contrasting heading font	12 (100%)	6 (75%)
Varied heading level sizes	9 (75%)	5 (62%)
Other heading variation	2 (17%)	3 (37%)

Another textual strategy commonly deployed by successful grant writers (75%) was to italicize key words within the text for emphasis. One funded PI bolded several key words while two unfunded PIs either underlined key words or placed them in quotation

---

<sup>12</sup> Serif fonts are those that have small lines used to finish off the main stroke of letters and that lead into the next letter (e.g., Times New Roman, Cambria, or Garamond). Sans serif fonts have no such lines (e.g., Arial, or Verdana).

marks. Only two unfunded PIs used the italicizing strategy, the preferred conventional choice among successful proposals. In one funded proposal, no other text (outside of headings) is bolded, italicized, all caps, underlined, or in any other way pronounced with the exception of one word—**threads**—(speaking of a cutting edge concept in the PI's research field). At the expense of highlighting other words through italicizing or other means, this seems to be a clear rhetorical move by the PI to emphasize one word and one concept over the entire balance of the proposal. Visual cues (deployed by communicators as designers), be they words or, as in this case, formatting that highlights specific words or concepts, create meaning by providing a built in reference (Kostelnick & Hassett, 2003).

Choices such as 11 pt. serif fonts and italicizing key words have apparently become conventions typical of the genre. When less conventional methods are employed they may actually distract reviewers' attention because they do not deliver the artifact in the form that is expected. Professional communication pedagogues teach that breaking such rules for effect can sometimes be rhetorically valuable, but for this genre (imagine a reviewer with a stack of 37 documents to read in one day), such variations can become irritating and disruptive to the process (such as with one unfunded document that used large stars as bullet points).

A more effective strategy seems to be an effort to create smooth navigation through page features and use of contrast in advance organizers, such as headings. As Table 5 also shows, 92% of funded PIs placed page numbers at the bottom center—a seemingly accepted convention broken by three fourths of unfunded PIs. In fact, three unfunded PIs did not even include page numbers, a requirement specifically outlined in

the GPG. I do suggest that placement of page numbers at the bottom center of pages is an expected convention, though one that is not prescribed anywhere. Though the GPG does require page numbers, it does not prescribe their placement. Another convention seems to be a right justified margin, used by 83% of funded PIs; yet, 62% of unfunded PIs chose to use a ragged right margin.

Finally, headings play a major navigational and cognition role as advance organizers in many document types. In the 20 CAREER proposals studied here, 18 exhibited numbered, bolded headings. Of the funded proposals, all included non-contrasting fonts for headings (though many technical writing textbooks encourage use of contrasting fonts—more evidence of a convention specific to this genre) with a slightly lesser frequency among unfunded proposals (Table 5). Of note is that, while most proposals in the sample used headings of varying font size for varying heading levels, 37% of unfunded PIs use less conventional heading variation (e.g., underlined, indented, or centered headings).

### **Design Summation**

A compilation of the data highlights from this document features review indicates that an ideally conventional CAREER award proposal—from a document design perspective—would include the following:

- non-complex graphics, captioned with figure/table numbers, standing alone in text (i.e., not text wrapped), and referenced in the proposal's text
- 11 pt. serif font
- italicized key words in the text (but not overly applied)

- bottom center pagination
- 1 inch margins, right justified
- bolded, numbered (e.g., 2, 2.1, 2.1.1, etc.), non-contrasting-font headings of varying sizes for varying levels

### **Document structure: Mapping patterns in funded proposals**

In section C, Career Proposal Review, of the NSF webpage “Frequently Asked Questions (FAQs) about the Faculty Early Career Development (CAREER) Program For Fiscal Years 2006, 2007, and 2008,” a researcher posed the following question:

I realize that my CAREER proposal will be evaluated according to the two NSF merit review criteria (intellectual merit and broader impact). Do CAREER proposals have any other considerations in the review process that I should be aware of? (NSF.org/pubs)

The FAQ’s answer succinctly repeats that reviewers look for “the effective integration of research and educational activities” and then lists specific areas reviewers are asked to note. The list follows (*italics added for emphasis*).

- A description of the proposed research project, including *preliminary supporting data* where appropriate, specific *objectives, methods and procedures* to be used, and expected *significance* of the results
- A description of the proposed *educational activities*, including *plans to evaluate* their impact
- A description of how the *research and educational activities are integrated* with one another
- Results from prior NSF support, if applicable

The researcher may as well have asked, “In what order do I structure my proposal?” And NSF may as well have answered, “Structure it however you deem appropriate, but as we’ve already indicated, you ought to include these sections.” The need to include

specific sections is clearly paramount, but how those sections are best ordered and presented does seem to make a difference.

Through this analysis of successful CAREER documents, I have determined that funded proposals follow a consistent structural pattern. By distilling the structure of all the funded proposals in this corpus, the ideal structure for sections in a CAREER proposal would be that shown in Figure 8. Flexibility and some slight variation from this structure is to be found across individual funded documents. For example, some documents include a brief (generally a single paragraph) concluding summary. Moreover, some funded documents use both broader impact and education sections while most use one or the other. As a whole, however, the successful documents I studied vary little from Figure 8's logical content flow. Three researchers followed this ideal structure exactly, and several others followed it very closely. A structural comparison of the funded and unfunded documents as shown in Table 6 also is based on the finding from the structural analysis as shown in Figure 8.

The first level sections of the structure shown in Figure 8 were fairly easily found by exploring the general structure of each document (e.g., section headings, subheadings, or other indicators such as bolded or italicized text). It is not surprising, for example, to find a high incidence of labeled, outlined goals and objectives in the successful documents (83%), but it is also revealing of unfunded documents to see such a low occurrence of deliberate document structuring. More revealing, however, is the failure of the unfunded researchers to include some kind of clearly outlined (e.g., with a section heading) sections on broader impact, one of the two key NSF review criteria. Though this observation at first seems counter to the idea that both researchers and reviewers often

## **PROJECT DESCRIPTION**

### **1. INTRODUCTION OR PROJECT OVERVIEW**

- 1.1. Background of the field and motivation for the project
- 1.2. Problem statement
- 1.3. Forecast intellectual merit and broader impact

### **2. PRELIMINARY RESULTS**

(This is not just a pie in the sky idea, but a sound foundation for future results.)

- 2.1. Past and current research in the field (the literature)
- 2.2. Past and current research by the PI

### **3. RESEARCH PLAN**

(Intellectual merit is “shown” or proven throughout the document but emphasized in this section.)

- 3.1. Introduction
- 3.2. Goals (vision) and objectives (steps to attain goals)
- 3.3. Challenges/Limitations
- 3.4. Detailed plan (with detailed methods and procedures)
- 3.5. Timeline (year by year outline of activities)

### **4. BROADER IMPACTS AND/OR EDUCATION INTEGRATION**

(As previously noted, these sections are often equated; however, as broader impacts may be generally outlined, educational activities are more explicitly outlined and tied into the research plan.)

- 4.1. Industry (impact on or collaboration with)
- 4.2. Academia and/or research field generally
- 4.3. Education
  - 4.3.1. Graduate, undergraduate, secondary
  - 4.3.2. Outreach
  - 4.3.3. Women/minorities/underrepresented groups
  - 4.3.4. Collaborations
  - 4.3.5. Interdisciplinarity
  - 4.3.6. Education assessment/evaluation plan
  - 4.3.7. Year by year outline of activities
  - 4.3.8. Dissemination (e.g., papers, conferences, websites)

### **5. RESULTS FROM ONGOING NSF SUPPORT (if applicable)**

*Figure 8. "Ideal" CAREER award proposal structure.*

see education integration and broader impact as equivalent, successful proposal writers do not seem to want to leave that assumption up to the reviewers—thus, a recommendation: the more PIs can avoid leaving critical information to reviewers’ assumptions and actually lead reviewers through a document to important points as they outline their integration of educational activities, the better.

Table 6

*Highlights of document structure strategy occurrence*

<b>Identifiable sections</b>	<b>Funded (12)</b>	<b>Unfunded (8)</b>
Introduction: Problem Statement	7 (58%)	1 (12%)
Preliminary Results	7 (58%)	3 (37%)
Research Plan	9 (75%)	5 (62%)
Research Plan: Goals and objectives	10 (83%)	3 (37%)
Education Plan	11 (92%)	6 (75%)
Broader Impact	7 (58%)	1 (12%)
Both Education Plan and Broader Impacts	6 (50%)	1 (12%)
Results from ongoing NSF support	7 (58%)	1 (12%)

The order PIs put these sections into this structure may prove to be just as important as what they include in the sections. Even though Table 6 shows that several of the unfunded documents included the critical component of an education section, many of the sections were badly out of the order in Figure 8. In two of the unfunded proposals, for example, underdeveloped education sections are actually found in the first few pages, long before the intellectual merit of the research program was established. One of those two unfunded documents even places the NSF Support section as the second paragraph in the proposal, whereas Figure 8 shows that section to typically come last.

## Chapter Conclusions

As required by NSF and as established in these findings, addressing intellectual merit appropriately is critical to securing any funding. Including specifically detailed plans that outline broader impact (both direct strategies and tertiary outcomes) is absolutely necessary. Accomplishing all that through effective use of rhetorical and generic strategies can help provide the edge a researcher needs to increase likelihood of being funded by NSF. Identifying and understanding what those strategies are and knowing how to incorporate them into the writing of a fundable proposal, of course, remains the challenge. This study's findings shed clarifying light on many of those strategies that include the following recommendations.

- proposing research that moves in creative, innovative directions
- emphasizing a sufficiently detailed education and overall project plan
- including meaningful engagement with underrepresented groups
- developing integrated education activities that go beyond the conventional, the expected, and the pedestrian
- aligning one's research with collaborators as appropriate
- formatting document design deliberately with rhetorical intent to help navigate, emphasize, highlight, etc.
- using graphics judiciously and with attention to good design (i.e., anticipating and accommodating readers' needs)
- avoiding leaving assumptions about the project plan up to reviewers conclusions



## CHAPTER 5

### MIXED METHODS ANALYSIS OF THE NSF PROPOSAL PROCESS

This chapter's research stems from a need to gain a clearer picture of the broader genre environment. If a genre is a typified recurring response to a rhetorical situation (Miller, 1984; Yates & Orlikowski, 1992, 2007), the research methods in this chapter provide further definition of that rhetorical situation. Traditional genre analysis may only look at a CAREER proposal (or grant proposals generally) as a *response*, which is a fairly passive view for a document that is entered into such a complex and competitive field of play. It is helpful to consider the point that genres work within complex social situations, which is particularly true of the multi-billion dollar granting networks.

While chapter four established the characteristics (conventionally and rhetorically) of the CAREER proposal genre, chapter five moves that genre into a more advanced theoretical framework, genre field analysis (GFA), to better understand the rhetorical work this genre does within the systems it is entered into. To say that a proposal document “does” something within its system is to ascribe to it a certain amount of agency—that it, indeed, does something once it is put into play. The discussion in this chapter illustrates that genres as agents (i.e., genre-agents) are often responsible for more influence than that simply intended or allowed by the people (i.e., player agents) who work with and around them. I also refer often to the NSF proposal system as an arena or field of play. This reference intends no disrespect to the immensely hard work that goes into this effort, but it does put proposal writing in a position to examine it through the lenses of play theory. In just the past year, I have personally been involved with writing or consulting on writing nearly 70 proposals—I am acquainted with the level of work it

requires. I am also acquainted with the thrill of victory when a project is funded as well as the deflation that can come with a declined proposal. Because that hard work is submitted to a system that follows a complex, though sometimes unpublished, set of rules and is extremely competitive, I have found the lens of play theory to offer greater understanding.

Further, I spend much time in this chapter presenting findings from a set of interviews I completed with several NSF program officers: Oksana, Brent, Dane, Scott, Ivan, Hwang, Ernesto, Paul, Sandra, Harvey, Deborah, Doug, Irene, and Edna (all pseudonyms). Several of these commented often on the social aspects of the proposal process and the interplay that exists between communities of researchers. Consistent and fitting with the play theory perspective afforded through GFA, several interviewees made references to play and games.<sup>13</sup>

### **Genre Field Analysis**

Before I fold in play theory as a helpful theoretical perspective, I will first recall the pertinent literature in genre studies. As mentioned in this work's literature review, genre studies and analyses have been partner to professional communication for several decades now, and the theoretical concept of genre ecologies (Bazerman, 1994; Paré, 2000; Spinuzzi, 2002, 2004; Spinuzzi & Zachry, 2000; Yates & Orlikowski, 2002) has continued developing over the past 10 to 15 years. Within the past few years, scholars recognized the shortfall that the more elementary genre perspectives have when

---

<sup>13</sup> For example, Brent referred to "playing the game;" Dane discussed how "reviewers may not be willing to play," and he mentioned "newcomers to the game;" Ivan talked about "that's the competition you want to play out in the proposal process;" Paul said, "you can overplay;" and Harvey referenced playing a game by stating, "we bat like good ball players—about a third get funded."

accounting for genres and genre ecologies’ interplay and even influence on the social systems in which they operate. Several heuristics and frameworks have been formulated in an attempt to better understand this interplay that include combinations of genre and rhetorical analysis with post-human perspectives such as activity theory, socio-cultural and post-techne approaches, and play theory (Hawk, 2004; Spinuzzi, 2004, 2007). Genre field analysis (GFA), for example, combines genre and rhetorical perspectives to provide “a framework structured through play theory that explains . . . the interplay between genres and [human] agents within existing social structures” (Christensen et al., 2007). The framework is also intended to lead human agents (e.g., proposal writers) to better understanding and working within those social structures. Because GFA dons the lenses of play theory to shed light on competitive and rules-based activity (such as the high stakes nature of grant writing), I have employed it here as the framework to open up the NSF grant writing system for closer viewing—and ultimately better CAREER proposal writing (as well as other proposals generally).

What this mixed methodology provides is a tool for seeing individual parts (in this case document types and human players as well as the influence they exert) and for mapping a genre’s context, or system. Further, it helps uncover factors that make a proposal successful considering what comes beyond just the conventional features (which may get it accepted for review but promises no funding) or the generic expectations (“agential” or player-influenced features). Through GFA, a researcher first works to identify the following elements of a communicative situation:

- Genre-agents, or the generic, structural elements of a document or communicative situation that exert agency within a context that includes player-agents

- Player-agents, or the human stakeholders within a given situation (Moeller & Christensen, 2010)

The following paragraphs first identify the genre- and player-agents at work in the NSF proposal system, or genre field, generally. I return to this analysis later in the chapter to define the transformative locales, possible play scenarios, and even penalty conditions evident in this particular genre field. Figures 12 and 14 aid in visualizing a typical approach to the genre field as well as a much more successful approach based on the agents and play scenarios discussed by the NSF interviewees.

### **Genre-agents**

Discussions of the proposal genre (and a subset within the proposal genre, specifically proposals for the NSF CAREER award) are presented in this and the previous chapter. A review of the NSF website as well as information gleaned from the ethnographic sketches and interview data later in this chapter also include mention of other genres working within the NSF proposal and funding system. These include the following:

- The GPG
- Solicitation(s) or other announcement vehicles (e.g., dear colleague letters)
- NSF website (i.e., funding pages)
- White paper (in this context, a one to two-page abstract/summary of key concepts of a potential research project)

- 1-page summary (included with the proposal's project description) that briefly outlines the project and its intellectual merit and broader impact (and education integration in CAREER proposals)
- Biographical sketch (a brief CV in an NSF-determined format included with the proposal's project description)
- Budget (included with the proposal's project description)
- Letters of collaboration/support (included with the proposal's project description) as appropriate
- Panel/review summary

An entire genre ecology begins to come into view with each document type, or genre, influencing each other with each playing an influential role throughout the funding process. At this point, GFA scholarship begins to examine how each of these genres exhibits agency within the system. Agency in this sense means the ability to exert influence or the action of exerting influence. In short, because of the influence they exert, whether intended or not, by the human players who deploy or patronize them, we can refer to them as genre-agents.

The GPG provides a good example of how a genre-agent functions. This 70 plus page document embodies NSF's prime directives. It provides definitions and explanations about pre-submission activities, proposal preparation instructions, proposal processing and review procedures, and all other policies and procedures relative to the funding process at the agency. It is acknowledged as the agency's "bible" and is intended to be the final authority (Paul indicated that the GPG trumps the solicitation and any other document—if it is in the GPG, it is supposed to happen). Though a few

interviewees intimated that this document is open (though less officially) to some interpretation among programs (perhaps more so in application than intent), most of the interviewees firmly advised that PIs follow the GPG exactly or proceed at the peril of having a proposal returned without review.

In essence then, the document *works* on behalf of the POs. They have ascribed a certain amount of agency to this genre-agent to define, explain, and enforce the rules. Those POs who apply it more loosely have simply retracted some of that agency. Paul illustrates how this kind of agency works in the following terms:

In general, the GPG is it. The solicitation trumps the GPG. Now the solicitations all go through a pretty extensive review to make sure there's nothing that conflicts with the GPG . . . it's a process. I write a solicitation, I send it to review by senior management both within the division and the directorate. It's reviewed by general counsel; at some point it's reviewed by everybody who is going to look at it for various things. So basically, the only two documents that a PI really worries about for the most part is being familiar with the GPG, which almost none of them are, and looking at the solicitation. . . . They should [follow the GPG], but they don't. They should if they're good, or if they have good grant support at their institution they have people who know that.

Principal Investigators should certainly be responsible enough to know and follow these genre-agents (like the GPG), and if they do many of their potential mistakes can be avoided. Moeller and Christensen also found, though, that the actual CAREER award genre field requires familiarity with several other genre-agents and is much more complex. Each genre-agent in the preceding list carries out tasks through the agency that they have been ascribed by those who produced and consult them.<sup>14</sup> Moreover, they exert influence on those who “patronize” or consume their content.

---

<sup>14</sup> On the NSF website, for example, each program area page contains a link to “What Has Been Funded (Recent Awards Made Through This Program, with Abstracts).” The link leads to a list of previously funded projects for that program. A PI can reference the list's types of projects and strategies to determine if her intended proposal is a good match. The list, in essence, exerts agency upon the potential PI who consults it by influencing her decision of whether or not to submit her proposal to that program. She may

The NSF website, for example, provides most of the essential information potential grantees need to enter NSF's funding system. The site, however, provides little information about the benefits of or encouragement to contact POs (Moeller & Christensen, 2010). If this approach were intentional on the part of the website creators, the website is then essentially acting in accordance with the agency it has been given. If, however, the creators had no such intent, and the website's omissions discourage PIs from contacting POs, it has then taken on an agency of its own (Spinuzzi & Zachry, 2000). Christensen, Cootey, & Moeller explained, "relative to a genre's capability to mediate, . . . human agents are just as likely to be controlled, performed upon, or communicated to by those same genres with little or no ability (agency) to do otherwise" (2007, p. 2).

### **Player-agents**

Player-agents, then, are those human agents—stakeholders—who (because they have agency and can act as well as be acted upon) set into action and also respond to the multiple genre-agents within a genre ecology. I spent much time in Chapter 4 dissecting the CAREER proposal genre-agent itself, but, of course, the genre would never come into existence were it not for the player-agents who call for it or those who produce it. Christensen et al. also explained, "Identifying the players in a field, and understanding the 'stakes' of participation allows us to better understand the nature of transactions within various genres" (2007, p. 2). The player-agents in this social structure could include the following:

---

also be influenced about just how she develops content and strategies within the proposal to match what she see as important to the reviewers and POs from that program area.

- Principal Investigator
- Collaborator(s)
- Mentor(s)
- Reader(s)
- Program Officer
- Reviewers
- Others who may exert some influence, albeit to a lesser degree (e.g., department chair; VPR/sponsored programs office; other NSF officers, e.g., at an NSF workshop)

Significantly, the NSF proposal process *could* include any or all of the listed player-agents; however, some may be omitted—most likely due to the PI’s personal preferences and/or ignorance of their potential benefits.

Though it is ultimately the PI on whom the responsibility rests to write a successful (or unsuccessful) grant proposal, the PO is an influential facilitator in that process. As a player-agent, the PO exerts influence on at least the reviewers and eventual reviews by selecting them in the first place. In addition to actually making funding decisions, he or she also has broad influence on the form of a proposal’s content by writing or revising solicitations. When a PI contacts a PO, which was a key strategy recommended by interviewees, the PO’s influence can be expanded into several new areas; i.e., recruiting the PI as a reviewer or agreeing to review a white paper to help the PI determine that a proposal is, indeed, being considered for submission in the correct program as well as confirming whether or not the project idea may be of interest or in line with a program’s priorities.



The previously outlined PO job description does not state (nor does the GPG) that the PO's job includes helping a PI prepare a proposal. In fact, they are forbidden from doing so as a conflict of interest. However, a PO does still have some responsibility, a vested interest (e.g., to reduce the number of irrelevant proposals), and a general willingness to help the PI through other allowable means. POs can and often do exert influence in other ways including the following (comments are examples taken from the interviews):

“We try to actually talk to dept chairs and other people to try to convince them to mentor their young professors and post docs.” (Oksana)

“I can't tell them to collaborate or even suggest it really, but I can tell them that a very interesting thing is going on somewhere, and say you should maybe look and see what they're doing. So that's one way to help the community of investigators.” (Oksana)

“If you refuse to support the peer review process but you still submit for funding you're not being too consistent in terms of principles. Then you should participate in this if you say I believe in the peer review principle . . . it's about believing in and living within the principle of peer review.” (Brent)

*The panel had suggested that a particular proposal had excellent merit and the PO agreed it would be good to fund, but they were both concerned about one portion of the approach—that the PI didn't have a particular expertise to pull off a part of what he or she had proposed. The PO called the PI and said, “We'd like to fund this project, but we feel it has this area of weakness. Do you have somebody in mind that you might be able to bring in and engage in the proposal either reasonably within the budget you proposed or possibly with a little more money if necessary to accommodate that extra person. We worked something out . . .” (Paul)*

“[We may counsel] people that have been declined . . . Sometimes we'll just put a note in saying we really suggest that you talk to us.” (Paul)

“See who the POs are involved with the program, send them an email and say I'd like to get your assessment about this topic that I want to work on—if it's suitable for your program. My own response is send me two pages of what you want to do, why, how, why it's important . . . I'll never give an opinion on whether it's a good idea. I'll only give an opinion on whether I think it fits my program . . . I'm sure it's easy for them to see whether it's something I'm interested in or not.” (Dane)

Through these examples, I give a peek into the concept of player-agents and, particularly, these player-agents' interaction with genre-agents and other player-agents as well as the system in which they operate together. The following sections expand this peek into a fuller view.

### **Ethnographic Analysis**

To research *other influencing variables*, this next stage of the study moves more purposefully beyond proposal documents as stand-alone artifacts and begins to examine the systems in which they are produced and operate (Spinuzzi, 2002, 2003; Tardy, 2003; Zachry et al., 2006). Indeed, an entirely separate genre from the proposal (though a genre that is clearly influential on proposals), the solicitation (i.e., request for proposal—RFP, funding opportunity announcement—FOA), most often initiates the grant proposal. Solicitations are produced by agency officers who have funds to grant but who also have distinct goals and parameters in mind for funding distribution—all of which constraints must be satisfied by proposers. Agencies also have internal and external documentation and communication methods (i.e., genres) for disseminating solicitations and other process-regulating information, including NSF's *Grant Proposal Guide* (GPG) and website.<sup>15</sup> These social, cultural, economic, and political considerations—including various documents, media, and people—all influence a researcher's proposal writing process and proposal document in some way.

---

<sup>15</sup> Most federal and state funding agencies have websites and instructional documents as well as some similar genres for soliciting proposals. Those include Request for Proposals (RFP), Funding Opportunity Announcement (FOA), and Broad Area Announcement (BAA).

This chapter's ethnography, or collection of accounts of player-agents' views on the genre's rhetorical context provides additional information on what makes a successful proposal successful (and vice versa). Studying the society of the network through interviewing those who operate within it to sketch an ethnographic landscape from a broader and deeper perspective is a valuable tool to gain understanding into the macro and micro elements of that society (Briggs, 1986, p. 1). Throughout this chapter, I will present the most salient findings from the interviews and draw conclusions from those.

NSF fronts an extensive website with abundant guiding documentation; however, the relative prominence of one influencing factor, the PO, seems to fly under the radar on the website for a position that plays such a critical role in the funding process (Moeller & Christensen, 2010). To move this research beyond an artifact-based study, the ethnographic picture from a collection of interviews with several POs at NSF presented in this chapter reveals insight not available from the agency's website or even from most researchers involved in proposal writing.

Eleven of the 14 interviews took place in person over a 2-day visit<sup>16</sup> to the National Science Foundation headquarters in Alexandria, Virginia, while the others were at various locations. This ethnographic sketch is a collective picture of NSF POs' points of view and is comprised of interviews with NSF POs across 6 directorates, 12 divisions and programs, and one cross-cutting program. Eleven of the interviewees came from an academic background, while three came to NSF from industry. Two interviewees had no experience whatsoever actually writing a proposal of any kind, and two had never written

---

<sup>16</sup> I was granted IRB approval on October 9, 2009 for the interviews and was required to provide each interviewee with a Letter of Information stating the purpose of the interviews and the intent to maintain confidentiality of names. Similarly, I was granted permission to conduct the interviews by NSF's legal office under the same conditions.

a proposal to NSF. Six interviewees were permanent NSF employees, three were temporary employees, and five were rotators (rotating POs generally have a specific time, usually 1 to 3 years, during which they serve as a PO and temporarily leave an academic appointment under agreement with the academic institution to return to the same position). Interviewees had varying time of experience as POs ranging from two weeks on the job to 27 years. Five interviewees were women, and nine were men. The names used in this chapter to identify the interviewed POs are pseudonyms. The interviews were recorded both in notes and on a voice recorder, which were later transcribed.

Interviews averaged just less than an hour, during which time I asked questions about POs' NSF experience and their own proposal writing experiences, what they look for as a successful proposal, what common mistakes they see and pitfalls to avoid, what best practices they recommend, and any other advice they have on how to be a successful proposal writer to NSF. In addition to follow up questions as appropriate during the interviews, the specific questions I asked were the following. These questions were intended primarily to get the POs talking in some general areas so that I could ask more specific and probing follow up questions.

- Will you tell me about your history as an NSF program officer?
- Will you tell me about your experience with grant writing (on both the writing and/or the reviewing/granting sides) with NSF and other agencies?
- What are the common mistakes you see investigators making in grant writing?
- Is there a generality of grant proposal writing best practices that can be applied across programs (and what advice would you offer PIs writing grant proposals)?

- Do you see any social aspects to the grant proposal writing process? If so, what do you see as the interplay between the actual writing process and any social aspects?

The following presentation of key collective and individual interview findings reveals insights into the NSF granting process that only those on the inside, namely POs, can offer.

### **NSF Program Officer Vignettes**

To many investigators, particularly newer faculty (those submitting CAREER proposals, for example), NSF is a black box. They often see it as an impersonal funding source that throws out as many hurdles as it does opportunities to gain access to its resources. They may see its face as a website. And they also know that NSF controls a significant portion of available research funding in the sciences and engineering.

Investigators must also know that there are, indeed, real people who work at NSF who facilitate proposal submission as well as administer agency funds. The player-agents most investigators work with are the agency's POs. While many PIs may get the distinct impression that POs' primary job is to decline funding (and this unfortunately *is* a large part of the job), a PO's role goes far beyond that. Nailing down how a PO helps PIs can be difficult since the NSF website does little to initiate any working relationships beyond listing names and contacts (and if one is willing to dig further lists areas of responsibility).

Since, as Chapin (2004) suggested, POs are a researcher's first and only contact with NSF (p. 27), it is advisable to be familiar with what they do. A general PO job

description (compiled from information in the GPG and from interviewees' responses)

includes the following:

- Write/co-write/publish the solicitation
- Receive and process submissions
  - Verify that the proposal fits into the program
  - Check compliance (e.g., to GPG, solicitation)
- Ensure that each proposal gets a fair review
  - Find reviewers and facilitate panels/reviews
  - Identify potential conflicts of interest among reviewers
  - Make sure the review process is faithful to the solicitation
  - Ensure the panel summary accurately provides appropriate feedback (e.g., problems, suggestions for improvements, good ideas, etc.)
- Recommend to NSF division directors what gets funded
  - Provide further information about declinations as requested
  - Negotiate budgets
- Conduct outreach/workshops/campus visits

A job description, though, is a minimum list of tasks and hardly provides a complete picture about the person or people who have that job and, more importantly, how they conduct their professional tasks. My interviews, however, debunked the black box image and impersonal stereotypes and revealed a PO cross section of people who are personal, interesting, concerned, engaged, willing to help, and often colorful-in-real-life. The following vignettes help paint a more accurate picture of the players as real people and what they're concerned about relative to working with grant proposals. Their

anecdotes also begin to lay the foundation for working better with them through more deliberate and effective communication choices (both in terms of interaction with POs and proposal production).

**The sage.** I pulled out my pocket recorder walking into Scott's office. As we sat down at the table in the corner tucked behind the open door, he said, "Turn off your recorder and let's just talk." I did not have to ask many questions of Scott; he did indeed just talk. He said he had read my list of questions I had emailed and that he knew the story I was after. Scott had been with NSF for nearly 30 years as a PO having previously been in both industry and academia. His bookcases were overflowing but orderly. He had one of the better window views available at NSF.

After a short and spontaneously delivered history of scientific research in the United States, Scott pulled a stack of about 18 proposals from his desk and smacked them on the table. He said, "These just came in. I haven't even looked at them yet." He turned the stack over and asked me to pick one. I pulled one out toward the middle. He scanned through the first page with his finger going back and forth down the page, clicking his tongue lightly as he went until he finally said, "Ah, there it is." He read a line that said something like *the objective of this project is . . .* The remainder of the sentence was non-understandable to either of us (and Scott is an expert in the field). That particular proposal even used the word *objective*, which some in the remainder of the stack did not. We went through a few more and had the same experience. He then proceeded through the entire stack with me, and there was one out of the 18 about which he said, "The objective on this one comes close."

Scott suggested that one out of the 18 would likely have received funding just based on the statement of the objective, which was the first sentence of the project description. He questioned whether the rest would receive funding, although he said some likely would because there is a certain amount of money to conduct research that needs to be distributed in this area. Scott estimated that about 2 to 5% of proposals are outstanding (and here is a PO who has literally read thousands). He acknowledged that although some scientists cannot articulate a research plan, some may still get funded based on the fact that the research they propose needs to be done. Scott continued for the next hour to list his eight most common mistakes in proposal writing—that discussion is continued below in the common mistakes section.

**Like pasta.** Ernesto was of Mediterranean descent—handsome, friendly, and expressive. Aside from his charm, he established instant ethos with just one story. He said,

I started my independent career and wrote my first grant and gave it to a guy to read. First I gave it to my son who was probably around 15 at the time and said ‘read this.’ He was a native speaker; he grew up here. Both my son and my friend said, ‘The English is – we understand, but it’s not up to par.’ So, bite the bullet, be humble, and I went to the writing center at my school and said let’s hammer this out sentence by sentence.

I thought, here is a guy with a PhD and a faculty appointment at a prestigious polytechnic institution, and he recognized that a key starting place for him was the writing center, which is intended to aid undergraduates in writing classes. If he is that committed, I figured I ought to listen to his advice.



As our conversation proceeded, I realized that, though a scientist, Ernesto was an artist. He had discovered the *techne*<sup>17</sup> and had analogized it with more readily understandable terms and concepts—his choice, the culinary arts. He continued to pepper his comments with references, such as that the content of a proposal is the beef but that we must not forget spice or that grantsmanship (with a satisfying roll of the r—grrrrantsmanship) is like following closely a fine recipe. His most enduring cuisine analogy came in his explanation of the time it takes to produce the piece of art itself.

“Grants many times are like meals, like cooking,” he explained and then went on to say,

Some things need maturation, need to stay on the shelf for a while. Like pasta, it’s always better if you eat it next day because the sauce. It’s like grants, right? You see a lot of grants written in a hurry. You know it was written in a hurry, that there was not much thought. One thing I have done always is write a grant one month before the deadline. Then you let it sit for a couple of weeks and then you attack it again. This maturation, this working in your sub-conscience, this simmering, is something that matters.

**Humorous proposal categories.** Paul was my first interview at NSF, and my longest. He came in about 10 minutes late and was wearing a red silk Hawaiian print shirt, frayed khaki cargo shorts, John Lennon glasses, and Birkenstocks—in late October. He paid me back for his tardiness by talking for an hour and a half spurred by relatively few questions. I realized after a few interviews that there is a kind of program officer humor, just like there is a certain type of police humor—a humor that keeps one from getting too down despite a stressful job. Paul let me in on some program officer humor relative to many of the proposals received that will generally not receive funding. He said,

---

<sup>17</sup> In Aristotelian terms, *techne* is the art of productive knowledge, a capacity to make or to bring something into being. What is significant to this context, as Johnson interpreted Aristotle, is that “the end of any kind of human activity involving making or producing artifacts (whether material or discursive) is in the receiver or user of the product” (Johnson, 1998).

We have a number of humorous categories we throw proposals in. One of them is the *trust me* proposal. This is a proposal that is pretty vague on exactly what they're going to do and completely devoid of any detail on how they're going to do it, and it's pretty heavy on what I've done in the past, how many publications I've had, how many awards I've had, how many Nobel Prizes I've had, and just what my general, personal, commitment to education is, and there won't be a heck of a lot of detail to back any of that up. Long on ethos, long on intent, and basically: trust me. I'm good. I've done good things in the past. Give me the money. Don't bother me with details.

Paul explained that the trust me proposal is known throughout the foundation, but he also mentioned another category: "We also get, in the infrastructure oriented fields, we get the *field of dreams* proposals." Field of dreams is known throughout some directorates. In fact, Scott had also mentioned the trust me proposal in his interview. Paul continued,

Anything where you're proposing to build a tool . . . the field of dreams concept is that if you build it they'll come, which means that you just build something and by virtue of its being really great and well engineered it will be useful to people and people will use it. As opposed to a process where you really are responsive to requirements and you demonstrate a process by which you are going to engage your target audience, have them engage in setting requirements, and then build in some kind of evaluation process that lets us see that you are in fact responding to the needs and that you have some measures of success. Field of dreams proposal have none of that. Field of dreams proposals just start off with an incredibly detailed architecture and a lot of technical discussion on what they're going to build that's meant to overwhelm you with how technically sophisticated this is, and yet nothing that really conveys how.

Relative to infrastructure grants, and as a slight variation of the field of dreams proposal, Paul outlined a third category that clearly annoyed him. He said,

The *shopping list* proposal is just a grab bag of a whole lot of things. Somebody's looked at the solicitation. They've looked at what the maximum amount is and the maximum duration, and they said, well I want to ask for the maximum amount. What can I do to fill that up? . . . I've seen proposals where there's as much as 10-12 individual aims. Some of them are connected, and some are just completely disconnected. When they're disconnected like that, they start to work against each other. People just look at this and say, this person is just listing everything they want to be doing for the next five years, and they've jammed it all into one proposal.

**Time is money.** Deborah was tall and slim, held herself professionally, and had an office as tidy as my Aunt Jo's kitchen. She adamantly preached clear, detailed, and organized writing along with the admonition to state the objective and establish the exigency right up front (see Scott's interview comments as well as Chapin, 2004). Deborah did not just tell me that is an important practice, however. She told me why relative to how much time reviewers will take with a proposal. She explained,

I remember a colleague who worked for [foundation X]. She said that the foundation basically brings all the reviewers to the hotel for the weekend. They get a stack of a hundred applications and they sit and they read all these applications. They basically have 10 minutes or something for each. You tell people who've just spent months writing this that essentially, and the same is true in [NSF] panels, that we allocate 15 minutes per proposal. There's 15 minutes to discuss your proposal. That means that . . . the easier you make it for us to discuss it, the easier it is you make it for us to see how wonderful it is. Obviously the panelists have spent a lot of time with the proposals before they come to the panel. It's just that our discussion in the panel will be on average 15 minutes per. . . . Ones that have already been read by the panelists and ranked very poorly, we may only spend 3 minutes on in the panel. We don't have time to discuss ones that we know are going to end up on the bottom of the pile.

**Tough guys.** The introduction to these ethnographic snippets claimed that many investigators see NSF not only as a passionless black box, but also possibly as a group of cranky people who delight in weeding out subpar proposals and sending declination notices. With an agency wide funding rate of around 20%, that stereotype may be understandable. More precisely, the funding rate at NSF has dropped from an average of 31% in 2001 to an average of 23% in 2010 (NSF SLC Workshop). If time is money, however, and PIs' time is becoming increasingly more crunched with tenure demands, increased teaching loads, and other personal and professional commitments, blunt critique intended to save time for PIs and POs can be seen as merciful.

Harvey thinks so anyway. Harvey has been an NSF PO for more than 20 years, and he came to that position after a successful academic career—concluding as a department chair at a well known polytechnic institute. He estimated the cost to produce a proposal and, in part, bases his justification for why POs and reviewers are perceived as tough on that estimate. Harvey made the following comment relative to giving a PI feedback when contacting a PO about research ideas:

I think there's responsibility in several places. My guess, and it's really a guess, is that a proposal costs \$30 thousand to develop. I'd like to see somebody put some real numbers and look at that to see if that number's right. But if you start thinking about my time and the proposer's time, my guess is that it's close to \$30K. So if somebody doesn't have a good idea, you really owe it to them to say, you're wasting your money. I mean they have better things to do with that. So I think we should be pretty tough.

**Either ya got it or ya don't.** With a PhD from MIT and an endowed chair at a well respected West Coast university, Sandra proudly said she had enjoyed NSF funding her entire career and at one point had maintained about an 80% proposal success rate. The prominent placement of her diplomas, awards plaques, and patents on the wall above her computer screen told me was both capable and driven. She said,

It's all about being a good scientist and making your science interesting to somebody else. Some people can do it and some people can't. There was this really good scientist I knew. I love his research and I love his energy, and he couldn't get a proposal funded. He tried over and over and over again. So he dropped out and he's in film now. He just couldn't figure out how to do it. I talked to him a lot. I was well funded and so *I knew how to do it*. But when it came down to him, he kept saying I can't make up a story that isn't true. I said, you're not, you're [telling your] good story.

I queried with some doubt in my voice, "So you're saying that you either have it or you don't?" Sandra responded with only minute capitulation,

I think you have to have enough and then you can work on it, but a lot of people that don't get funded shouldn't get funded and should never get funded because

they just don't have very good ideas. It's a bell shaped curve, and they're down there at the end. So maybe they do other things.

Like make movies, I suppose.

**Communicating excitement.** Building on Sandra's conclusions, the key, it might seem, to consistently successful proposal is to have "good ideas" and then be able to communicate those effectively. Though Sandra maintains that some just do not have good ideas, Deborah also considered the reality that some do, but they just can't do the communicating part. She concedes that, though researchers in this category may be able to communicate the technical parts well enough, they are unable to sell the sizzle. She related the following anecdote:

Sometimes I also talk to PIs who I think really have potentially excellent work. You've read their proposal and you sit down at the table with them and they start talking about it and they glow. They just glow. And I look at the proposal and I kinda go, it's gray. There's some way, if I could say to them, you have just in this five minutes communicated more energy and more importance of your work than came out in these 15 pages. You have to figure out how to get that.

### **Ethnography Findings**

Considering all the interviews, it was clear that most POs feel a dedication to their community (e.g., academic/research field), and they feel a strong sense of excitement to be involved in advanced scientific research. It was also clear that they become a bit irritated, if not downright frustrated, by many proposal submissions. Though most of my interviewees knew that I was doing research about writing successful proposals, specifically CAREER proposals, I volunteered little information about what professional communicators do. Regardless of their knowledge level into my background, they generally seemed willing to discuss all aspects of successful and unsuccessful proposals.

This section outlines in more detail insights gained from POs into how to improve grant writing success generally (which can be applied specifically to writing a CAREER proposal or most other NSF proposals as well as proposals to several other agencies).

Interviewees came from six different directorates and twice as many programs. In addition to varying in time of service from 2 weeks to almost 30 years, they also had offices on the 5<sup>th</sup>, 6<sup>th</sup>, 7<sup>th</sup>, 8<sup>th</sup>, 9<sup>th</sup>, 10<sup>th</sup>, and 11<sup>th</sup> floors. My point is that NSF has hundreds of POs (I contacted 76 to get 14 interviews), and the 14 that I interviewed rarely personally knew or even knew of the others I interviewed, yet they came to generally similar conclusions.

**Contacting program officers—Ask early; ask often.** I attended an NSF regional outreach meeting held in Salt Lake City, Utah in October 2010. The meeting’s purpose was to educate academics about NSF programs and processes (similar to the outreach activities that interviewees had discussed with me). A recurring theme at the Salt Lake meeting was an encouragement for PIs to contact POs in their respective programs of interest early enough to resolve questions (e.g., Does my research fit into a certain solicitation or program? Can I submit letters of support with a CAREER proposal?) and head off potential problems in the submission process. The second half of the message wasn’t exactly a “call any time” offer, but it was an invitation to contact POs as appropriate and as often as needed. The invitation may prove quite valuable to potential investigators at the meeting (and those who attend similar NSF meetings), but for most researchers consulting only the website (Moeller & Christensen, 2010) or possibly other researchers who have previous NSF experience, finding guidance toward contacting POs is less likely.

My interviews revealed that POs are not only willing to be contacted but also that they strongly encourage it, and they even mentioned how they prefer to be contacted. Four interviewees preferred being contacted by phone and four by email. Two suggest that an email to arrange a phone call would be best, while four others acknowledged that they preferred a personal visit if possible. All stated that contacting POs was very important to success as a proposer, and several maintained that whenever possible, PIs should come to the NSF headquarters and personally visit with them. Of course, they also mentioned the need to be sensitive to time constraints.

Interviewees cited a general lack and reluctance on the part of investigators to contact POs (not just at NSF, but in reference to other funding agencies as well). Though it would seem natural that declined proposers would call for clarification or to express contrary views (and they do), interviewees who addressed that question said that even declined PIs rarely contact them. Of course, interviewees acknowledged the many demands placed on researchers (e.g., writing proposals, heavy teaching loads, work-life balances). Some opined that some PIs would rather incorporate reviewer feedback into a subsequent proposal submission than contact a PO for guidance up front. Some suggested that many PIs are just intimidated or are ignorant of the fact that they can call for some direction.

In spite of POs commitment to avoiding conflicts of interest and being fairly restricted in the help they can offer investigators who call, interviewees generally expressed much interest in having researchers contact them and forming what might be seen as a very limited partnership. Program officers are still part of the research communities they came from prior to serving at NSF, and they have a tremendous need to

remain connected to that community both to keep in contact with potential reviewers and to be able to return to that community as researchers if they are serving as temporary or rotating program officers. Moreover, several interviewees suggested that their demanding work load can be lightened somewhat when they are able to offer some guidance to PIs well before submitting a proposal.

Interviewees indicated that when investigators contact them to ask questions about a solicitation or to ascertain whether their research would be best submitted to a particular program, PIs can get a better feel for the agency's or the program's goals. One interviewee indicated a recent example of helping a PI understand what broader impact means and how that should be balanced with education integration (rather than being replaced by it) in a CAREER proposal. Conversely, interviewees indicated that a PI contacting the PO can give a much better feel for the PI's work to not only make sure that it fits within a particular program but also to arrange for appropriate reviewers.

Relative to helping a researcher fit her research into the appropriate program—and this point hints again at an unofficial partnership—several interviewees said they encourage investigators to submit a white paper of one to two pages for their review. Though they can't offer critique about the content or say that the idea is poor or passé, they can certainly confirm whether the idea fits into their program or whether the PI ought to be looking at an alternate program. One interviewee even suggested that while it would be inappropriate to tell a PI that she needs a collaborator or that professor so and so would be an excellent collaborator for the research, that it would be appropriate to say that there's currently some other interesting work being done in this area and suggest that the PI look at professor so-and-so's research.



One point that several interviewees made was for investigators at any level (brand new assistant professor on up) to contact them to serve as reviewers. Five primary points came out of the interviews in this regard. PIs serving as reviewers and on panels can 1) find out how the submission, reviewing, and funding process works, 2) learn that those who review for NSF are genuinely trying to help rather than trip up proposal writers, 3) influence the direction of science research and influence which topics in a community are funded, 4) see what goes into successful grants by learning from good examples, and 5) see the pitfalls of unsuccessful grants and learn from proposal writers' mistakes.

**Common mistakes.** Though many proposal writing researchers and commentators do and should focus on the “to dos,” there are also many “thou shalt nots” and even more “thou should nots.” In regards to pitfalls and mistakes, Friedland (2000) mentions that the top pitfall is failure to establish the “general significance” of a project and also lists several other mistakes proposal writers make, both in terms of content and writing (p. 35). Most interviewees corroborated Friedland's assertion that funding is, indeed, granted based on the significance of the project's content, and they outlined several areas of common proposal writing mistakes. What may be as interesting is the emphasis of mistakes they identified. The first category of common mistakes has to do with *proposal content*:

Top most identified content common mistake:

- Not representing the literature in the field or not framing the project within the field. (This includes either not being familiar with what's happening or being discussed in the field or simply disregarding it. A common indicator of this gap in representation is over citing oneself.)

Second most identified content common mistakes:

- Not having a clear plan to accomplish the stated objective or having a plan that lacks adequate detail
- Assuming that the reviewers will understand the technical areas or that they will be more than generally familiar with the topic

Third most identified content common mistakes:

- No clear objective statement or objective buried later in the document (i.e., not putting the whammy up front—[Chapin, 2004, p. xii])
- Not being concept or hypothesis driven

Other identified content common mistakes:

- Too many directions, experiments, aims, or methods and/or no synthesis or unifying theme (e.g., in a CAREER proposal)
- Too small an idea or myopic theme (e.g., in a CAREER proposal)
- Poor matching of the budget to the project activities

Another category of common mistakes identified out of the interviews deals more with *NSF administrative and programmatic needs* and includes only one set of comments, but its implications for proposal writers are very important. The mistake is not paying attention to requirements outlined in both the GPG and in solicitations. The GPG, for example, specifies certain font styles and sizes that are allowable. It also indicates that the one page project summary shall be included and that it shall address in separate statements the intellectual merit and the broader impacts of the project. If these are absent, the proposal is supposed to be returned without review—end of game.

Solicitations, similarly, may demand that specific content be included. The CAREER

award solicitation, for example, requires proposals to have an integrated research *and* education plan. Some interviews mentioned that this education plan is not necessarily synonymous with broader impacts and that its elements should not be pedestrian (for example outlining a new course). If that education integration is not included in a CAREER proposal it may be returned without review—end of game.

*Writing/mechanics* constitute the next category of common mistakes discussed by interviewees. The surprising aspect of this category is how prevalent its discussion was among interviewees. They clearly communicated that a proposal is less likely to be funded if the content considerations were not appropriately in place, and of course they emphasized that NSF's administrative and programmatic needs must be met of the proposal risks being returned without review. However, the interview transcripts produced one third more instances of mentioning writing/mechanics common mistakes as opposed to content mistakes. Writing mistakes fell into the following areas.

Top most identified writing/mechanics common mistake:

- Unbalanced proposals, such as too much information on prior work, too long an introduction and leaving inadequate space for the project plan, imbalances between broader impact and intellectual merit, long technical sections with little on project management or evaluation, etc.

Second most identified writing/mechanics common mistakes:

- Excessive technical writing (including over use of acronyms or jargon) with little to no explanation/definition
- Absent or inconsistent or ineffective headings; general disorganization
- Misspelling

- Bad grammar
- Cut and paste problems (i.e., cutting and pasting sections from previous proposals without updating information for NSF's, such as finding references to NSF and NIH or DOE as the funding agency within the same document)

Other identified writing/mechanics common mistakes:

- General poor attention to writing (e.g., the same word spelled correctly and incorrectly across several instances)
- Using words other than research—NSF's mandate (e.g., develop, design, improve)
- Not enough graphical help when it would help understanding of complex concepts
- Figures and/or figure text too small to read (without zooming in on a computer—POs reported that they and many reviewers still like to print out proposals for reading)
- Fonts too small
- Multiple letters of collaboration (or letters of support when allowed) written in exactly the same words
- Proposals obviously written in a hurry
- Issues with references style

**Best practices.** On the flip side of the coin, I followed up questions about common mistakes with queries into what interviewees saw as best practices for successful proposal writing. Again, though I had not told interviewees that I was there to find out about writing-specific solutions to or the writing nuts and bolts of good

proposals, they once again provided nearly 30% more comments about best practices in the actual writing of proposals as opposed to content or NSF administrative and programmatic requirements. Moreover—and this points to POs’ general *we want to help rather than hinder* nature—interviewees responded with 23% more comments about best practices overall across the three categories as opposed to common mistakes (71 total comments about best practices compared with 55 total comments about common mistakes).

As mentioned, best practices categories broke down generally the same as common mistakes. Comments about best practices in the *proposal content* category roughly parallel as cures for the common mistakes previously mentioned as follows.

Top most identified content best practice:

- State the objective and project significance clearly and early

Second most identified content best practices:

- Propose excellent content, research ideas, and research plans (This point would seem to go without saying, but my interviews revealed a fair amount of heartburn on the part of POs that they receive proposals that are clearly not well conceived or presented.)
- Acknowledge the pertinent and related literature/place research idea in context with what is happening in the field

Third most identified content best practice:

- Propose novel work (bring in new knowledge)

Fourth most identified content best practices:

- Clearly detail and explain the project

- Proceed from a science-based problem, hypothesis, and objective
- Include a clear management plan

Other identified content best practices:

- Include an evaluation plan for the project
- Include minorities, outreach, other underrepresented groups (I believe there was less emphasis of this point in terms of best practices because this principle is clearly included in NSF agency-wide and programmatic documentation.)

Regarding the *NSF administrative and programmatic category*, as might be expected, interviewees discussed the importance of following the GPG and solicitations' instructions very carefully; however, they discussed to an even greater degree the importance of PIs identifying early on to which NSF program area they should send a proposal. The recommendation to do so early was based on the previously discussed principles of contacting POs. The interviewees also strongly suggested doing research into previous funding in the programs that may be seen as a potential fit for proposed research to better understand both the agency and its programs and respective goals.

In the final category, *writing mechanics* best practices, interviewees had plenty to say. Interestingly enough, however, the advice they gave for antidotes to common mistakes in writing were less mechanics oriented and more strategic. More than half of their responses to the best practices question came in this category and are here listed in order of frequency.

Top most identified writing/mechanics best practice:

- Have a reader (Nine out of the 14 interviewees suggest having a reader—a colleague or someone trusted who is familiar with the PI's field. Four suggested

that two readers of different types would be best: someone who knows the field and also someone less familiar with the subject matter but who can at least offer more objective critique. Ernesto even suggested giving a proposal “to mean people . . . Look for someone who is not in your institution that you know that they speak their mind, they they’re not afraid to tell you, look, this is not going well.”

Second most identified writing/mechanics best practice:

- Find a mentor/coach (In a step moving beyond just having a reader, eight interviewees mentioned the need to find someone who has been successful writing grants generally, NSF more specifically, and NSF grants in the specific program area or award, such as CAREER. This person needs to be able to offer advice, allow perusal of past successfully written proposals as well as declined one, and be able to commit some time to a PI’s writing process.)

Third most identified writing/mechanics best practice:

- Perform pre-writing<sup>18</sup> work
  - Anticipate panels/reviewers’ questions and concerns relative to the research area and project (i.e., reader-centered writing)
  - Be aware that panels/reviewers may be non-experts (As Paul admonished, “If you can’t write in layers, you’re running the risk of writing to only one or a few people who are capable of reading it a certain way. If you write too high you’ll get somebody who says this is a great idea and we need

---

<sup>18</sup> Here, I group several the interviewees’ responses/comments into a pre-writing classification. No interviewees actually used the word pre-writing, but the activities they described fall within such a classification.

this, but you're going to totally miss the person who's capable of [knowing] whether this is really going to work or not. If you spend too much time on details, you're going to be lost in the weeds and a technical person will think it's wonderful, but they won't have the capacity to explain to the other panelists why it's good.”)

- Serve on panels (the benefits of which have already been discussed under the contacting POs section)
- Learn how to read and get useful information from the reviews (This can be done both with reviews a mentor might provide for his previous proposals as well as reviews a PI receives—particularly from declined proposals—to improve the next submission.)
- Though no interviewee mentioned it in so many terms, some of them did imply that PIs can also find out from program managers what type of review they will have, such as ad hoc or panel. Such information can give them a clue as to the level of expertise and how much time reviewers will dedicate to the process. (A panel review, which is conducted by peers at NSF, means that reviewers may have time to read proposals first and then discuss them together in context of other reviews in a panel setting. A panel is also likely, however, to have more reviewers who are non-experts in a specific research area contained in any one proposal. In such a situation, a proposal writer would do well to follow Paul's advice and learn to write in layers. An ad hoc review, by contrast, sends proposals out



for review to reviewers who usually have specific expertise in a field related to the proposal.)

Fourth most identified writing/mechanics best practice:

- Use workshops and outreach resources (NSF sponsored, campus, others)

Fifth most identified writing/mechanics best practices:

- Start early
- Pay attention to writing basics (e.g., spelling, grammar, punctuation) and/or get help to do so

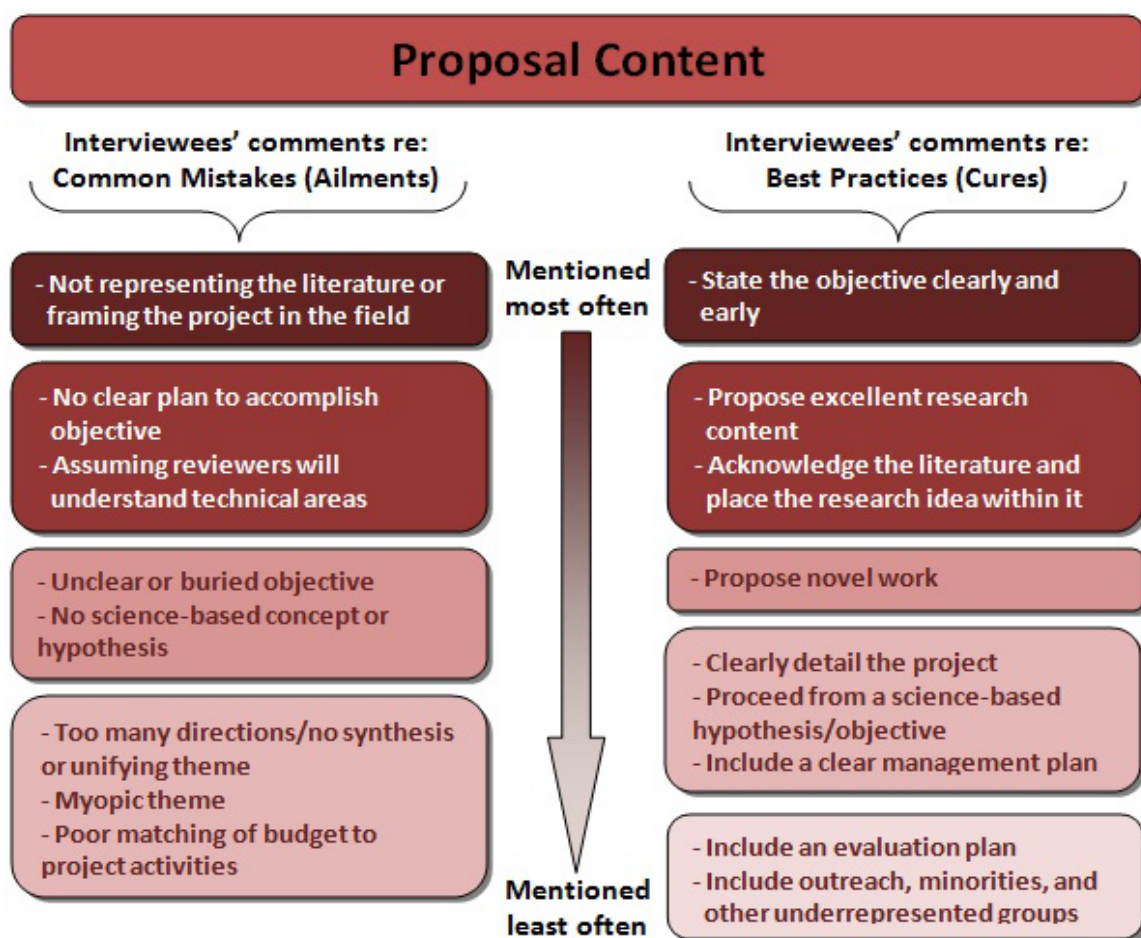
Other identified writing/mechanics best practices:

- Incorporate meaningful graphics with readable labels and text to communicate complex concepts and data
- Pay attention to organization and formatting in order to lead the reader through and to make important concepts and points in the document readily accessible and locatable
- Write clearly and concisely
- Collaborate as appropriate

It is not surprising that the best practices discussed by POs would have some correlation with the common mistakes that mentioned. Figures 9-11 illustrate at a glance this general correlation in interviewees' comments regarding the ailments of proposal writing common mistakes and the available preventive cures of best practices.

The mistake in proposal content that my interviewees were most concerned with was not representing the current and key literature in a PI's field or not framing the research project within that literature. It is worth noting that for every common mistake

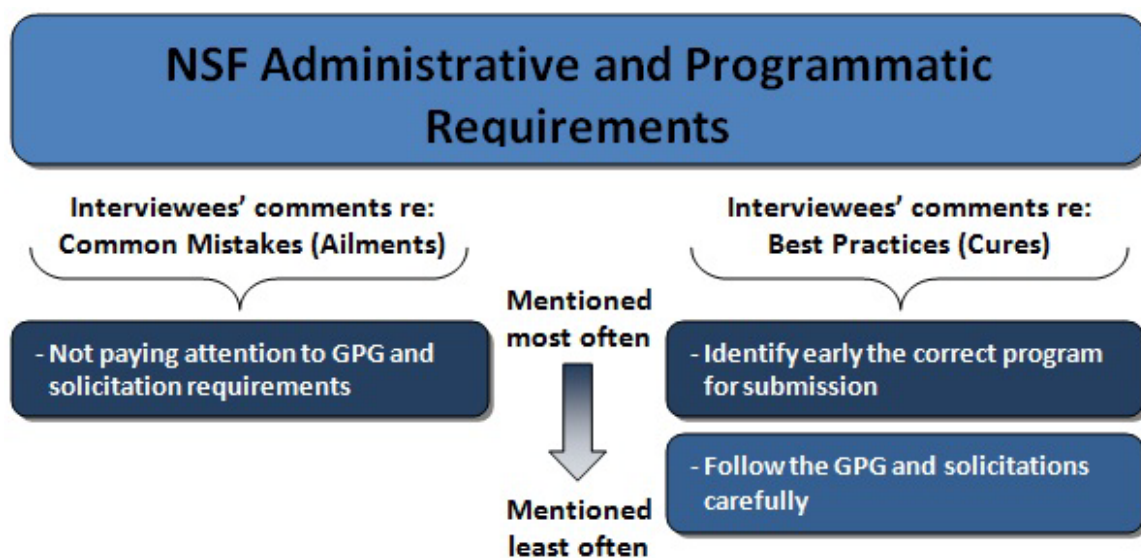
listed in the left column, a preventive cure can be found in the right column of best practices. The figure indicates at the top of the columns those mistakes or practices that interviewees mentioned most often moving toward those mentioned least often. This should not be read as those mentioned least often being not important. POs never referred to any items listed as “maybe it would/wouldn’t be a good idea;” rather, these items were discussed in terms of “don’t do this” (common mistakes) and “do this” (best practices).



*Figure 9.* Hierarchy of interviewees' responses relative to proposal content common mistakes and best practices.

When conducting the interviews, I did not ask questions about common mistakes or best practices relative to the proposal content or administrative/programmatic categories as they are illustrated here. Those classifications emerged as I analyzed

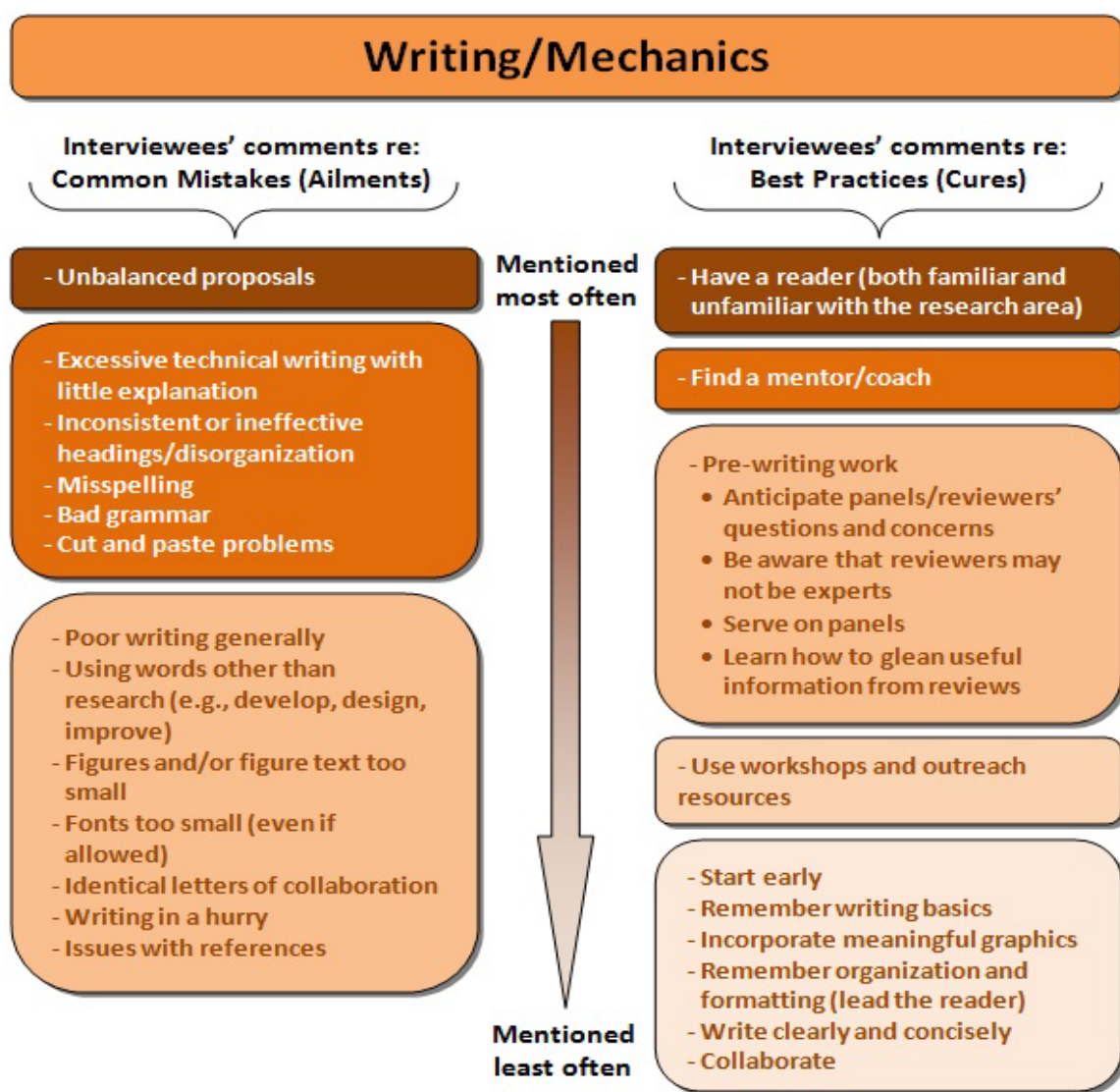
responses. The category shown in Figure 10, for example, stood out in the responses because half of the interviewees complained about so many PIs not following NSF guidelines that have been published in such a readily accessible manner. A few interviewees discussed following the GPG and other documents as a best practice, but I got the feeling that most considered it a “no-brainer” when mentioned as a common mistake and not worthy of much other discussion. The POs did, however, have pointed advice about doing the homework necessary to get the proposal to the correct program. The mapping below presents some play scenarios with genre- and player-agents that address that specific problem.



*Figure 10.* Interviewee responses relative to NSF administrative/programmatic requirements common mistakes and best practices.

Finally, POs were quite vocal about infractions of writing and mechanics, yet they were even more adamant about suggesting best practices in the same area (see Figure 11). This would preliminarily lead one to consider, from the POs and the reviewers' perspective, the importance of the proposal's writing mechanics relative to its content. A

well written proposal is clearly very important and may prove to tip the funding scale given otherwise equally fundable research project proposals. A significant factor in the best practices column here is the focus on social aspects for cures. The top four groups of best practices all incorporate the influence of player-agents, such as readers, mentors, reviewers (working with or serving as), and workshops and outreach resources that are facilitated by player-agents.



*Figure 11.* Interviewee responses correlation between writing/mechanics common mistakes and best practices.

### **Genre Field Analysis—the Developing Picture**

With the genre-agents and player-agents identified and with an understanding of what those agents do, further sharpening the genre field analysis focus leads to defining the space in which those agents operate as well as how they exert influence (or have influence exerted upon them). Since GFA is a tool for seeing the individual parts of a genre field at play, it leads to the ability to map a genre's context, or system. Further, it helps uncover factors that make a proposal successful considering what comes beyond just the conventional features. In addition to genre- and player-agents, through GFA a researcher works to identify these other elements of a communicative situation:

- Transformative locales, or the points of negotiation in which genre-agents and player-agents influence one another through play scenarios (Moeller & Christensen, 2010)
- Play scenarios, or the strategic, observable actions or interactions of agents (both genre and player) engaging other systemic elements—a key identifier of transformative locales (Moeller & Christensen, 2010)
- Penalty conditions, or the points at which agency has been exerted by genre- and/or player-agents that violate the rules-based system and disrupt continued play to varying degrees

The analysis continues from this point to define these elements. Figure 12 aids in visualizing a typical approach to the genre field, while Figure 14 describes a potentially much more successful approach to the CAREER proposal genre field based on improved understanding of the agents, play scenarios, and penalty conditions discussed by the NSF interviewees.

## **Transformative Locales and Play Scenarios**

It is possible to identify a number of transformative locales within any system in which agents interact through the process of identifying a variety of play scenarios. To approach from a slightly broader perspective in this context, however, I have identified two primary transformative locales to more deeply examine:

1. Formulation→Submission: includes all genre- and player-agents as well as play scenarios engaged from the point of a PI recognizing a need for research funding until he or she actually submits a proposal. This transformative locale focuses primarily on agents and play scenarios, the engagement of which, affect or can be affected by the PI.
2. Proposal Review: includes all genre-agents, player-agents, and play scenarios from the point of the PO receiving a submission until a funding decision has been made and reviews are returned to a PI. This transformative locale focuses primarily on agents and play scenarios, the engagement of which, affect or can be affected by the PO.

The play scenarios enacted with these transformative locales will be discussed in more detail while explaining via the figures how they operate and can ultimately exert influence through player- and genre-agents.

## **Penalty Conditions**

The mappings below will indicate that penalty conditions exist within the arena of play. Both versions show that when the GPG is violated, the game is generally terminated (based on the ability of POs to have some interpretation of the GPG). If the proposal is

submitted to the wrong program and the PO does not catch it, the game may be over. PIs can certainly also disrupt the process by irritating other player-agents, particularly reviewers. Such irritating may not result in being thrown out of the game, but in play terminology those consequence could be called moving back spaces. If the reviewers have to work harder to find information because of those disruptions, be they mechanical or content related, that is going to put them at a disadvantage. Nine out of the 14 interviewees mentioned these types of disruptions that were mostly of a mechanical nature and included key words such as irritate, annoy, frustrate, exasperate, how could you, and blows my mind (this last one regarded not using spell check). If only 20% of proposals are funded on average at NSF, and assuming hypothetically that 100 proposals are received by a program, and any number of those could be fundable projects, those proposals that did not make reviewers overlook irritations or dig through to find key points are naturally going to rise to the surface when it comes to funding.

Since the concept of penalty conditions is a new addition to GFA contributed by the findings of this work, it is worth discussing at further length. Though a PI may not technically have done something wrong (i.e., contrary to the GPG or solicitation) frustrating POs and reviewers parallels closely Huizinga's (1950) idea of the spoil sport who disregards the rules of play whether those rules are overtly stated (e.g., GPG) or unstated but implied (e.g., grantsmanship). Players are beholden to the rules regardless. If grant writing can be viewed as a high stakes games (for purposes of illustration and argument), then playing that game "demands order absolute and supreme . . . The player wants something to 'go', to 'come off'; he wants to 'succeed' by his own exertions" (p. 10). However, those exertions may be considered subpar and in violation of the

expectations of other players (POs, reviewers). In this case those other players play both participant and referee and assess penalties for rules violations. Penalties may include receiving a downgraded review. “Despite [a PI’s] ardent desire to win, he must still stick to the rules of the game,” Huizinga declared “As soon as the rules are transgressed the whole play-world collapses. The game is over” (p. 11). Interviewees were very pointed in their comments in this regard:

ESL speakers get no special allowance . . . you still have to be able to communicate [the science] in the language in which science is being conducted. (Scott)

If you made something that is so dense by compressing fonts and letters and characters and things it makes people cranky. It’s just not a good idea because you annoy reviewers and they don’t like it. (Hwang)

If the thing were organized and there were headings, it’s much easier to find a point. (Ernesto)

That irritates the reviewing population because it says figure 3 and they can’t find it or figure 3 has nothing to do with the comment. (Dane)

One error is not to have proofread, not to have used spell check. That just blows my mind. (Harvey)

They know that NSF allows 10 pt type, but they should know that my 70 year old eyes can’t handle less than 12. (Harvey)

Good proposals are very succinct. They don’t blah, blah, blah . . . if something isn’t written well, you’re exasperated by the second page. (Sandra)

Sometimes the figures you can’t read. How could you do that? I mean we need to see this stuff, but it’s just a mess. Why include it if you can’t read it? (Sandra)

This not following directions is, of course, really irritating . . . this goes back to elementary school as well—read the instructions. (Deborah)

You have to recognize that the people reviewing these have a stack of proposals. So anything that frustrates them is going to count against you. (Deborah)



Finally, Huizinga (1950) offered the real danger in the ignorantly or blatantly breaking the game's rules: "The player who trespasses against the rules or ignores them" whether he was aware of the rules' existence or not "is a 'spoil sport' . . . Therefore, he must be cast out, for he threatens the existence of the play-community" (p. 11).

### **Genre Field Mapping**

To illustrate the field (i.e., genre field) upon which the NSF proposal process and system plays out, I present in Figures 12 and 14 two different mappings of two different versions of the same genre field (with variations depending largely upon the number of play scenarios engaged) based on the genre-agents, players-agents, and play scenarios as discussed by my interviewees. Both diagrams contain the Formulation→Submission and the Proposal Review transformative locales. Figure 12 shows a typical proposal process genre field and its inherent interplay. The diagram in this figure is a variation from Moeller and Christensen's (2010) earlier mapping of this genre field that came from a case study in which they followed a PI at a western land-grant university, Anders, through his writing process for a CAREER proposal. They tracked Anders' pre-writing process as he began as typically as most PIs do by consulting the program solicitation, NSF website, and GPG. Those genre-agents exerted a certain amount of influence on how Anders drafted his CAREER proposal, which was subsequently submitted to NSF and was declined. Anders allowed the influence of yet another genre-agent, his review panel's summary, to exert influence on a second iteration of a CAREER proposal, which he submitted a year later, and it too was declined. In mutual frustration, the researchers and Anders questioned what more he could have done to improve his chances. It was at

this point that Anders mentioned that he had never made any contact with the NSF PO over his research area until after the second declination. Anders revealed further that in his conversation, the PO agreed that it was a good project (and at least one reviewer suggested that the proposal should be funded), but that the program wasn't interested in funding that particular research area at that time. Incidentally, Anders submitted the same proposal to a different funding agency, after having conversed with a PO there who said they would likely be interested in his research project; it was funded. The case study led Moeller and Christensen to examine much more acutely the combined effect of genre- and player-agents (particularly POs) and their workings within social systems.

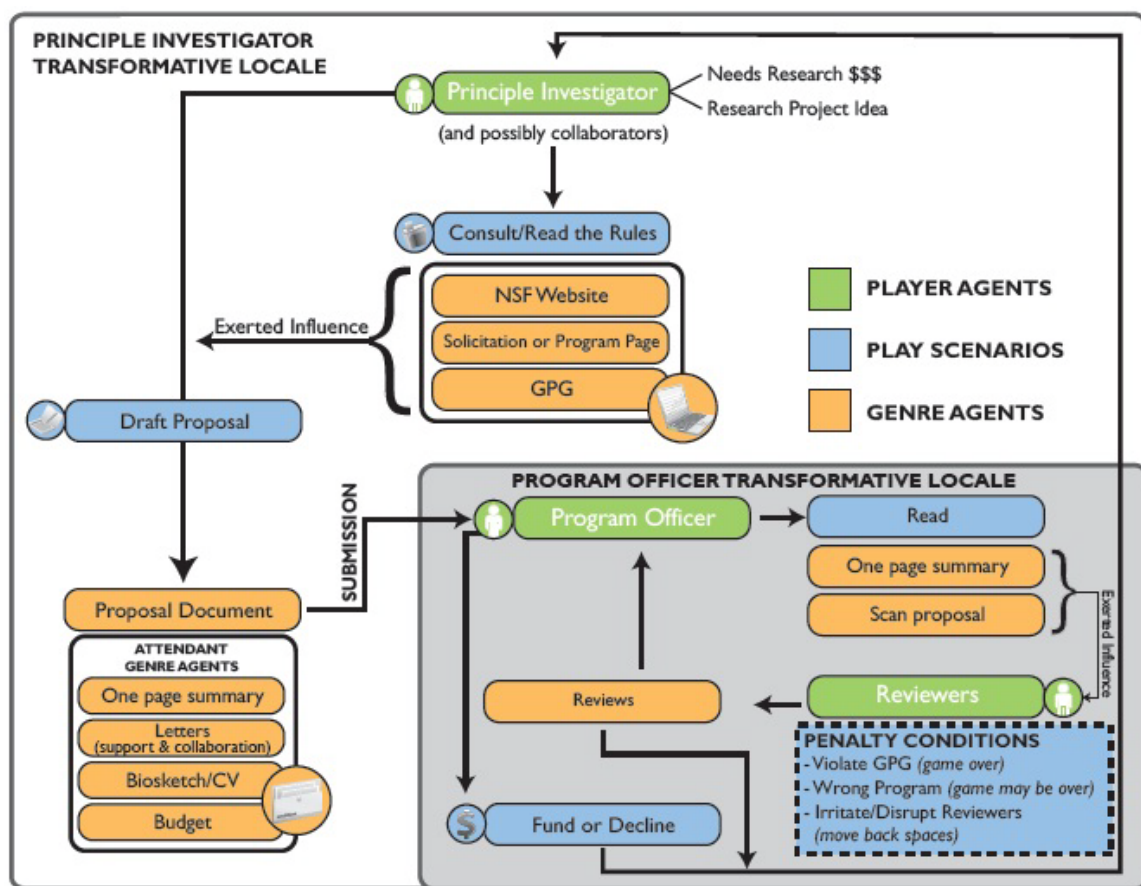


Figure 12. Genre Field Analysis mapping version 1.0 of a typical approach to the proposal process genre field.

Though the proposal process might have multiple starting points depending on each player-agent's perspective, for convenience in this illustration, I begin the typical proposal process genre field mapping in Figure 12 at the point where a PI recognizes a need for research funding and determines that NSF is a likely source for that funding. He also recognizes that he has a research project idea or concept that may fit in line with what he perceives as an NSF program area of interest. The PI may possibly have collaborators, which would also be player-agents; however, with the CAREER award being a solo PI program, those collaborators would not be officially listed as Co-PIs on the project, though as player-agents they may indeed exert influence on the PI.

In the first likely set of play scenarios, a PI can go instantly to drafting a proposal, though he would most likely begin to consult or read the rules of play as published by NSF. Reading the rules would consist of referring to several possible NSF genre-agents. The first of those would be the NSF website, in particular its funding pages. A PI would likely go to the program page for a particular program (selecting from across the directorates, divisions, and programs). He may also find a link from the program page to peruse other previously funded projects within that program area. Each program page publishes a set of abstracts of previously funded projects.

Another genre-agent the PO would likely consult in an early play scenario is the solicitation, or if the identified funding source is a program without a solicitation, then the PI would likely consult the program's webpage. With either genre-agent, he would find more specific information about proposal format and content requirements for that funding avenue. Moreover, he would be able to evaluate how well his research idea fits within that particular funding mechanism. The PI may also choose to consult the GPG,

although as we have already discovered from several interviewees, few PIs actually do know the GPG's content, or at least a few actually consult it to any larger degree. The GPG will exert influence regardless of the PI's knowledge of its content. For example, the GPG prescribes (among other things) that the biographical sketch to be included with the proposal should be only two pages, should not include any personal information (even including cell phone), and should include a list of only 10 publications, five of which are most closely related to the proposed project. If the PI submits a biosketch that is even one line more than two pages, includes a cell phone numbers or home email address, or has 11 publications listed, the entire proposal, also according to the GPG, should be returned without review, and the PI cannot claim that he did not know—it was published in the GPG.

All of these genre-agents will, of course, exert influence on the drafting of the proposal when the PI moves to that point, which is the next most likely play scenario. The proposal (a genre-agent) is constituted of the 15-page project description, which in this work I have more generically referred to as the proposal. This genre-agent is accompanied by other genre-agents, which include the 1-page summary, the biosketch, a budget, and letters of support or collaboration as appropriate.<sup>19</sup> All of these represent the proposal document as indicated in the map in Figure 12.

Once the proposal has been drafted and all of its parts have been included, the next play scenario would be to submit it to NSF through the appropriate online portals (Fastlane or Grants.gov). Ultimately, the proposal package is received by the PO, and

---

<sup>19</sup> Relative to the CAREER award these would include the letter of support from the department chair and any letters of collaboration outlining an agreement to collaborate with the PI on the project in terms of perhaps lab space or other collaborative contributions the PI has engaged. Other letters of support are specifically prohibited for the CAREER award and, if included, would also get the proposal returned without review.

note in Figure 12 that at the point of submission, this discussion moves from the Formulation→Submission transformative locale to the Proposal Review transformative locale. Note also that the former is dominated by the PI, and the latter is dominated by the PO. Once the PO receives the submission, she would most likely read the 1-page summary genre-agent to get a general idea of the proposed work. The summary is also supposed to include, with headings and distinct sections, a summary of intellectual merit and broader impact. (Recall here my experience with Scott in reading several proposals and not being able to identify what the work was about due to the absence of an objective statement or due to an objective statement that was not understandable.) She may also scan the proposal itself reading headings, scanning graphics, and looking for key points in the text. Both efforts engaging these genre-agents are a play scenario intended to accomplish at least three things: (1) determine whether the proposal is responsive to the basic requirements set out by NSF (i.e., the GPG and the solicitation), that all the necessary parts have been included there, and that they are presented in the format NSF requires pursuant to agency administrative needs (much of this is done by fastlane, NSF's online submission portal; (2) confirm that the proposal content and proposed project fit into the program area; and (3) inform the PO of what would constitute an appropriate set of reviewers (i.e., reviewers who have some frame of reference for the content and who are not conflicted as reviewers for a particular PI).

Once those basic procedural and administrative tasks have been checked off, the proposal is sent to reviewers, which may be an ad hoc set of reviews, a panel of

reviewers, a combination of both, or an internal review as indicated in NSF's simplified depiction of the proposal review process in Figure 13.<sup>20</sup>

An ad hoc review would likely consist of sending out several proposals to experts in the field and receiving reviews back that evaluate published criteria for that program. A panel of reviewers may first receive and review the proposals individually and then gather (e.g., at NSF headquarters) for a discussion panel to consider each proposal relative to program priorities as well as the strength of each proposal in terms of the quality of the project idea, the intellectual merit, the broader impact, budget, management plan, evaluation, etc. A panel review may well include reviewers who are expert in one specific area covered under an NSF program but who may also be conversant but less familiar with the technicalities of other proposals' project areas.

In any review situation, reviewers and panelists are required to comb through multiple proposal documents in a fairly short period of time. Though mechanics are not generally supposed to be a part of the review, anything that hinders or frustrates reviewers from efficiently conducting reviews may unofficially penalize PIs (e.g., penalty conditions).

As reviews are completed, reviewers will create a review summary for each proposal document, which, along with the individual reviews, are returned to the PO. The PO considers the reviews as an evaluation of merit and not as a recommendation to fund or decline. Based on those recommendations of merit, in her next play scenario she determines whether to fund or decline a proposal, and those determinations are confirmed by division directors. (She may have a variety of considerations for funding relative to

---

<sup>20</sup> To be sure, I do not infer that NSF has only its interests in mind. On the contrary, NSF's PO/PI partnerships and outreach efforts are admirable and are on par with similar activities from other agencies.

program priorities, agency mandates including involvement of minorities and women as investigators or participants, new investigators, undergraduate and graduate research interests, less successful universities, maintaining a portfolio of funded research areas, and even geographical distribution.)

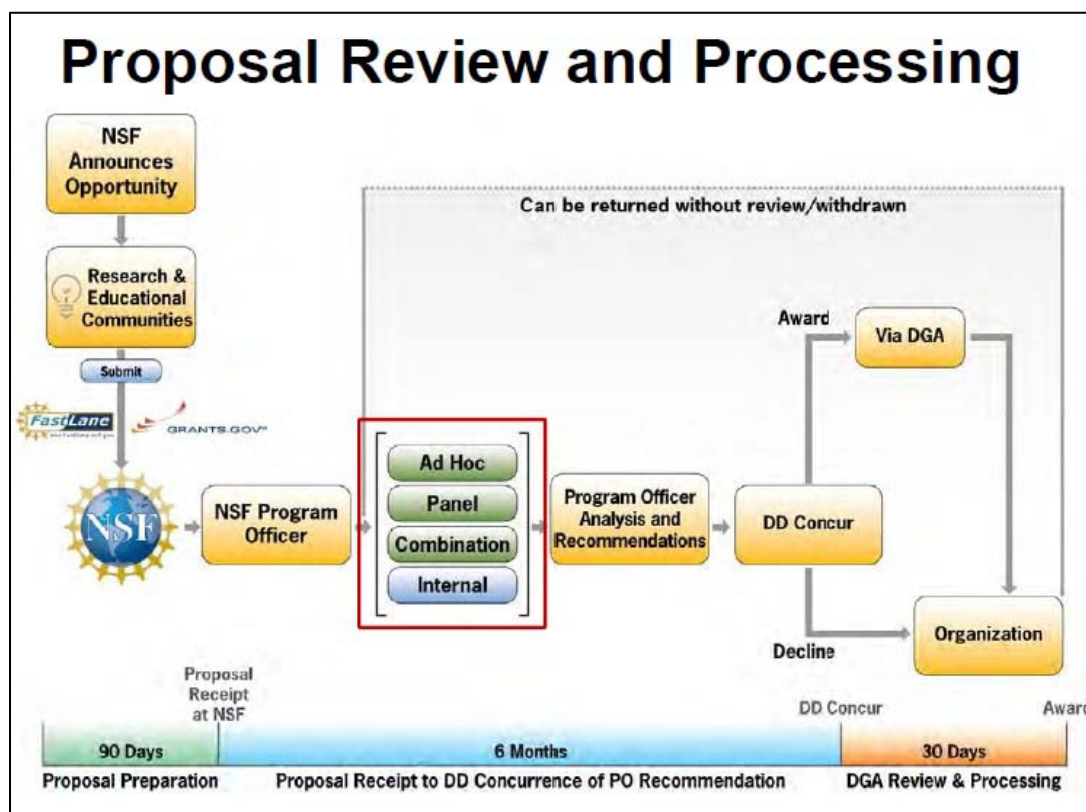


Figure 13. NSF's depiction of the proposal review process (from NSF Salt Lake City PI Workshop, October 25-26, 2010).

Documentation about the PO's funding decision as well as the reviews and review summary are then returned to the PI. If he has been selected for funding, his research begins following finalization of any budget negotiations. If he is not funded, in what would be the next play scenario that would start the process once again, he might allow reviewers as player-agents and the review documents themselves as genre-agents to exert

their influence on a subsequent proposal iteration to be submitted to either the next round of the same solicitation, to a different program, or even to a different agency.

Though the steps described through the genre field in the preceding illustration will have some order to them, it is fairly difficult to specifically number those steps. The interplay is determined in part by the process set up by NSF, but the player-agents, particularly the PI, have a fair amount of latitude regarding how, when, where, why, and with which genre- and player-agents they will engage. That latitude continues to grow as does the process variability as more play scenarios are identified and engaged, as will be illustrated in Figure 14. This figure shows a proposal process genre field with greatly expanded PI agency due to identifying, understanding, and deliberately engaging a greater number of play scenarios with more purposeful influence exerted by both genre- and player-agents. This mapping shows what Anders did not know (Moeller & Christensen, 2009). Had he had this level of insight, he would have enjoyed the influence of several other genre- and player-agents and would likely have revised the focus of his CAREER research project (especially if he had contacted the program officer and exercised any of the play scenarios depicted in the upper right corner of Figure 14—see the continuing discussion).

In the proposal process genre field version 2.0, a much broader and more active Formulation→Submission transformative locale can be seen—still centered around the PI, who in version 2.0 experiences expanded agency and is able to make more informed and deliberate decisions based on his ability to engage several more play scenarios through genre- and player-agents while he sees them exerting influence to his benefit. The process here begins the same as the PI recognizes the need for research dollars and



formulates a research project idea and proposal content. In the first set of play scenarios, he certainly will read the rules and engage the genre-agents of the NSF website, program pages, and previously funded proposals. He would also read the solicitation and/or program pages and would become familiar with the GPG as well, which we learned from version 1.0 are all essential to incorporating the proper elements into the genre-agents that come later in the process, in particular the proposal document and accompanying documentation.

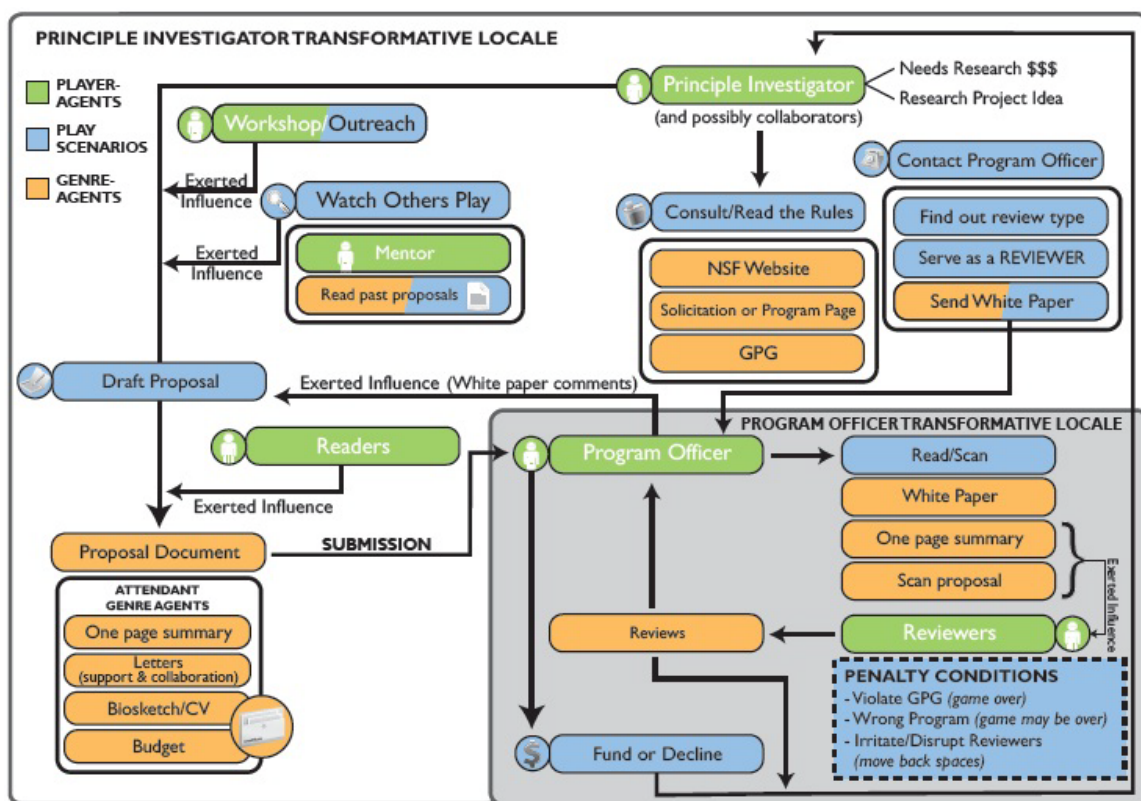


Figure 14. Genre Field Analysis mapping version 2.0 of expanded PI agency in the proposal process.

At this point, the PI would not likely begin drafting the proposal but would first look for a number of other possible play scenarios. The first might be to contact the PO—

a consistent finding in this study. Various play scenarios can result from making that initial contact.

A PI can inquire about what type of review is scheduled for a particular program. This play scenario is an effort to make the correct rhetorical appeals right up front—to create a rhetorical partnership with the reviewers. The PI will never personally meet the reviewers nor will he even know who they are, but if he can know at least if it is an ad hoc review that he will likely have more experts in the review field. If it is a panel review, he can know that there may be a number of experts in addition to a number of qualified people who may be less initiated in his particular field. Knowing that can afford him the knowledge of the level at which he should write and if he should write in layers that include both the technical and less technical appeals. He can essentially give reviewers an excuse to take up his cause (i.e., give the player-agents an excuse to exert their influence on his behalf). In other words, by knowing generally what types of readers he will have, he can focus on their needs and expectations as readers, which allows him increased potential influence on reviews. This rhetorical alliance can help the PI move reviewers toward recommending for funding.

Another potential play scenario that comes from contacting the PO is to inquire about serving as a reviewer. Such service would give the PI an opportunity to see the process from the inside, become better acquainted with the PO, and see a number of proposals that are successful (and unsuccessful) and examine and incorporate their characteristics accordingly as a proposal writer.

A third possible play scenario coming from contacting the PO is to ask the PO if she would receive a white paper, a 1-2 page summary/abstract of the project plan for

feedback about the plan's fit in the program. It might be worthwhile to jump down for just a moment into the Proposal Review transformative locale, the one dominated by the PO. If she agrees to review that white paper and provides some comments and direction, at least in terms of does this concept or project idea fit within the program's funding direction, those comments (another genre-agent) will certainly exert some influence eventually when the PI begins to draft the proposal.

A PI can find even more pre-writing play scenarios prior to beginning to draft any proposal documents. He may attend NSF-sponsored workshops or outreach activities, campus sponsored activities of the same type, or seek similar help from a number of other organized sources. Similarly, in another possible play scenario that in play theory might be called watching others play, the PI might find a mentor or mentors. These player-agents would exert a fair amount of influence on the way a proposal is drafted (recall Figure 11). A mentor may help the PI find other successful proposals to review to watch even more proposal writers who have "won" or "lost" in this arena of play before. Reading those past proposals, both successful and unsuccessful, will exert a certain amount of influence on the upcoming proposal drafting.

Having already participated in several initial play scenarios, a PI might begin to draft a proposal, but that activity would incorporate the influence of all of the outcomes of the previously engaged play scenarios. As the proposal is drafted and goes through cycles of revision, another play scenario the PI can enter into is to find readers, both those familiar with the subject area and perhaps even the PI's research, as well as those who are either not familiar with it or who may be able to offer a particularly critical review. Accounting for the influence exerted by these player-agents, the proposal document is

further revised and completed with the same accompanying genre-agents in the proposal package as in version 1.0; however, each of those agents would also be influenced by the same play scenarios engaged in to this point.

Moving to the Proposal Review transformative locale, the proposal package is submitted to the PO. If the contact had been made and a white paper sent, she would likely recognize the PI's name and project. As she scans the proposal document and reads the 1-page summary and recollects the white paper, she is already familiar with the work and may have already determined appropriate reviewers, like Burke's *identification* that was discussed earlier (Burke, 1950). She also already knows that the proposal is in the right program.

The proposal again is sent to appropriate reviewers, and the process for the reviewers is the same as in version 1.0. Reviewers read the proposals, submit the reviews, the PO makes the play to determine to fund or decline. She folds that declaration in with the reviewer comments and returns it to the PI. Similarly to version 1.0, the PI would either be funded and begin work or could take the reviews and, in another play scenario, incorporate them into another iteration of the proposal for later submission.

The expanded PI agency clearly evident now in the Formulation→Submission transformative locale has come through the multiple play scenarios he has engaged that have enabled player-agents and genre-agents working on his behalf to exert a much greater influence. Significantly, he has in large part determined where and how that influence is directed to his benefit. This transformative locale alone in version 2.0 has gone from two to nine PI play scenarios (and 10 if a PI chose to incorporate reviews from a prior declined proposal). Two compelling genre-agents (and play scenarios) have been

added: review of past proposal documents (from mentors and from serving as a reviewer), and the white paper, which has served to also draw the PO into the Formulation→Submission transformative locale on behalf of the PI. Other meaningful player-agents now working in the PI's part of the genre field include the PI himself serving as a reviewer, NSF or campus agents in workshops, mentors, and readers (those who are both less and more objective).

Of note in version 2.0's Proposal Review transformative locale is that the total genre- and player-agents as well as play scenarios have not appreciably changed; however, the proposal documents as genre-agents that entered that part of the field of play are much more strategically and rhetorically prepared. Significantly, the play scenarios engaged in the Formulation→Submission transformative locale (the PI dominated locale) in version 2.0 have served to maximize agents' influence from the Proposal Review transformative locale (the PO dominated locale) on the PI's behalf as well—a far cry from the agency-centered focus shown in Figure 13.

### **Chapter Conclusion**

Not everyone who reads this chapter will want to conduct such a study to figure out how to best participate in a given genre field—nor would they need to. This methodology should prove valuable to those academics who study documents (individually or sets) and what they do. For those who require a more practical application, however, knowing that the major GFA elements (genre-agents, player-agents, transformative locales, play scenarios, and penalty conditions) exist in document

systems, that they can be identified, and that their influence can be evaluated should be sufficient.

The chapter's ethnographic sketches confirm that NSF's POs are a key to effective work in the CAREER proposal genre field. Their job, of course, is to facilitate the advancement of science through administering agency funds for research proposals, but they are still real people, agents, with very specific needs. The same is true with reviewers. Principal investigators must see where those needs lie and effect rhetorically deliberate influence within the proposal system to make strides toward increasing funding opportunity. The most succinct recommendation I might extend to PIs from this chapter is to map the parts of a genre field they operate in that are apparent to them. As they continue to identify those elements (e.g., genre-agent, play scenarios, etc.), they must continually update their genre field maps (either physically or mentally). Doing so will help them better understand the agency available within the system and how to best manage it for their success.

## CHAPTER 6

### CONCLUSION

The roots of this research began as a set of informal questions I was thinking through while consulting with four researchers on CAREER award proposals. Each of the researchers had previously been declined in a prior submission, and each was struggling to pinpoint exactly why. With around 3,000 CAREER proposals submitted every year and a funding rate at around 20%, thousands of PIs nationwide have likely had the same struggle. I knew that these researchers I worked with were obviously intelligent people and capable of executing relevant and complex research projects. Not only did I have the question of how good proposals get turned down, I also wanted to know how to move a potentially fundable proposal into the funded category. Now, four years after those initial consulting sessions, I believe I have uncovered some valuable insights to offer them (and others in similar situations) through the use of combined theoretical lenses that produce a broader and empowering perspective for working with the rhetorical activity that is proposal writing.

Having sought to identify and understand the factors that would give CAREER proposal writers an edge in moving closer to receiving NSF funding, the mixed theoretical methods approach used for this work has shown not only what those factors are, but also how and where they can be identified. The primary research question I posed in this study focused on how to discover those determining factors. Genre field analysis (which combines rhetorical and genre analysis with perspectives from social theory frameworks, such as play theory and ethnographic study) has proven to be a valuable theoretical framework for this application. Through GFA, I was able to uncover evidence

of PIs' deliberate and effective choices in terms of writing, organization, design elements, and rhetorical moves that can be found in successful CAREER proposal documents as opposed to their unfunded counterparts. Significantly, GFA allows one to identify key genre-agents and player-agents as well as the transformative locales, or meaning making spaces, in which they operate. Having identified those elements, a PI can more deliberately (i.e., rhetorically) make choices regarding play scenarios to engage in the proposal writing process that produce expanded agency on her behalf. Genre field analysis is particularly suited for uncovering the expressed and implied rules in such a complex system, which can help the PI avoid the proposal writing pitfalls, or penalty conditions, that plague otherwise competent researchers. Finally, this work has produced model genre field mapping of the NSF proposal process genre field (including the mediating spaces in which influence is exerted), which has expanded the view of the agency and influence (both extant and introduced) available to PIs.

### **Key Findings**

The study's research questions initially asked if the most salient conventional and rhetorical elements of the genre could be identified and, if so, what are those elements and do they appear more conspicuously in funded as opposed to unfunded CAREER proposals? Chapter 4's findings in particular answer these questions.

From a rhetorical analysis and relative to the proposal's project content, the first key finding was that a CAREER proposal writer should take seriously the requirement to integrate a detailed, innovative *education plan and activities*. With a CAREER award, it is not just about the research. The successful proposals from this study's corpus averaged



four distinct education activities and predominately integrated those activities and the research into coursework. As regards treatment of NSF priorities, successful proposals also meaningfully incorporated underrepresented groups into research activities at a much higher rate than unfunded proposals.

Where rhetorical and genre analysis meet in this regard, findings showed that 92% of studied proposals included a dedicated education plan section with its own heading. Findings from this part of the study also demonstrated that, overwhelmingly (more than 90%), successful proposal writers emphasized their *collaborative efforts* as well as the *novel and exigent* nature of their research. From a purely generic, conventional perspective, a conglomerate picture emerged from among the proposals in the study corpus of features most expected by reviewers, which include the following: non-complex graphics, captioned with figure/table numbers, standing alone in text (i.e., not text wrapped), and referenced in the proposal's text; 11 pt. serif font; italicized key words in the text (but not overly applied); bottom center pagination; one inch margins, right justified; and bolded, numbered (e.g., 2, 2.1, 2.1.1, etc.), non-contrasting font style headings of varying sizes for varying levels. Further, Figure 8 illustrated the ideal structural format for proposal sections, their headings, and their related content.

The next set of research questions revolved around identifying influential variables that affect the funding process (and potentially funding success). I wanted to know if those who actually work inside the granting system and make funding decisions (i.e., program officers) could provide insight on the former question. As the study progressed, it revealed that POs could not only provide invaluable insight, but that they were also part of those influential variables. The interviews with POs and resulting

ethnographic sketches in particular gave a peek into the collective mind of POs at NSF. A key revelation from chapter 5 is that NSF is not a large impersonal entity—and that includes POs as well as the reviewers they assemble to help facilitate the review and funding process. On the contrary, the POs, personally, have collective concerns and priorities that translate into social interactions and personal facilitation that is accessible to investigators. Having said that, PIs must be sensitive to the fact that, just as themselves, POs and reviewers have enormous constraints on their time, and the more PIs irritate them through violations of conventional expectations and bad rhetorical moves, the further down the review scale PIs will slide.

The program officer ethnographic sketch also confirmed some already known—and revealed some new—common mistakes proposal writers make and outlined best practices to avoid those as viewed from inside the system (which answers the final research question about identifying proposal writing best practices). The most egregious of the common mistakes include not acknowledging or framing the research within the community's literature, not paying attention to NSF prescriptive documents (e.g., GPG), and committing a variety of writing and mechanical transgressions. Interviewees' larger focus, however, was on proposal writing best practices, which included stating objectives clearly and up front, giving fair treatment to the community's literature, and identifying the correct program for submission (something POs can obviously help with, yet so few PIs avail themselves of). As a cure to the variety of mechanical transgressions, POs overwhelmingly suggested engaging a variety of other player-agents who can exert additional positive influence on the proposal. Working with the other player-agents

includes mentors, readers, and other grant system professionals (e.g., at workshops) as well as a PI herself serving as an NSF reviewer to get a more clear inside view.

If researchers pondering how to best participate in the NSF funding system were to read this work and take only one thing from it, I hope it would be the paramount importance of developing a relationship with their PO. This does not mean having to send a birthday card, but researchers must recognize that the PO is a key and extremely influential player in the larger research community and a gatekeeper for funding within the NSF system. The advantage of face time (or phone time or email time) with the PO is the ability to move that player-agent's influence into the PI-dominated transformative locale and to apply her play scenarios on the PI's behalf (see Figure 14).

Throughout these conclusion paragraphs, I have mentioned the key elements of genre field analysis, such as genre-agents and player-agents as well as transformative locales, play scenarios, and penalty conditions. The study's overall findings are convincing that being able to identify these elements and understand their respective roles is an advantage in itself for a PI. The mapping concept afforded PIs (and other player-agents) by GFA is empowering in its ability to paint the entire scene of various agents involved and influence exerted in the proposal process. Mapping a genre field like the CAREER proposal process through GFA is much like learning to play a game. The steps to GFA mapping in Tables 7 through 12 were developed by Christensen et al. (2009) to benefit both novices and experts in the genre field in uncovering hidden, strategic elements of the field. I have adapted it to this context and offer it as a framework in relation to the findings and mapping completed by my research on the CAREER award. The tables' accompanying narrative is not intended to address every possible step a PI

could take; it is intended, however, to illustrate a likely CAREER proposal writing scenario mapping. Its steps may also be of value to others engaging a genre field analysis mapping.

Table 7

*Step 1 to effective genre field analysis mapping: Open the box*

<b>1. Open the box</b>	a) Unpack the game and its parts. Based upon the playing field and pieces, <b>hypothesize</b> how to play the game.	What opportunities for player action are apparent? Do these match your goals? The answers to these questions will help with Step 4.
		What values does the game represent?
	b) Ask: Does the game's mission/goals align with mine for playing?	
	c) Ask: Is this the game I should be playing? Are there other games that suit my goals/situation better?	

In step one a PI might scan the CAREER award solicitation to get an idea for the award amount and term as well as the general program requirements. She begins to think about her research and how she might develop a research project that fits within the field of play as she currently sees it. This would include determining preliminarily a possible program at NSF for submission. Since developing a CAREER proposal is a major task, she would likely also evaluate whether this would be the best funding opportunity for her to submit to considering her time, research area, resources, etc.

Table 8

*Step 2 to effective genre field analysis mapping: Read the rules*

<b>2. Read the rules</b>	a) What is the game's objective? Does this match with your hypotheses in Step 1?
	b) What rules govern play? (These can include the official and unwritten rules as well as rules represented by the game design and actual game play.)
	c) What are the victory conditions?
	d) What penalty and/or termination conditions exist?

Whether or not the PI has determined to submit a CAREER proposal, in step two she would read the solicitation more thoroughly, likely highlighting key points concerning the questions she asked herself about time, funds, resources available, and her own research area fitting into the parameters laid out in the solicitation. She will look for other information to better inform her decision about preparing a submission or about how to start developing a proposal. In so doing, she might consult NSF genre-agents that include documentation about the CAREER program on the NSF website (e.g., presentation slides and descriptive pages). The GPG would be another important document for her to consult if she were not already familiar with its prescriptive content about the proposal's form, submission, and review. She may also begin to ask others about their experiences with writing CAREER proposals to get a closer perspective on what would be required of her. She would ask others for advice. As she reads the solicitation and other documents closely, she will look at due dates and read to understand the review criteria as she begins fitting a project to them.

Table 9

*Step 3 to effective genre field analysis mapping: Identify the agents*

<b>3. Identify the agents</b>	a) Who will be playing the game? What roles will they play? (self, other players, referees, collaborators/team members, etc.)
	b) How do others approach the game? Can you watch others play?
	c) What non-human pieces in the game affect its play? What do they do to influence the game?
	d) How are the players represented by the game pieces? What are the affordances and constraints on the pieces' and players' actions?

The PI will now begin to examine the pieces and players she needs to involve. She will likely first identify the types of documents that need to be included in the proposal submission and begin to at least outline those (or possibly update them from previous proposals; e.g., biosketch). Ideally, consistent with the genre field analysis

illustrated in Figure 14, she will recognize that contacting the PO is an important step to success and that she could discuss her idea with him in conversation or through a brief white paper to make sure that her research idea is in rhetorical alignment with the program's goals. Of course, she would recognize the constraints that the PO cannot tell her what to propose, though he may have advice on what is important to the program and larger research community relative to her own research interests. She may have already served as a reviewer for NSF, or she could consider asking about serving as a reviewer to gain further insight into the review process as well as her community. Members of that community would be among the reviewers she would serve with, and they would be the reviewers for her future proposals. The PI may have attended in the past or could attend NSF or campus sponsored workshops and outreach activities to improve her proposal writing focus and expertise. She may also seek out a mentor, perhaps a senior faculty member in her department or a proposal writing professional. When she was looking through the NSF website she could have looked at previously funded CAREER proposals in her research area and requested copies, or she may have ask others at her own institution to look at past CAREER proposals. In any case, as she begins to draft her proposal, she would do well to find readers who are players familiar with this genre and her project as well as those who are not and who could be more objective. She would want both types of readers to offer critique on her forming proposal. She would have recognized, of course, that this process cannot all be done in a hurry at the last minute and will have started months in advance of the due date.

Table 10

*Step 4 to effective genre field analysis mapping: Identify and map transformative locales*

<b>4. Identify and map transformative locales</b>	a) Identify the ways players can influence the game (i.e., play scenarios—the most obvious will be the actions required by players during their “turns,” but in what other strategic ways do players interact with the game’s other players, rules, strategic planning, etc.?)
	b) Identify ways in which the game and its pieces and players influence other pieces and players. What are the material constraints on players’ actions?

Having identified a number of genre-agents and player-agents, in the fourth step the PI will begin to recognize that these pieces and players have exerted some degree of influence on her drafting process, which, if she were following the steps outlined here, she would identify as a transformative locale. She might make a mental map of the process she has engaged to this point, or she might find that a physical map would better help her see the influence she has exerted and that has been exerted on her and the genres she is producing. Having done so, she can incorporate the rules she knows (including NSF criteria as well as content and conventional expectations) and elements of the map into more deliberate choices.

Table 11

*Step 5 to effective genre field analysis mapping: Strategize play scenarios*

<b>5. Strategize play scenarios</b>	In each transformative locale, identify all possible play scenarios and map the trajectory for each play scenario. What will the likely result of each action be?	a) Strategy options
		b) Trial and error, experimentation
		c) Workarounds
		d) Collaboration
		e) Quitting

Through mapping, the PI can project possible play scenario trajectories as she, at different points, had discussions with and made requests to the PO (e.g., finding out about the review type, serving as a reviewer, sending a white paper). She may, for example, engage different strategy options, such as contemplating attending a proposal writing

workshop at which she would actually draft proposal documents. As she weighs the cost of such an activity against the projected benefits (i.e., projects the play scenario trajectory), she would be able to make well-oriented decisions. She may also simply incorporate what she has learned through trial and error from reviews of her previously unfunded proposals, or she may experiment and work with different forms of document formatting or possibly bounce broader impact ideas off of colleagues for their feedback. If unfunded in prior attempts, she may try a workaround and talk with different POs to make sure she is proposing in the right program area, or she may submit essentially the same proposal to a different program type or even different agency. She may also decide that bringing in a collaborator would increase her expertise and credibility in a certain area. Of course, she can also simply quit the CAREER Award pursuit entirely.

Table 12

*Step 6 to effective genre field analysis mapping: Continually update the map*

<b>6. Continually update the map</b>	As game play progresses, update your map to include newly created or understood rules, transformative locales, play scenarios, as well as pieces and players who change the playing field.
--------------------------------------	--

Regardless of the point at which the PI finds herself in the proposal writing process, she can update her map to give her an ever developing picture of the system she has engaged. Updating her map will also see where and how she can best work within it given the constraints of the other agents and the rules and spaces surrounding the activities. Hypothetically, this may be her second or even third attempt at writing a CAREER proposal, which is quite common. A savvy PI would continue to update her genre field map with each proposal submitted, including reviewer comments and other personal experience. This updating would help her not only with subsequent CAREER



submissions (up to three, anyway), but also with proposal writing and submission generally. The worst thing a PI can do is essentially start over the process, or game, with each new proposal writing endeavor back at step one—opening the box.

### **Contributions**

This research contributes a deeper theoretical discussion of a less understood but quintessentially rhetorical communication artifact and process to the professional communication literature. Moreover, it further establishes a mixed methods approach, namely genre field analysis, as a tool of considerable rhetorical power to unlock complex, genre-influenced social systems.

Putting this work into practice, an additional purpose rising from the study's research questions was to elucidate best practices for CAREER award proposal writers. My suggestion for readers of this work who are engaged in writing proposals is to copy Figures 9 through 11 and hang them close by to remember both the common mistakes and the best practices that were on the top of POs' minds.

On another practical level, this work engenders a value-added relationship between professional communicators and researchers in the sciences who depend on granted funding for their professional survival. A closing focus of this study, but also a jumping off point for further work, is on the value that has been extended to both fields from these findings.

This study has bridged theoretical gaps and potentially created synergistic bonds between professional communication and the engineering and science fields. Professional communicators possess rhetorical specialties, understanding, and expertise that allows

them insights into the complexities of the high stakes game of grant writing. They already do so regularly within multiple other technical contexts. As funding becomes increasingly competitive, scientific researchers will find complementary work coming from professional communicators who understand multiple theoretical frameworks that can shine new light on the proposal process. Professional communicators can work with rhetorical strategies (e.g., rhetoric as moves, rhetoric as style) to exert influence on grant writing processes (e.g., genre fields) and outcomes. In play theory speak, that would be to “extend the magic circle” (Huizinga, 1950), meaning having the ability to bring into view all the players and all the strategic possibilities (see Tables 7 – 12 and Figure 14).

Such an expansion of knowledge and perspective lends to elevated science and engineering fields through the communication genres used within those fields to produce knowledge. The purpose of professional communicators’ involvement with research proposal writing is to help investigators be more competitive in a highly complex system. Offering the skills they do, professional communicators have the ability to elevate proposal writers’ rhetorical skills, so they can compete and succeed on the merits of their research skills and abilities (e.g., Huizinga, 1950, p. 10). In essence, we can help level the playing field. NSF’s budget allows around 20% of CAREER submissions to be funded even if many more of the proposals than that 20% are fundable in terms of a project’s funding worthiness. Lending rhetorical skills, we can help elevate the science by making those with good ideas more accessible, readable, understandable, etc., thus, pushing more competitive proposals into the field of play.

## **Applications**

As mentioned, the research conducted in chapter 4 was originally part of a research internship. Another activity I participated in during the internship was to help develop and present a CAREER award orientation for assistant professors at USU. Resulting from that experience, I outlined a set of online NSF CAREER Award Orientation training modules. Incorporating the findings of this study into such training would prove effective to orient researchers to NSF grant writing, specifically the CAREER award. It would also provide an edge to those researchers through an orientation that will include both best practices of successful PIs as well as the valuable lessons learned from unfunded writers. As importantly, exposing proposal writers to basic GFA mapping elements, including the “How to Play” steps, would give them a valuable tool that can be continually sharpened throughout an entire career.

Four of the unfunded proposals included in the corpus of texts for this study came from researchers I consulted with as another internship activity. I worked individually with assistant professors in instructional technology, mechanical and aerospace engineering, and two from biology. Though much of my work with three of the PIs consisted largely of copyediting, my consultations with one PI, Anders, delved further into the document’s content and design as he prepared it for a second submission. Because these consultations took place before I started to outline this dissertation, I did not have the benefit of all the findings; however, for future consultations, the findings presented in this report will prove to be valuable assets to CAREER writers. Chapter 5 discussed at great length the potential benefits this study would have been to Anders, and

I believe it will be to other investigators I consult with on proposal writing in coming years.

### **Implications for Further Research**

As part of seeking avenues for further research, I first acknowledge a limitation of this work. Though the study's findings and interpretation of the data indicate significant trends regarding CAREER proposal rhetorical moves and document design strategies/conventions, the sample size of artifacts for the CAREER proposal analysis and the number of POs in the ethnographic study are fairly small. The study was never intended to be a statistical representation of either sample group, however, and the findings from the number of documents in the former case and interviewees in the latter are valuable and illustrative in their own right. With these trends and methods established, though, an expanded study with similar methods would offer tremendous insight into the questions that could be asked in a larger, more statistically significant study. Further research to declare absolutely the genre's conventions would necessitate a larger sample size. Accurate statistical analysis would also require that I partner with a researcher who could offer expertise with quantitative methods.

For a study in a similar context, after a few conversations with interviewees and other program officers, I believe that NSF may have an interest in an evaluation of the agency exchange between two of the field's genres. At the Salt Lake City PI meeting in fall, 2010, I discussed such a potential study with the program officer over the CAREER award. She mentioned that her program was currently working on revising the CAREER program solicitation. I suggested that a longitudinal study about the influence of the

solicitation on the resulting proposals from one generation of solicitation to the next would be of interest to NSF because the agency seems very conscientious about maintaining the integrity of the solicitation relative to the subsequent review process. The program officer encouraged me to send a proposal to her recommending such a study to be funded by NSF.

Next, these analysis methods are well tooled to explore the CAREER proposal genre specifically and proposals generally, as well as expose the substance and style evident in the genre's expectations and characteristics. What this dissertation does not account for is the much larger systems (e.g., NSF's multiple internal organizations or the agency as a whole, universities, regulators, legislators, congressional budget office, academic communities, collaborators, competitors) within which the NSF proposal and review system operates. A compelling challenge for genre field analysis would be to examine these larger systems that ultimately integrate into larger genre fields that would likely prove to exert influence on each other through the various genre field elements. A preliminary approach to studying these larger fields would be to examine them in a similar fashion to this study and then study how multiple genre fields interact.

Another study involving ethnographic methods may be to involve other player agents in the NSF funding genre field. The interviews that created a rich ethnographic landscape in this study were only conducted with one set of player agents in the genre field. An ethnographic examination of the writing processes engaged by both successful and unsuccessful proposal writers would give further insight into the genre dynamics and social dynamics and their interplay.

## REFERENCES

- Allen, N., Atkinson, D., Morgan, M., Moore, T., & Snow, C. (1997). What experienced collaborators say about collaborative writing. *Journal of Business and Technical Communication, 1*, 70-90.
- Aristotle. (1991). *On rhetoric: A theory of civic discourse* (G. Kennedy, Trans.) New York, NY: Oxford University Press.
- Barton, B. F., & Barton, M. S. (1991). Ideology and the map: Toward a postmodern visual design practice. In B. R. Sims (Ed.), *Studies in technical communication: Selected papers from the 1991 CCCC and NCTE meetings* (pp. 35-71). Denton, TX: University of North Texas.
- Bazerman, C. (1988). *Shaping written knowledge: The genre and activity of the experimental article in science*. Madison, WI: University of Wisconsin Press.
- Bazerman, C. (1994). Systems of genres and the enactment of social intentions. In A. Freedman, & P. Medway (Eds.), *Genre and the new rhetoric: Critical perspectives on literacy and education* (pp. 79-101). New York, NY: Taylor & Francis.
- Bazerman, C., & Prior, P. (2004). *What writing does and how it does it: An introduction to analyzing texts and textual practices*. Mahwah, NJ: Erlbaum.
- Berkenkotter, C., & Huckin, T. N. (1995). *Genre knowledge in disciplinary communication: Cognition/culture/power*. Hillsdale, NJ: Erlbaum.
- Bizzell, P., & Herzberg, B. (1990). *The rhetorical tradition: Readings from classical times to the present*. New York, NY: St. Martin's Press.

Blackburn, T.R. (2003). *Getting science grants: Effective strategies for funding success*.

San Francisco, CA: Jossey-Bass.

Boilard, S., & Simbol, A. (Legislative analyst's office). (2010). Prisons vs. universities

proposal would unwisely lock up budget flexibility. Sacramento, CA: Retrieved from

[http://www.lao.ca.gov/reports/2010/edu/educ\\_prisons/educ\\_prisons\\_012610.aspx](http://www.lao.ca.gov/reports/2010/edu/educ_prisons/educ_prisons_012610.aspx)

Bowman, J. P., & Branchaw, B. P. (1992). *How to write proposals that produce*.

Phoenix, AZ: Oryx.

Briggs, C. L. (1986). *Learning how to ask: A sociolinguistic appraisal of the role of the interview in social science research*. New York, NY: Cambridge University

Press.

Bruffee, K. (1984). Collaborative learning and the 'Conversation of Mankind.' *College English*, 46, 635-52.

*Budget plan 2009/10*. (2009). Unpublished manuscript, Stanford University, Palo Alto,

CA. Retrieved from <http://www.stanford.edu/dept/pres-provost/budget/plans/BudgetBookFY10.pdf>

Burke, K. (1950). *A rhetoric of motives*. Berkeley, CA: University of California Press.

Burnett, R. E. (1991). Substantive conflict in a cooperative context: A way to improve the collaborative planning of workplace documents. *Technical Communication*, 38, 532-39.

Caillois, R. (1958). *Man, play and games*. Chicago, IL: University of Illinois Press.

Chapin, P. G. (2004). *Research projects and research proposals: A guide for scientists seeking funding*. Cambridge, UK: Cambridge University Press.

- Christensen, D. M., Cootey, J. L., & Moeller, R. M. (2007). Playing in genre fields: A play theory perspective on genre. *Proceedings of the 25th annual international conference on design of communication* (pp. 1-8). New York, NY: ACM Press.
- Christensen, D. M., deWinter, J., Moeller, R. M., & Sherlock, L. M. (2009). Mapping genre fields. *Proceedings of the 27th annual international conference on design of communication* (pp. 307-308). New York, NY: ACM Press.
- Connor, U. (2000). Variation in rhetorical moves in grant proposals of US humanists and scientists, *Text*, 20, 1-28.
- Connor, U. & Mauranen, A. (1999). Linguistic analysis of grant proposals: European Union research grants. *Engineering Specific Purposes*, 18(1), 47-62.
- Cross, G. (1994) *Collaboration and conflict*. Cresskill, NJ: Hampton Press, Inc.
- Devitt, A. (1991). Intertextuality in accounting. In C. Bazerman & J. Paradis (Eds.), *Textual dynamics of the professions* (pp. 336-337). Madison, WI: University of Wisconsin Press.
- Devitt, A. (2000). *Disciplinary discourses: Social interactions in academic writing*. New York, NY: Longman.
- Dombrowski, P. M. (1992). *Challenger* and the social contingency of meaning: Two lessons for the technical communication classroom. *Technical Communication Quarterly*, 1, 73-86.
- Dycus, R. D. (1977). The effect of proposal appearance on the technical evaluation scoring of government proposals. *Journal of Technical Writing and Communication*, 7(4), 285-295.



Faber, B. (2007). Discourse and regulation: Critical text analysis and workplace studies.

In M. Zachry & C. Thralls (Eds.), *Communicative practices in workplaces and the professions: Cultural perspectives on the regulation of discourse and organizations* (pp. 203-218). Amityville, NY: Baywood.

Flower, L. & Hayes, J. (1980). The cognition of discovery: Defining a rhetorical problem. *College Composition and Communication*, 31, 21-32.

Foss, S. K. (2004). *Rhetorical criticism: Exploration & practice*. Long Grove, IL: Waveland Press.

Friedland, A. J. (2000). *Writing successful science proposals*. New Haven, CT: Yale University Press.

Geisler, C. (2004). *Analyzing streams of language: Twelve steps to the systematic coding of text, talk, and other verbal data*. New York, NY: Pearson Education.

Grove, L. K. (2004). Finding funding: Writing winning proposals for research funds. *Technical Communication*, 51(1) 25-35.

Hall, M. S., & Howlett, S. (2003). *Getting funded: The complete guide to writing grant proposals* (4<sup>th</sup> ed.). Portland, OR: Portland State University Press.

Hawk, B. (2004). Toward a post-techne-or, inventing pedagogies for professional writing. *Technical Communication Quarterly*, 13, 371-392.

Hayles, N. K. (1999). *How we became posthuman: Virtual bodies in cybernetics, literature, and informatics*. Chicago, IL: University of Chicago Press.

Huizinga, J. (1950), *Home ludens: A study of the play-element in culture*. Boston, MA: The Beacon Press.

- Johnson, R. (1998). *User centered technology: A rhetorical theory for computers and other mundane artifacts*. New York, NY: SUNY Press.
- Johnson-Sheehan, R. (2008). *Writing proposals: Rhetoric for managing change*. New York, NY: Longman.
- Katz, S. (1992). The ethic of expediency: Classical rhetoric, technology, and the holocaust. *College English*, 54(3), 255-75.
- Kennedy, G. E. (1983). Teaching formal proposals: A versatile minicourse in technical writing. *Journal of Technical Writing and Communication*, 13(2), 123-137.
- Kostelnick, C., & Hassett, M. (2003). *Shaping information: The rhetoric of visual conventions*. Carbondale, IL: Southern Illinois University Press.
- Lipson, C. (1988). A social view of technical writing. *Journal of Business and Technical Communication*, 2, 7-20.
- Luzon, M. J. (2005). Genre analysis in technical communication. *IEEE transactions on professional communication*, 48(3), 285-295.
- Lewin, K. (1951). *Field theory in social science; selected theoretical papers*. D. Cartwright (Ed.). New York, NY: Harper & Row.
- Mara, A. (2006). Pedagogical approaches: Using charettes to perform civic engagement in technical communication classrooms and workplaces. *Technical Communication Quarterly*, 15, 215-236.
- McAllister, K. S. (2004). *Game work: Language, power, and computer game culture*. Tuscaloosa, AL: University of Alabama Press.
- Miller, C. (1984). Genre as social action. *Quarterly Journal of Speech*, 70, 151-167.

- Mitroff, I. I., & D. E. Chubin. (1979). Peer review at NSF: A dialectical policy analysis. *Social Studies of Science*, 9(2), 199-232.
- Moeller, R. M., & Christensen, D. M. (2010). System mapping: A genre field analysis of the National Science Foundation's grant proposal and funding process. *Technical Communication Quarterly*, 19(1), 69-89.
- Myers, G. (1990) *Writing biology: Texts in the social construction of scientific knowledge*. Madison, WI: University of Wisconsin Press.
- Nardi, B. (1996). *Context and consciousness: Activity theory and human-computer interaction*. Boston, MA: MIT Press.
- Norman, D. A. (2002). *The design of everyday things*. New York, NY: Basic Books.
- National Science Foundation. (2008a). *Faculty early career development (career) program solicitation* (NSF Publication No. 08-557). Arlington, VA: Retrieved from <http://www.nsf.gov/pubs/2008/nsf08557/nsf08557.pdf>
- National Science Foundation. (2008b). *Merit Review Facts*. Arlington, VA: Retrieved from <http://www.nsf.gov/bfa/dias/policy/meritreview/facts.jsp>
- National Science Foundation. (2008c). *Note to reviewers of CAREER Proposals*. Arlington, VA: Retrieved from [http://www.nsf.gov/crssprgm/career/note\\_for\\_reviewers.pdf](http://www.nsf.gov/crssprgm/career/note_for_reviewers.pdf)
- National Science Foundation. (2009a). *CAREER program PowerPoint*. Arlington, VA: Retrieved from [http://www.nsf.gov/bfa/dias/policy/docs/career\\_az.pdf](http://www.nsf.gov/bfa/dias/policy/docs/career_az.pdf)
- National Science Foundation. (2009b). GPG: *Grant proposal guide* (09-29). Arlington, VA: Retrieved from [http://www.nsf.gov/pubs/policydocs/pappguide/nsf09\\_29/gpg0929print.pdf](http://www.nsf.gov/pubs/policydocs/pappguide/nsf09_29/gpg0929print.pdf)

National Science Foundation. (2010). *Introduction to Transformative Research*.

Arlington, VA: Retrieved from

[http://www.nsf.gov/about/transformative\\_research/](http://www.nsf.gov/about/transformative_research/)

Ornatowski, C. (1997). Technical communication and rhetoric. In K. Sta & C.

Ornatowski (Eds), *Foundations for teaching technical communication: Theory, practice, and program design* (pp. 31-51). Greenwich, CT: Ablex.

Paradis, J. (1991). Text and action: The operator's manual in context and in court. In C.

Bazerman & J. G. Paradis (Eds.) *Textual dynamics of the professions: Historical and contemporary studies of writing in professional communities* (pp. 256-278).

Madison, WI: University of Wisconsin Press.

Paré, A. (2000). Writing as a way into social work: Genre sets, genre systems, and

distributed cognition. In P. Dias & A. Paré (Eds.), *Transitions: Writing in academic and workplace settings* (pp. 145-166). Cresskill, NJ: Hampton.

Rude, C. D. (1995). The report for decision making. *Journal of Business and Technical*

*Communication*, 9(2), 170-205.

Selzer., J. (2004). Rhetorical analysis: Understanding how texts persuade readers. In C.

Bazerman & P. Prior (Eds.), *What writing does and how it does it: An introduction to analyzing texts and textual practices* (pp. 279-308). Mahwah, NJ:

Erlbaum.

Spinuzzi, C. (2002). Modeling genre ecologies. In *Proceedings of the 20th Annual*

*International Conference on Computer Documentation* (pp. 200-207). New York,

NY: ACM Press.

- Spinuzzi, C. (2003). *Tracing genres through organizations: A sociocultural approach to information design*. Cambridge, MA: The MIT Press.
- Spinuzzi, C. (2004). Four ways to investigate assemblages of texts: Genre sets, systems, repertoires, and ecologies. In *Proceedings of the 22nd Annual International Conference on Computer Documentation* (pp. 110-116). New York, NY: ACM Press.
- Spinuzzi, C. (2007). Who killed Rex? Tracing a message through three kinds of networks. In M. Zachry & C. Thralls (Eds.) *Communicative practices in workplaces and the professions: Cultural perspectives on the regulation of discourse and organizations*. Amityville, NY: Baywood.
- Spinuzzi, C., & Zachry, M. (2000). Genre ecologies: An open-system approach to understanding and constructing documentation. *Journal of Computer Documentation*, 24(3), 169-191.
- Swales, J. (1990). *Genre analysis: English in academic and research settings*. Cambridge, U.K.: Cambridge University Press.
- Tardy, C. (2003). A genre system view of the funding of academic research. *Written Communication*, 20, 7-36.
- Total budget and general funds budget 2009-10 incomes*. (2009). University Budget Office, Penn State University, University Park, PA. Retrieved from <http://www.budget.psu.edu/factbook/finance2009/income200910.asp>
- Trimbur, J. (1989). Consensus and difference in collaborative learning. *College English*, 51, 602-16.

- Winsor, D. A. (1990). The construction of knowledge in organizations: Asking the right questions about the *Challenger*. *Journal of Business and Technical Communication*, 4, 7-21.
- Yang, O. O. (2005). *Guide to effective grant writing: How to write a successful NIH grant application*. New York, NY: Springer.
- Yates, J., & Orlikowski, W. J. (1992). Genres of organizational communication: A structurational approach to studying communication and media. *Academy of Management Review*, 17(2), 299-326.
- Yates, J., & Orlikowski, W. J. (2002). Genre systems: Structuring interaction through communicative norms. *Journal of Business Communication*, 39(1), 13-35.
- Yates, J., & Orlikowski, W. J. (2007). The PowerPoint and its corollaries: How genres shape communicative action in organizations. In M. Zachry & C. Thralls (Eds.) *Communicative practices in workplaces and the professions: Cultural perspectives on the regulation of discourse and organizations* (pp. 67-92). Amityville, NY: Baywood.
- Yore, L., Hand, B., & Florence, M. (2004). Scientists' views of science: Models of writing and science writing practices. *Journal of Research in Science Teaching*, 41(4), 338-369.
- Zachry, M., Spinuzzi, C., & Hart-Davidson, W. (2006). Researching proposal development: Accounting for the complexity of designing persuasive texts. In *Proceedings of the 24<sup>th</sup> Annual International Conference on Computer Documentation* (pp. 142-148). New York, NY: ACM Press.

## APPENDICES

## APPENDIX A

**Coding Identification Table**

The following tables are samples (all 20 documents were examined in each of the area represented) of the coding identification tables I assembled to examine trends in types of strategies apparent in the study corpus documents. The highlights within the tables served to develop my coding and later tabulating. In simpler terms, formulating these coding identification tables helped me know which meaningful rhetorical phenomena to look for in the proposals.

Table 13

*Content analysis coding identification table*

CONTENT ANALYSIS			
Proposal ID	Intellectual Merit	Broader Impact	Education Integration
Funded #8	* “The goal of this project is to produce a ‘direct’ method to . . . This is a very ambitious goal, but recently developed mathematical tools offer hope for significant progress, if not a complete solution.”		* “organize a research group from UG, GS, and a post doc researcher. Providing a research experience for these students is the main education goal . . .” DC—The education plan in this proposal is pretty minimal (see absence of BI)—the intellectual merit must rate high. * All research projects are student conducted * PI includes an Assessment Plan: weekly group meetings, presentations
Funded #9	* “further the fundamental understanding of [research area] . . . , prepare and thoroughly characterize new NTE materials, and being incorporating them.” * “contribute to basic scientific knowledge in [research area] . . . ultimately allow researchers to predict the properties of compositions that have not been fully characterized.”	* Dissemination: journals, presentations, seminar presentations, grad students’ theses.	* introduce GS, UG, HS students, especially women and minorities to participate in research and recruit to work in lab * recruit “economically disadvantaged families” * mentoring from faculty * outreach activities (high schools visit the dept, programs to “attract girls to careers in S&E), “equip teachers with a hands-on science class



			*maintain accessible advanced materials lab/powder diffraction facility
Funded #10	<p>* Plan will “advance state-of-the-art . . . methods for sensor networks . . . accelerate the deployment and facilitate successful operation of large-scale networks.”</p>	<p>* applications such as detecting air leaks in space hardware “will motivate and steer our research in this area and provide a test bed for our detection and estimation algorithms.”</p> <p>* impact signal-processing and other tasks . . . improve energy and bandwidth efficiency.”</p> <p>* dissemination through journals, PI webpage; lecture notes available to researchers, students, and engineers worldwide on the PI’s website</p> <p>* PI’s research group includes one female and one Hispanic student.</p> <p>* Dept has dedicated staff member recruiting underrepresented students; dept maintains contact with Society of Women Engineers, National Society of Black Engineers, Society of Hispanic Professional Engineers, American Indian Student Office</p>	<p>* internet-based collaborative education . . . sharing experiences between universities. . . ConneXions, a growing experimental, open-source/open content approach to authoring, teaching, and learning.”</p> <p>*developing two signal processing courses (UG and Grad)</p> <p>*student encouraged to pursue interdisciplinary research topics and attend classes in other depts.</p> <p>* integrating modern signal processing applications in the UG curriculum</p> <p>* intro a senior level course</p> <p>* PI will include HS science and math teachers into the design and analysis of Education methods</p>
Funded #11	<p>* In Intro: “The PI will develop a resource calculus, a set of rules for combining resources inequalities to obtain new ones, which will enable a standardization and, in many cases a drastic simplification of coding theorem proofs.”</p> <p>* Once the resource calculus for a particular class of scenarios is established, one can use it to prove new coding theorems.”</p>	<p>* Intro: “The broader impacts of the proposal . . . graduate-level course in [research area] . . . writing of a textbook . . . undergraduate courses . . . foster the development and increase public awareness of [research area] . . . building interdisciplinary collaborations.”</p> <p>* dissemination via internet; textbook: “there is no textbook available that covers the last six years of development in [research area].”</p> <p>* Service: extensive refereeing of research articles</p>	<p>* New grad course; training of 2-3 PhD students . . . intro of this new materials into the course curriculum</p> <p>* UG teaching</p> <p>* Local activities (i.e., outreach): founding an institute for [research area], fostering liaisons with postdocs at Caltech through lectures and further student exchange</p> <p>* Interdisciplinary collaboration</p>

Table 14

*Rhetorical analysis coding identification table*

<b>RHETORICAL ANALYSIS</b>			
<b>Proposal ID</b>	<b>Canonical Strategies</b>	<b>Addl Language Strategies</b>	<b>Other “Moves”</b>
Funded #1	<p>* Style: <b>repetitive use of similar phrases for novel</b>—new idea; new way to look at existing analysis . . . tools; novel high-level goals</p> <p>* Style: use of <b>metaphors</b> such as “building blocks”</p> <p>* Style: Author’s description of research plan as an <b>evolutionary approach</b> confirms PI’s intent to build on his own and other current research, a key element of the IM criteria.</p> <p>* Memory: Each major section starts with a section intro (i.e., a <b>roadmap forecasting</b> section content).</p> <p>* Memory: Each research plan section follows the same <b>pattern of subheadings</b> (Motivation, Proposed Work, Relation to Previous Work, Evaluation, Long-term Vision). After 3 sections, the device works well for the reader to anticipate the PI’s research process.</p>	<p>* In Project Summary, heading Broader Impacts <b>AND</b> Educational Goals: the and is significant</p>	<p>* 4 pages of background in a 15-page proposal may seem too much unless ethos/logos needs to be established.</p> <p>* Each research plan section contains an Evaluation subheading, in which the research proposes how to validate the accuracy of the findings (fx, pg. 9, researcher states how the work both differs from and enhances extant work and cites other researchers that provide a comparison form of evaluation)</p> <p>* Localization: Though NSF looks for broader impacts that affect the general scientific community, it also looks for impacts that have local importance (fx, pg. 14, the research refers to 1.2 million people in the university area, small collection of high-tech companies).</p>
Funded #4	<p>I include in this sample only the Additional Language Strategies. The Canonical Strategies are similar in nature to several other proposals, but I found the language use in this proposal especially effective.</p>	<p>* This PI is a good writer—visually and emotionally descriptive; <b>energized language</b> usage, such as powerful framework, natural framework, extremely flexible paradigm, blaze new directions, provably effective, particularly exciting aspects, thrusts</p>	
Funded #5	<p>* Invention: Each major section and project section is prefaced with a <b>Problem Statement</b> subheading</p> <p>* Invention: On the first page is a section with the <b>subheading Intellectual Merit</b>, which then lists four</p>		<p>* NSF is big on <b>sustainability</b> of programs it funds: “Therefore, the tools, algorithms, and obtained insights will be used to continue the study with multiple different</p>

	<p>key contributions</p> <p>* Style: use of similar <b>phrases for novel</b>, such as introduces the concept.; first essential steps; new insights and approaches; novel hot spot technology</p> <p>* Memory/Delivery: outlines <b>Plan of Work</b> in a table by year, topic, and research focus</p> <p>* Invention/Delivery: dedicated section and <b>heading for Education Plan</b>; dedicated section and <b>heading for Broader Impact</b></p> <p>* Invention: references about <b>collaborating with existing industry</b>: new courses covering topics and domains relevant for the current job market; PI plans to develop a . . . networking laboratory (with the support of Corporation [X]).</p>		resources and different application scenarios.”
Funded #7	<p>* Invention: (pointing arrow) PI includes as part of the section heading for the intro the proposal’s goal: “My goal is to provide opportunities for underprivileged students to conduct the first system investigation of [research]”</p> <p>* Style: use of similar <b>phrases for the exigency</b>: Relatively little is known; Interspecific eavesdropping has only recently been shown . . . and it is not clear how common it is; . . . has been postulated but not shown; Work by several investigators <i>suggests</i> . . . However, thesis possibility <i>has never been rigorously tested</i>; The effect . . . is unknown; relative little is known about; the first detailed investigation of [research area].</p> <p>*Invention: Student consistency will be evaluated before they independently collect data</p>	* Use of key words in the intro to frame the IM aspect: “a unique opportunity for studying the evolution of [research area].	* <b>Consubstantiality</b> : The first section/paragraph is Reviewer Comments, in which the PI mentions that the proposal was submitted and declined the year prior and how he has follow the reviewers’ comments in this revision: “As suggested I have simplified the proposal; refocused on the basic biology; collected the necessary preliminary data; education plan is described in greater detail; new components to improve undergraduate instruction.”

	(evaluation, assessment). *Invention/Delivery: dedicated section and heading to Education Plan & Philosophy		
Funded #10	<p>* Style: use of similar phrases for novelty: novel approaches, novel . . . methods, we proposal novel distributed methods</p> <p>* Invention: “expected to reveal previously unobservable phenomena in the physical world . . . currently attracting considerable attention”; efficient methods need to be developed</p> <p>* Invention: “Students working under the PI’s supervision have produced journal articles and conference publication and defended one PhD and three MS degrees. The PI has introduced changes into the graduate curriculum that have been well received by students. These results indicate the potential for success of the proposal plan.”; “Our preliminary simulation results . . . show successful performance of the [research methods].”</p> <p>* Invention/Delivery: dedicated section and headings for Education Initiatives as well as for Broader Impacts of the Proposed Work. Also subheadings and details for Dissemination of Research Results and Teaching Tools; Integration of Research and Education; Participation of Underrepresented Groups</p>	* our approach is remarkably simple; method is computationally simple and applicable to a wide range of sensing environments (DC: This also speaks to broader impact)	* Use of a hypothetical as a rhetorical tool: “For example, consider a network of temperature sensors deployed throughout a building to detect and track the spreading of fire . . . This example motivates the proposed development and analysis of distributed methods for signal processing of localized phenomena.”

Table 15

*Document design analysis coding identification table*

<b>DOCUMENT DESIGN ANALYSIS</b>				
<b>Proposal ID</b>	<b>Graphics</b>	<b>Textual</b>	<b>Headings/Navig.</b>	<b>Page</b>
Funded #1	<ul style="list-style-type: none"> <li>* identified by figure number, referred to in-text, captioned</li> <li>* non-complex (more graphics showing less complex detail and concepts), support concepts presented in the text</li> <li>* figures at top of pages or smaller with text wrap</li> </ul>	<ul style="list-style-type: none"> <li>* 10-11 pt professional serif font</li> <li>* paragraph indentation at .3</li> <li>* double line spacing between heading sections</li> <li>* key words and phrases italicized (e.g., <i>bottleneck resources</i>, <i>robustness</i>, <i>critical scaling factor</i>)</li> </ul>	<ul style="list-style-type: none"> <li>* use of heading levels, bolded, varied in pt size, and numbered (C, C.1, C.1.1, etc.)</li> <li>* non-contrasting heading font</li> </ul>	<ul style="list-style-type: none"> <li>* page numbers</li> <li>* right justified margins</li> </ul>
Funded #2	<ul style="list-style-type: none"> <li>* one graph included, captioned as figure 1, referenced in-text</li> </ul>	<ul style="list-style-type: none"> <li>* 10 pt professional serif font</li> <li>* key words and phrases italicized (e.g., <i>skill diversity</i>, <i>task introduction intervals</i>)</li> <li>* double line spacing between headings/sections</li> </ul>	<ul style="list-style-type: none"> <li>* Four distinct heading levels: bold, decreasing size going down levels, numbered (C, C.1, C.2.1, no number on lowest level)</li> <li>* non-contrasting heading font</li> </ul>	<ul style="list-style-type: none"> <li>* page numbers (though they're somewhat confusing/conflicting with the heading numbers)</li> <li>* right justified margins</li> </ul>
Funded #3	<ul style="list-style-type: none"> <li>* 4 tables and 10 images or charts, numbered/managed correctly, used to support text</li> <li>* figures at top of pages of smaller with text wrap</li> </ul>	<ul style="list-style-type: none"> <li>* 12 pt professional serif font</li> <li>* double line spacing between heading/sections</li> </ul>	<ul style="list-style-type: none"> <li>* non-contrasting heading font</li> </ul>	<ul style="list-style-type: none"> <li>* page numbers</li> <li>* header</li> </ul>
Funded #4	<ul style="list-style-type: none"> <li>* non-complex figures</li> <li>* equations as figures rather than in line in text</li> </ul>	<ul style="list-style-type: none"> <li>* key words and phrases italicized (e.g., <i>asymptotic analysis</i>, <i>finite-length analysis</i>, <i>data compression</i>, <i>novel message-passing schemes</i>)</li> </ul>	<ul style="list-style-type: none"> <li>* use of heading levels bolded, varied in pt size, and numbered (C, C.1, C.1.1, etc.)</li> <li>* non-contrasting heading font</li> </ul>	<ul style="list-style-type: none"> <li>* page numbers</li> <li>* footnotes</li> <li>* right justified margins</li> </ul>

## APPENDIX B

**Occurrences of Broader Impact and Education Integration Plan strategies**

Table 16

*Broader impact strategies occurrences*

<b>Funded Proposals (12 Total)</b>	<b>BROADER IMPACT STRATEGIES</b>	<b>Unfunded Proposals (8 Total)</b>
7	Collaboration with/impact on industry and/or professionals/professions outside the academy	0
4	Dissemination – papers/conferences	0
7	Dissemination – electronic (websites/software)	3
2	Dissemination – through other collaborations	1
2	Collaboration with/impact on military/defense	0
3	Education development – textbooks, teacher training, courses/curriculum	5

Table 17

*Education integration plan strategies occurrences*

<b>Funded Proposals (12 Total)</b>	<b>EDUCATION INTEGRATION PLAN STRATEGIES</b>	<b>Unfunded Proposals (8 Total)</b>
5	Specific involvement of women	3
7	Specific involvement of minorities/other URGs	4
2	Workshops/tutorials	2
10	Curriculum – undergraduate	5
7	Curriculum – graduate	5
1	Curriculum – K-12	0
2	Curriculum – K-12 educators	0
2	Curriculum – interdisciplinary course develop	1
3	Curriculum – online course development	1
4	“Outreach” – visit K-12 schools	2
1	“Outreach” – talks	2
3	“Outreach” – recruiting events/activities	0
3	“Outreach” – general/undefined	0
5	Research/lab involvement – undergraduate	2
2	Research/lab involvement – graduate	1
3	Research/lab involvement – K-12 (primarily HS)	0
2	Service – general/undefined	0
3	Mentoring – doctoral students	0
4	Mentoring – general graduate students	0
2	Mentoring – undergraduate students	0
1	Mentoring – high school students	2
3	Assessment of curriculum	0

## APPENDIX C

**Key canonical moves counting at least one instance of each type of move found in both funded and unfunded proposals**

Table 18

*Canonical strategies occurrences*

<b>Funded Proposals (12 Total)</b>	<b>CANONICAL STRATEGIES</b>	<b>Unfunded Proposals (8 Total)</b>
11	Invention (logos) – collaboration with colleagues, other universities, industry/professionals outside the academy (or having an impact on industry)	3
3	Invention (logos) – discussion of interdisciplinary research and/or education strategies	1
3	Invention (logos) – inclusion of research or education evaluation/assessment plan	0
3	Invention (ethos) – discussion of being women or minorities or project plan associated with women or minorities	0
4	Arrangement – outline at the beginnings of major sections (Note: all funded and unfunded proposals had a recognizable general outline in the intro)	0
11	Style – words/phrases for concept of novel	4
4	Style – “pointing arrows” to one key project concept (e.g., Our main goal is . . . )	0
7	Style – repeated use of energized phrases/words describing the research’s exigency (e.g., “has never been rigorously test”; “[this project] is the first detailed investigation of [research area]”	1
4	Memory – repeated sub-heading patterns	1
11	Delivery – dedicated section or sub-section (with specific heading) for Education Plan	5
7	Delivery – dedicated section or sub-section (with specific heading) for Broader Impact	2

## APPENDIX D

Table 19

*Document design elements occurrences*

<b>Funded Proposals (12 Total)</b>	<b>DOCUMENT DESIGN ELEMENTS</b>	<b>Unfunded Proposals (8 Total)</b>
12	Graphics – Figure/table numbers	4
12	Graphics – Captions	4
12	Graphics – references to graphics in the text	4
12	Graphics – stand alone graphics (no text wrap)	6
6	Graphics – text wrapped graphics	0
9	Graphics – only non-complex graphics (graphics represent only one concept)	4
3	Graphics – complex graphics (a single graphic represents multiple concepts)	2
4	Textual – 10 pt font	3
6	Textual – 11 pt font	0
2	Textual – 12 pt font	5
12	Textual – serif font	7
0	Textual – sans serif font	1
9	Textual –italicized key words/phrases	2
1	Textual – bolded key words/phrases	0
0	Textual – underlined key words/phrases	1
0	Textual – scare quotes around key words/phrases	1
11	Headings – numbered levels	6
1	Headings – un-numbered levels	1
12	Headings – some form of bolded multiple levels (e.g., L1, L2, L3)	5
9	Headings – varied type pt size for varying levels	5
0	Headings – contrasting heading font (e.g. sans serif heading with serif text)	1
12	Headings – non-contrasting heading font	6
2	Headings – other forms of heading variations for levels	3
0	Headings – L1 headings centered on page	1
11	Page numbers – bottom center	2
1	Page numbers – top right	1
0	Page numbers – bottom right	2
0	Page numbers – no page numbers included	3
10	Margins – right justified	3
2	Margins – ragged right	5
2	Headers included	1
0	Footers included	0
3	Footnotes included	1



## APPENDIX E

**Inter-rater/reliability testing materials****Definitions**

**Broader Impact:** 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?

**Education Integration:** One of the principal strategies in support of NSF's goals is to foster integration of research and education through the programs, projects and activities it supports at academic and research institutions. These institutions provide abundant opportunities where individuals may concurrently assume responsibilities as researchers, educators, and students, and where all can engage in joint efforts that infuse education with the excitement of discovery and enrich research through the diversity of learning perspectives.

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

**Rhetorical Canon**

**Invention/Arrangement:** In the invention and arrangement stages of fashioning a grant proposal, a PI would make choices about which of the most important content elements of a research project to include. This stage would also see a PI determining how to best formulate a research project to appeal to the needs of the agency. The PI would also strategize positioning of that research as a significant contribution to the PI's field of study and accompanying literature.

**Style:** Looking for elements of style would mean looking for language that formulates "ideas in figures and ornamenting arguments [to] make them structurally more understandable, memorable, and convincing." This doesn't imply simply scouring texts for ornamental language or word candy; rather, it implies looking for language and even formatting that best *moves* readers (e.g., reviewers and POs) to understanding, remembering, and convincing.

**Memory:** Memory in practice includes mnemonics and associations that aid both communication senders and receivers to improve recall and retention.

**Delivery:** In classical rhetoric, a predominantly oral tradition, delivery is mostly referred to as “presenting the speech with effective gestures and vocal modulation.” In a written as opposed to an oral composition, attention to delivery can be seen, for example, when a writer deliberately makes a textual gesture as if to “point” to something to give it special attention or emphasis.

### Coding Test

After reading the definitions, we’ll practice first. To see a particular *stylistic* strategy for intellectual merit and a *delivery* strategy of pointing to it, look for examples in the first sample document of the concept of novelty. Read the first two pages only and circle any instances of words or phrases that in any way represent or are synonymous with the concept of novelty. Are the words written or formatted in any way with *delivery* significance?

You’ll now read through the test proposal three times with the *definitions* close by. You may scan technical sections. After each pass, record your findings on the test coding sheet below.

1. The first time, locate and highlight key words and phrases that indicate any broader impact strategies.
2. On the second read through, locate and highlight in another color key words and phrases that indicate any education integration plan strategies.
3. On the final reading, highlight in a third color any general or specific strategies (content or writing/formatting) that would fit into the definitions of the rhetorical canon.

Table 20

*Inter-rater tester coding identification table*

Broader Impact strategies	Education Integration strategies	Intellectual Merit canon elements
* building a <b>research group</b> with expertise * <b>interdisciplinary</b> effort * <b>dissemination</b> : - make findings available to other researchers via website; - provide access to project database; - available to students and researchers; - publish journal articles; - develop material into textbook	* <b>curriculum</b> development: grad courses; modify undergraduate curriculum; lectures; * multimedia classrooms, internet, and software methods * integrate <b>high school teachers</b> * <b>curriculum evaluation</b>	Invention:  * <b>collaboration</b> : “cooperative . . . central sensing systems” * interdisciplinary research and dissemination activities
		Arrangement:  No instances found for arrangement
		Style:

<p>* <b>collaboration</b> with others for database; collaborative education strategies; break down racial barriers through research area</p>		<p>* multiple words/phrases found for <b>novelty</b></p> <p>* student tester mentioned “<b>pointing arrows</b>” to key points (e.g., “our approach is remarkably simple”; alert vs. sleeping</p> <p>* student tester found instances of expressing the importance (i.e., <b>exigency</b>): “our proposal develops optimization”; challenges educators; important contributions; “accelerate deployment and successful operation”</p> <p>Memory:</p> <p>* instance found of one list numbered from 1-3 (where all other lists were bulleted)</p> <p>* student tester mentioned <b>structure and headings</b> here as deliberately formulated for best memory of reader</p> <p>Delivery:</p> <p>No instances found for delivery</p>
--	--	---

## APPENDIX F



Department of English  
3200 Old Main Hill  
Logan UT 84322-3200  
Telephone: (435) 797-2733



### Letter of Information

NSF Grant Proposals: Understanding the Genre, the Genre Field, and the Social System

Dr. Ryan Moeller, Professor in the Department of English at Utah State University, and David Christensen, Doctoral Student in the Department of English at Utah State University, are conducting a study to find out more about the processes and structures of successful NSF grant writing. You have been asked to take part because you are a NSF program officer and have been identified as an expert source on the subject. There will be approximately 12 participants at this site.

David Christensen has made an appointment to meet with you in your office for an interview that may last approximately one hour. He will record the conversation with a voice recorder and by taking notes. Your name and contact information will be maintained only in the investigators' records, and in the event of publication of information gained from the interview, your name will not be used (i.e., any attribution would be made to "a program officer at NSF"). You may request a written transcript of the interview.

There is minimal risk in participating in this interview and there may not be any direct benefit to you from this study. The investigators, however, may learn more about more successfully engaging principle investigators in future proposal writing, which information would be made available to you. Your participation is strictly voluntary and you may withdraw at anytime.

Only David Christensen and Dr. Ryan Moeller will have access to the data, which will be kept in a locked file cabinet in a locked room. Personal, identifiable information will not be used with any results of the research study that are created in publishable form and which will be made available to you as explained above.

If you have any questions or concerns please contact David Christensen at 435-890-8269 or Dr. Ryan Moeller at 435-797-8637.

Thank you,

---

Dr. Ryan Moeller  
Principle Investigator  
rylish.moeller@usu.edu

---

David M. Christensen  
Co-Principle Investigator  
dm.christensen@usu.edu

*Figure 15. IRB letter of information for study participants.*

## CURRICULUM VITAE

**David McKay Christensen**

Proposal Development Manager  
Department of Mechanical and Aerospace Engineering  
Utah State University  
4300 Old Main Hill  
Logan, Utah 84322-4300  
Office: 435.797.7370  
Cell: 435.890.8269  
dm.christensen@usu.edu

---

**EXECUTIVE SUMMARY**

With degrees in communication and writing, coupled with fifteen years of business management and marketplace experience, I have focused my research and career direction on the teaching and production of technical and academic communication. My portfolio of communication skills and training along with entrepreneurial success is uniquely suited to securing grants and contracts with funding agencies and organizations as well as instilling communication expertise in future industry and business leaders.

---

**EDUCATION****PhD, English: Professional Communication**

Utah State University, 2011  
Committee Chair: Ryan Moeller

**MA, English: Literature and Writing**

Utah State University, 2005

**BA, Communications: Public Relations**

Brigham Young University, 1990

---

**PUBLICATIONS**

Christensen, David, Keith Gibson, and Laura Vernon. "The Role of the Cognate Course in Graduate Technical Communication Programs." *Programmatic Perspectives* (<http://www.cptsc.org/pp.html>). (2010) 2.1: 23-41.

Moeller, Ryan and David Christensen. "System Mapping: A Genre Field Analysis of the National Science Foundation's Grant Proposal and Funding Process." *Technical Communication Quarterly*. (2010) 19.1: 69-89.

Hult, Christine A., Thomas N. Huckin with David M. Christensen. *Instructor's Manual and Multimedia Resource Guide to Accompany 'The New Century Handbook.'* 4<sup>th</sup> ed. New York: Pearson, 2008.

Christensen, David, Jason Cootey, and Ryan Moeller. "Playing in Genre Fields: A Play Theory Perspective on Genre." In *Proceedings of the 25<sup>th</sup> Annual International Conference on Computer Documentation*. ACM Press, New York, NY 2007, 1-8.

---

## PRESENTATIONS

"ADVANCE—USU Initiatives: Ombudsperson for Promotion & Tenure and Hiring for Excellence Search Committee Online Training Modules." Poster presented at NSF 2009 ADVANCE Program Meeting. Alexandria, VA. October 29, 2009.

"Emerging Technologies: Exploring Collaboration Tools for Depth and Breadth in the Digitized Writing Classroom." Rocky Mountain Modern Language Association annual conference. Snowbird, UT. October 8, 2009.

"Mapping Genre Fields." Workshop presented with Ryan Moeller (Utah State University), Jennifer DeWinter (Worcester Polytechnic Institute), and Lee Sherlock (Michigan State University) at SIGDOC 09—ACM International Conference on Design of Communication. Bloomington, IN. October 5, 2009.

"Genre Systems: Up Close and Personal." The English Studies Forum. Utah State University, Department of English. Logan, UT. March 25, 2009.

"Emerging Technologies that Matter: Bridging the Gap between Classroom and Workplace Tools." Presented with Quinn Warnick (Iowa State University) at Association for Business Communication annual conference. Tahoe, NV. October 30, 2008.

"The Role of the Cognate Course in Graduate Technical Communication Programs." Presented with Laura Vernon (Utah State University) and Keith E. Gibson (Utah State University) at Rocky Mountain Modern Language3 Association annual conference. Reno, NV. October 10, 2008.

"Playing in Genre Fields: A Play Theory Perspective on Genre." Presented with Ryan Moeller (Utah State University) at SIGDOC 07—ACM International Conference on Design of Communication. El Paso, TX. October 22, 2007.

“Promising Partnership: How a Student-run Online Editing Center Helps Engineering Students Improve Their Technical Writing.” Poster presented at Association of Teachers of Technical Writing annual conference. New York, NY. March 21, 2007.

“Flying Under the Radar: How Rhetorical Speechwriting Choices Advocate without Alienating.” Presented at Association for Business Communication annual conference. San Antonio, TX. October 25, 2006.

---

## ACADEMIC POSITIONS

### **Proposal Development Manager; Mechanical and Aerospace Engineering**

Utah State University, November 2010-Present

Build a culture of proposal writing and grant winning excellence to increase sponsored funding; research funding opportunities; provide strategic proposal development feedback and help develop faculty research portfolios; write proposal content as appropriate; edit final proposal documents iteratively before submission; identify, develop, and maintain relationships with funding agencies as well as with potential collaborators; produce boilerplate materials, templates, and outlines; free PIs' time and effort allowing them to strategize about research.

### **Research Assistant/Program Manager; ADVANCE Grant at USU**

Utah State University, August 2006-February 2010

Funded by the NSF, the \$3 million ADVANCE Grant emphasized the strengths of diversity and contributed to the development and full participation of women and other underrepresented groups in academia.

Created quarterly and annual reports; collaborative developed program website, web-based *Hiring for Excellence* modular training program, and faculty ombudspersons interactive training program; administrated multiple faculty mini-grants and reconciled budget; collaborated with ADVANCE programs at several other universities; coordinated efforts with internal university offices (e.g., President's office, Vice President for Research, controllers, multiple departments); collaborated on a successfully funded \$450 thousand NSF PAID (Partnerships for Adaption, Implementation, and Dissemination) grant.

### **Project Lead; Online Editing Center**

Utah State University, August 2005-May 2008

Provided editing services (and supervised three undergraduate editors) for USU Electrical and Computer Engineering Department's Senior Design II and III courses; annually worked with nearly 100 undergraduate students comprehensively editing (while offering instruction regarding edits) approximately 300 documents including proposals, design reviews, poster presentations, and final reports (Dr. Kelli Cargile Cook, Project Supervisor)

## **Research Intern; ADVANCE Grant at USU**

Utah State University, January-April 2006

Consulted with three professors (two in Biology, one in Instructional Technology) on writing of NSF CAREER Award grant proposals; co-organized with two biology professors a CAREER Award Preparation Workshop for Vice President of Research Office).

---

## **TEACHING POSITIONS**

### **Instructor**

Utah State University, January 2011-Present

Engineering Honors Inquiry

### **Graduate Instructor**

Utah State University, July 2004- December 2009

- Professional Editing (one section)
- Professional Writing Capstone (last half of one section)
- Introduction to Technical Communication (for non-English majors); Developed syllabus and was first instructor to teach the course at USU (two sections live; two sections online; one section hybrid-live/online/broadcast)
- Intermediate Writing: Research Writing in a Persuasive Mode (five sections live; one section via broadcast over UEN-Utah Education Network)
- Introduction to Writing: Academic Prose (five sections)

### **Adjunct Instructor**

Brigham Young University, Salt Lake Center, April-June 2009

Management Communication: Writing in Organizational Settings (one section)

### **Teaching Evaluations/Instructor Ratings**

Utah State University (6 point scale)

Professional Editing (department average 5.0)

- Live: 5.6

Introduction to Technical Communication (department average 5.2)

- Live/online/broadcast: 5.2
- Live: 5.8, 6.0, 5.9

Intermediate Writing (department average 5.1)

- Live: 5.3, 6.0, 5.8, 5.8, 5.8
- Broadcast: 5.3

Introduction to Writing (department average 5.0)

- Live: 5.3, 5.6, 5.4, 5.7, 5.4

Brigham Young University (8 point scale)

Management Communication (department average 7.00)

- Live: 7.7



**Writing Center Tutor/Interim Director**

Utah State University, Uintah Basin Campus, January 2004-May 2005

---

**ACADEMIC HONORS AND AWARDS**

- PhD/MA GPA 3.9
- Dean's List, College of Humanities, Arts and Social Sciences, Utah State University
- Dean's List, School of Graduate Studies, Utah State University
- Communications Excellence Awards: Outstanding Senior (1990), Outstanding Junior (1989), Brigham Young University

---

**OTHER PROFESSIONAL EXPERIENCE**
**Communication Consultant**

Vernal, Utah, 1999-2005

Consulted on communication and marketing for clients including Ashley Regional Medical Center (ARMC) and National Finals Rodeo's Dinosaur Roundup Rodeo—created and produced public relations and advertising materials; consulted on community and internal affairs including human resources/employee relations, training, speeches, special events, and crisis planning/management; developed a five-year strategic communication plan for ARMC's \$18 million expansion.

**President and CEO; DKC Inc. dba Christensen's**

Vernal, Utah, 1997-2004

**VP Merchandising and Communication; Christensen's**

Vernal, Utah 1991-1997

Successfully operated a multi-million dollar retail corporation; performed duties as strategic manager in human resources, marketing, buying, accounting, and merchandising; maintained successful relations with 30-40 employees in two locations and hundreds of vendors.

**Account Coordinator; Dunn, Reber, Glenn, Marz Advertising and Public Relations**

Las Vegas, Nevada, 1989-1991

Managed accounts including Young Electric Sign Company (YESCO) and The Tournament Players Club/PGA Tour; developed public relations and advertising plans and collateral for current and potential clients; facilitated creative processes between clients and agency departments.

---

## PROFESSIONAL ASSOCIATIONS

Society for Technical Communication  
Association for Business Communication  
Society for Technical Communication

---

## REFERENCES

Ryan Moeller, PhD  
Associate Professor, Professional and Technical Communication  
Department of English  
Utah State University  
3200 Old Main Hill  
Logan, Utah 84322-3200  
rylish.moeller@usu.edu

Christine Hult, PhD  
Professor (emeritus), English  
Former Associate Dean, College of Humanities, Arts and Social Sciences  
Principal Investigator, NSF ADVANCE Grant  
Department of English  
Utah State University  
christine.hult@usu.edu

Kelli Cargile Cook, PhD  
Associate Professor, Technical Communication  
President, Association of Teachers of Technical Writing  
Department of English  
Texas Tech University  
2500 Broadway  
Lubbock, TX 79409  
kelli.cargile-cook@ttu.edu