Writing More Effective Grant Proposals

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October 2, 2017

Tips for Today

1. Make a Strong First Impression
2. Articulate a Simple, Concise, Memorable Theme
3. Assemble and Present Facts (not Opinions) and Specifics to Tell a Compelling Story around the Theme
4. Do Your Homework
5. Have and Consult a Brain Trust

Make a Strong First Impression:
The Opening Statement: Tips from Trial Attorneys

- **Remember what Mom told you.** "You don't have a second chance to make a first impression."
- **Connect with the Jury** [Reviewers]. Know who your reviewers will be (not names, but types) and remember that they are your audience. Some may not be experts—write with these in mind.
- **Drop a Bomb**. Give some specific fact or claim that jars your audience, and that you can back up.
- **It's All About the Story**. *"The key to a successful opening is a compelling and coherent narrative…that is built around a simple, engaging and forceful presentation of the theme of your case [proposal]. The goal is to craft a lens through which the jury will see the evidence that provides the jurors with a view of what happened [what you propose to do] that leads inexorably to your desired outcome [funding!]. The details matter less; the story is all."*
- **Don't stretch the facts**. *You'll be found out later.*

ABA Journal, March 2017
http://www.abajournal.com/magazine/article/trial_lawyers_best_opening_statements

Make a Strong First Impression:
Effective Opening Statements

- "A superb opening can set you on a path toward winning the case, but a disastrous opening may be difficult to overcome."
- "Don't waste space getting to the theme."
- Drop a Bomb. Give some specific fact or claim that jars your audience, and that you can back up.
- It's All About the Story. "*The key to a successful opening is a compelling and coherent narrative…that is built around a simple, engaging and forceful presentation of the theme of your case [proposal]. The goal is to craft a lens through which the jury will see the evidence that provides the jurors with a view of what happened [what you propose to do] that leads inexorably to your desired outcome [funding!]. The details matter less; the story is all.*"
- Don't stretch the facts. *You'll be found out later.*

American Bar Association
https://apps.americanbar.org/labor/lel-aba-annual/papers/2003/mcwilliams.pdf

Make a Strong First Impression:
The Opening Statement

- A Few Good Words
- Crisp. Clear. Memorable.
- Specific.
- Lens through which to view all that is to follow.

A Few Good Men: 1:05:38

Make a Strong First Impression:
The Opening Statement (A Few Good Words)

"The FACTS of the case are these:

- On midnight of September 6th, the accused entered the barracks room of their platoon mate, PFC William Santiago.

- They woke him up, tied his arms and legs with tape, and forced a rag into his throat.

- A few minutes later a chemical reaction called *lactic acidosis* caused his lungs to begin bleeding.

- He drowned in his own blood and was pronounced dead at 37 minutes past midnight.

…

These are the FACTS of the case, and they are UNDISPUTED."

Make a Strong First Impression:
The Opening Statement (A Few Good Words)

"There was NO POISON ON THE RAG and there was NO INTENT TO KILL; and any attempt to prove otherwise is futile …..

When Dawson and Santiago went into Santiago's room that night…it's because it was WHAT THEY WERE ORDERED TO DO.

Now, out in the real world that means nothing….But if you're a Marine, assigned to Rifle Security Company Windward, Guantanimo Bay, Cuba, WHEN YOU ARE GIVEN AN ORDER, you FOLLOW IT, or you PACK YOUR BAGS.

Make no mistake about it. Harold Dawson and Lowden Downy are sitting here before you today, because they DID THEIR JOB."

Make a Strong First Impression:
The Opening Statement

No African-American students and no female students of any race or ethnicity have been known to pass an Advanced Placement computer science exam in Mississippi in at least the last decade.

The University of Mississippi will incentivize and train 48 practicing Mississippi teachers to offer Advanced Placement (AP) Computer Science Principles in some of the nation's most underserved public schools.

The result will be a 40-fold increase in Mississippi enrollments in AP Computer science courses, and a corresponding increase in the number of students who successfully complete the AP Computer Science Principles exam (with a score of at least 3 out of 5).

Assemble and Present Facts and Specifics to Tell a Compelling, Readable, Story around the Theme

How?

- Lay out specific, measurable, objectives
- Give specific timelines and milestones
- Cite specific performance record
- Give specific expected impacts
- Describe specific approaches

Why?

- Demonstrates that you've thought things through
- Demonstrates competence
- Instills reviewer confidence
- Anticipates and proactively answers reviewer questions

Be Specific: Examples: Broader Impacts (NSF)

Broader Impacts: Will the project….
- Utilize activities that are directly related to specific research projects
- Utilize activities that are supported by, but are complementary to the project
- Fully engage women, persons w/ disabilities, & underpresented minorities
- Improve STEM education and educator development at any level
- Increase public scientific literary and public engagement w/ science & technology
- Improve well beings of individual in society
- Develop a diverse, globally competitive STEM workforce
- Increase partnership between academia, industry and other
- Improve national security
- Increase economic competitiveness of the United States
- Enhance infrastructure for research and education

Be Specific: Examples: Broader Impacts (NSF)

Increasing participation in STEM (computing) programs and careers

- African Americans
- Women
- Hispanics
- Native Americans
- Native Alaskans and Hawaiian Islanders
- Persons with Disabilities

Research Opportunities for Undergraduate Students

K-12 STEM Outreach Programs

Increasing institutional, regional, & national research infrastructure

Benefiting society

Be Specific: Exercise

A group of tick researchers at UM has offered an exciting course on ticks, edited a useful handbook on ticks, developed several outreach programs, and collaborated on lots of research.

Exercise: What words in the text above are too general (not specific enough)?

Be Specific: Solution

A group of tick researchers at UM has offered an exciting course on ticks, edited a useful handbook on ticks, developed several outreach programs, and collaborated on lots of research.

Exercise: What words in the text above are too general (not specific enough)?

A group of tick researchers at UM's has offered an exciting course on ticks, edited a useful handbook on ticks, developed several outreach programs, and collaborated on lots of research

Be Specific: Past Behavior Predicts Future Success

- with 5 senior Native American women students, built a traveling "TickMobile" that has so far shown 1,000 kindergartners in Northeast Mississippi how to safely extract ticks from themselves or other children on the playground;

- developed the "Tick Engineering Camp" through which they have recruited 10 students (including seven women and one African American) into the Center for Manufacturing Engineering; and

- sponsored Brad Paisley to the Oxford Science Café in 2012, where he performed his song "I'd Like to Check You for Ticks" for over 100 community members.

Be Specific: Past Behavior Predicts Future Success

UM's *Ticks from Other Worlds Research Group:*

- published 15 tick-related articles in peer-reviewed journals, including 5 articles with undergraduate co-authors, and one with an undergraduate, Hispanic student as the lead author [REF]

- developed a 500-level interdisciplinary course called "Genetic Tick Engineering," which has been offered 10 times since 2005 and completed by 500 students in both chemistry and engineering programs.

- developed an e-handbook: "How to Kill a Zombie Tick," which has been downloaded 15,000 times to Apple/iOS, Android, Kindle, and Blackberry mobile devices.

Be Specific: Involving Underrepresented Groups

Among the K-12, undergraduate and graduate students in the PI's group, more than 50% of the students are from underrepresented female and African American groups

Among the K-12, undergraduate and graduate students in the PI's group, more than 50% of the students are from underrepresented female and African American groups

The PI has mentored four high school, nine undergraduate, and four graduate students to date, over 50% of whom are from underrepresented groups and this commitment will continue during this project period.

Be Specific: Involving Underrepresented Groups

Pictures help convey prior record of working with underrepresented groups.

Figure 8: Group photo of the members of the 2009 Ole Miss Physical Chemistry Summer Research Program.

Be Specific: Example Broader Impacts Statements from Actual Successful UM Grant Applications

Mississippi leads the nation by far in the percentage of residents who are African Americans: 37%. (Louisiana is second next at 32%).

At the University of Mississippi, over the past 10 years (2002-2011), minority enrollment has increased by 78.9 % and African-American enrollment is up 84.0%. Last fall, 24.2% (nearly one in four) of UM students were minorities and 16.5% were African-American.

We will develop a K-12 outreach program of science demonstrations at the North Panola high school, North Panola Junior high school and Green Hill elementary schools. 97% of the students at these schools are African American and 87% qualify for free lunch programs. Through this outreach program, we will try to recruit these students into our high school, undergraduate and graduate programs.

Be Specific: Example Broader Impacts Statements from Actual UM Grant Applications

A collaboration of computer scientists and K-12 STEM teacher educators at University of Mississippi will build a professional development program to incentivize and train 48 practicing Mississippi teachers to offer Advanced Placement (AP) Computer Science Principles in some of the nation's most underserved public schools.

The result will be a 40-fold increase in Mississippi enrollments in AP Computer science courses, and a corresponding increase in the number of students who successfully complete the AP Computer Science Principles exam (with a score of at least 3 out of 5).

Be Specific: Gather and (Re)Use Sourced Facts

Women enroll at disproportionately lower rates in engineering, computer sciences, physical sciences, and economics. (NSF)

"Foreign students earned 57% of all engineering doctorates, 54% of all computer science degrees, and 51% of physics doctoral degrees. Their overall share of S&E degrees was one-third." (NSF)

By 2020, employment in all computer occupations is expected to increase by 22%. (ComputerWorld)

Be Specific: Gather and (Re)Use Sourced Facts

Very few students in Mississippi take (or have access to) Advanced Placement Computer Science courses and exams; in fact, only 104 Mississippians have attempted the AP CS A exam over the past 10 years (College Board, 2014, 2005-2013).

No female or African American in Mississippi is known to have passed the AP CS exam over the last decade, and no African American has even come close. In particular, where Mississippi is concerned:

- Over the past nine years, no white female has attempted the AP CS exam.
- Over the past six years, no African American female has attempted the AP CS exam.
- Over the last decade, no female of any race or ethnic group is known to have passed the AP CS exam.
- Over the last decade, no African American is known to have scored any better than a 1 (out of 5) on the AP CS exam, even though 59 African Americans (26 male, 33 female) have tried.

Be Specific: Gather and (Re)Use Sourced Facts

While Mississippi's AP CS statistics are particularly bleak, Mississippi is not exactly leading the nation in other AP subjects either.

Mississippi lags the nation in both the percentage of its students who take AP exams in any subject (2014 rank: 49th at 17.2%, leading only North Dakota) and the percentage of AP exams passed in any subject with a score of 3 or better (2014 rank: 49th at 32.4%, leading only Arkansas).

In 2014, only about 44% (126 out 282) of Mississippi's public high schools even offered AP courses of any type (College Board, 2014).

Tip: Don't Editorialize

The proposed project is the single most important opportunity our state has to simultaneously transform its educational, research, healthcare, and public safety landscape, through the creation of a combined network of fiber optic and wireless towers that will place middle mile anchor institutions geographically throughout Mississippi and ultimately provide coverage to 97% of the state..

Comment [11]

Can you link this to any statewide action plan or official document that states these objectives as a statewide goal?

Comment [10]

Avoid sweeping statements and rhetoric. Make as fact-based as possible.

Tip: Don't Editorialize or Use Sweeping Rhetoric
Do: Make Fact-Based Claims

Bad:

- Mississippi is the worst state in the nation when it comes to Advanced Placement.
- Mississippi's political elite devalues public education; that is why our Advanced Placement offerings are so dismal.

Good:

- Mississippi lags the nation in both the percentage of its students who take AP exams in any subject (2014 rank: 49th at 17.2%, leading only North Dakota) and the percentage of AP exams passed in any subject with a score of 3 or better (2014 rank: 49th at 32.4%, leading only Arkansas).

- In 2014, only about 44% (126 out 282) of Mississippi's public high schools even offered AP courses of any type (College Board, 2014).

Very Strenuously Object to Almost All Adverbs

- *A Few Good Men*: 1:16:38

Very Strenuously Object to Almost All Adverbs

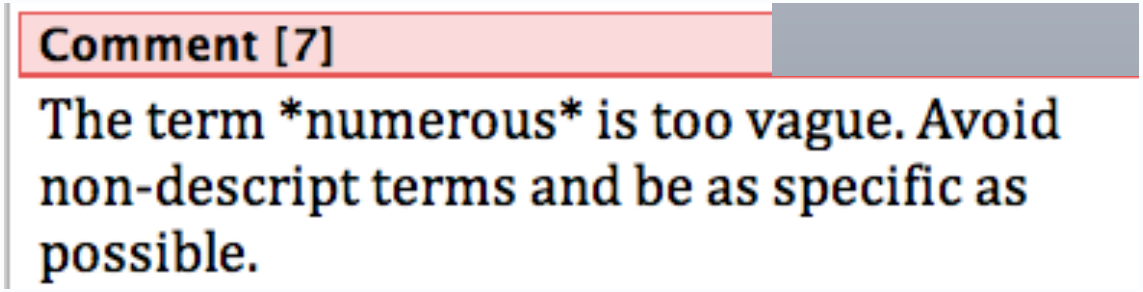
- *A Few Good Men*: 1:38:00

  https://www.youtube.com/watch?v=bOnRHAyXqYY
- Use facts instead
- The users should draw their own conclusions
- Some adverbs to watch out for:

  clearly, importantly, significantly
- When is it ok to use adverbs?
  - Sparingly, for effect
  - To convey factual content—not opinion
  - The results were ***statistically*** significant

Limit Descriptive Adjectives
Replace them Descriptors with Limiters

Partners include the nonprofit Mississippi Economic Growth Alliance Point of Presence (MEGAPOP), the Mississippi Wireless Communication Commission (WCC), the Mississippi Research Consortium (MRC, representing the four research universities), the University of Mississippi Medical Center, and the Mississippi Department of Information Technology Services (ITS), with strong support from numerous other organizations in the public and private sector.

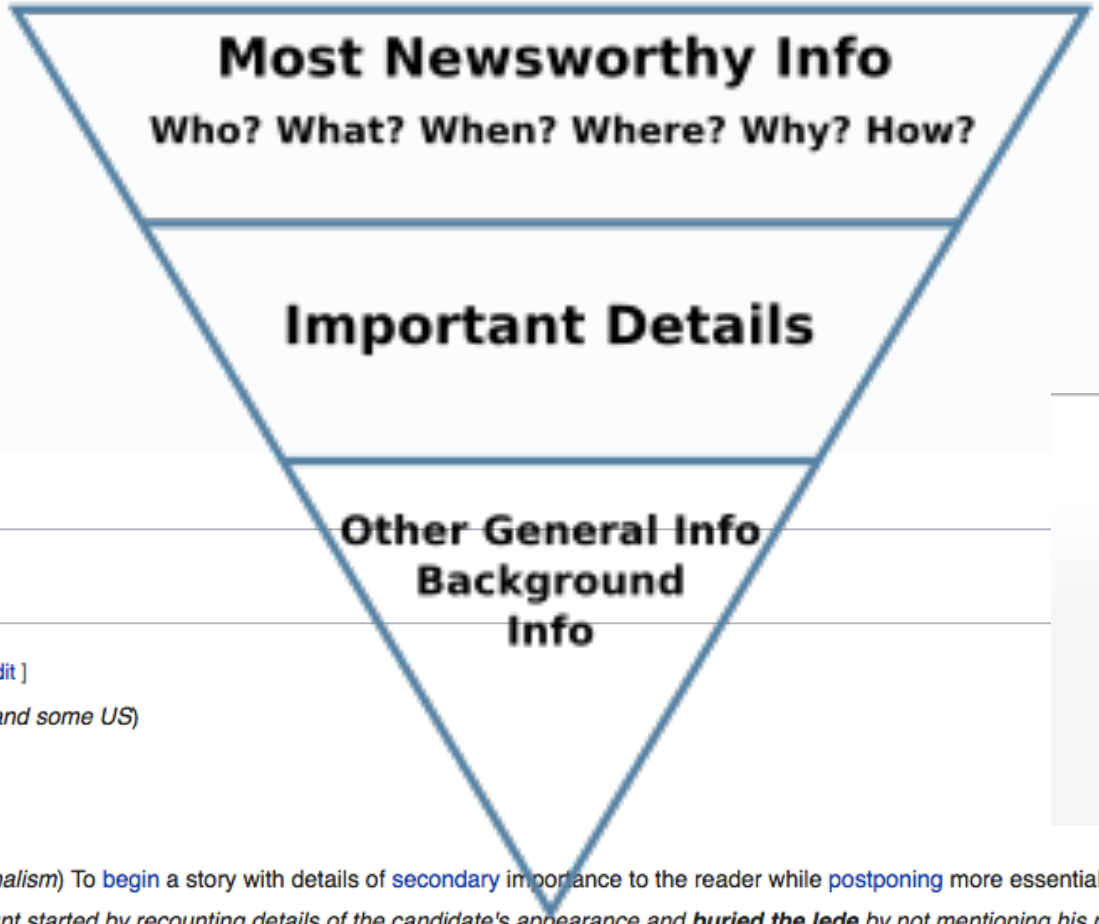


Some adjectives to watch out for:

numerous, significant, important, useful, exciting, several

Be Considerate: Don't Bury the Lede

Journalists use *Inverted Pyramid Style* for news stories



bury the lede

English [edit]

Alternative forms [edit]

- bury the lead (*non-US and some US*)

Verb [edit]

bury the lede

1. (*idiomatic*, *US*, *journalism*) To begin a story with details of secondary importance to the reader while postponing more essential points or facts.

*The news account started by recounting details of the candidate's appearance and **buried the lede** by not mentioning his new call for tax reform until the 19th paragraph.*

Wiktionary
The free dictionary

Be Considerate: Don't Bury the Lede

Front-load your proposal with the most important points first; the rest is just supporting information

Do not assume everyone is interested in what you have to say; do not assume all reviewers will read your entire proposal.

If you can interest them, great. If not, make sure they learn your intentions by reading the first few sentences.

Be Considerate: Use a Logic Model
Be Considerate: Use the Sponsor's Language

Context: The UM STEM professoriate does not reflect the University's commitment to inclusiveness and diversity.
NSF ADVANCE IT grant proposal: Transform how we recruit and support women and communicate our commitment.

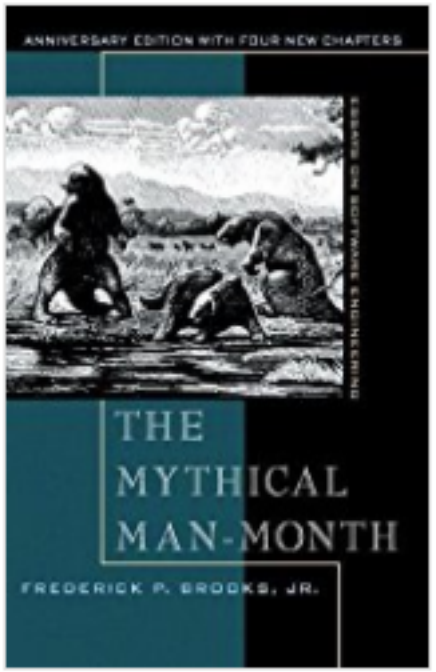
Barriers/ Possible Causes	Goals	Strategies	Outcomes	Broader Impacts
• Low number of Core STEM women applicants, interviews, and hires • Retention of Assistant/ Associate Professors in SBS • Fear of breaking poorly understood hiring rules • Regional/cultural barriers • Organizational barriers (gendered or poorly understood policies) • Lack of shared/known information about what is required BY ALL for faculty success and diversity in the UM environment	• Transform Recruitment • Identify Additional Barriers • Change the Climate by Improving Understanding • Communicate Outcomes and Commitment	• STEM Faculty Recruiting Office • *Inform UM* survey of STEM faculty candidates and faculty departures to identify push/pull factors • HERI Faculty Survey of campus climate • Social Science Research: regional effects on recruitment and retention • M^2Seed grants to multidisciplinary multicultural research teams and for understanding diversity in higher ed. settings • National travel grants to non-UM women STEM PhD earners • Annual STEM Faculty Cohort Orientation & Retreat • Leadership in STEM Conference • Leadership in Multiculturalism Conference • Travel grants for women	• Barriers to diversity uncovered • Policies & resources enhanced, clarified, and/or created • Best practices identified and broadly adopted • UM is (and is seen as) a model for diversity and inclusion in "Deep South" settings • Double the number of women interviewed for STEM T/TT positions • Women in all STEM tenure and tenure-tracked positions increased by 75% • Double the of number of African American women STEM T/TT faculty	• Feed and diversify the STEM pipeline • Other institutions will better understand and address their own regional barriers to STEM recruitment and advancement • Improved UM climate for not just women but also African Americans and other under-represented groups in STEM • Improved climate and diversity for non-STEM faculty

Be Considerate:
Use Tables

		Department	BIOLOGY	CHEM ENGR	CHEM/BIOCHEM	CIV ENGR	COMP INFO SCI	ELECTRICAL ENGR	GEOLOGY/GEO ENGR	MATH	MECH ENGR	PHARMACOLOGY	PHYSICS & ASTRONOMY	CORE TOTALS	ECONOMICS	POLITICAL SCI	PSYCHOLOGY	SOCIOLOGY/ANTRHO	SBS TOTALS	ALL STEM TOTALS
UM Current Tenure/Tenure Track Faculty	Assist.	All	6	1	4	2	3	0	2	5	0	2	3	28	4	7	5	4	20	48
		Women	1	0	0	2	1	0	0	1	0	1	1	7	2	1	3	3	9	16
		% Women	17	0	0	100	33	0	0	20	0	50	33	25	50	14	60	75	45	33
		AA Women	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	2	2	3
		Nat'l % Women	38	15	23	23	21	13	38	26	14	6	19		29	49	54	60		
	Assoc.	All	7	1	7	3	3	5	3	5	2	2	5	43	4	6	8	9	27	70
		Women	2	0	1	1	0	0	0	2	0	1	0	7	0	1	4	4	9	16
		% Women	29	0	14.3	33	0	0	0	40	0	50	0	16	0	17	50	44	33	23
		AA Women	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
		Nat'l % Women	33	28	17	12	15	17	19	26	10	17	14		25	29	51	53		
	Full	All	6	5	3	3	2	3	0	5	4	2	6	39	3	3	3	3	12	51
		Women	1	0	0	0	1	0	0	0	1	0	0	3	0	1	0	1	2	5
		% Women	17	0	0	0	50	0	0	0	25	0	0	8	0	33	0	33	17	10
		AA Women	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Nat'l % Women	23	10	13	6	11	0	16	11	6	37	9		14	18	30	31		
	Total	All	19	7	14	8	8	8	5	15	6	6	14	110	11	16	16	16	59	169
		Women	4	0	1	3	2	0	0	3	1	2	1	17	2	3	7	8	20	37
		% Women	21	0	7	38	25	0	0	20	17	33	7	15	18	19	44	50	34	22
		AA Women	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	3	3	4
Recruiting and Hiring		#of Searches	5	1	4	2	4	1	2	3	1	1	0	*24*	4	11	3	7	25	49
	Applicants to UM	Total	214	41	155	66	117	22	26	295	21	51	0	*1,008*	810	465	125	276	1,676	2,684
		Women	49	6	22	3	17	0	3	64	0	9	0	*173*	189	114	74	152	529	702
		% Women	23	15	14	5	15	0	12	22	0	18	0	17	23	25	59	55	32	26
		AA Women	0	0	0	0	1	0	0	0	0	0	0	*1*	2	1	0	17	20	21
	UM Interviews	Total	34	3	2	7	16	5	7	12	5	7	0	*98*	55	29	6	58	148	246
		Women	7	1	0	1	3	0	3	0	0	1	0	*16*	15	10	5	34	64	80
		% Women	21	33	0	14	19	0	43	0	0	14	0	16	27	34	83	59	43	33
		AA Women	0	0	0	0	1	0	0	0	0	0	0	*1*	0	0	0	8	8	9
	UM Hires	Total	3	1	1	1	3	1	2	3	1	1	0	*17*	4	10	3	7	24	41
		Women	1	0	0	1	0	0	0	0	0	1	0	*3*	1	1	3	5	10	13
		% Women	33	0	0	100	0	0	0	0	0	100	0	18	25	10	100	71	42	32
		AA Women	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3
	National % of Women PhD Graduates		54	31	40	26	21	16	38	29	14	52	19		34	42	70	62		

Plan to Throw One Out (Fred Brooks)

"For most [software] projects, the first system built is barely useable: too slow, too big, too hard to use, or all 3. It ends up being discarded and redesigned. The discard and redesign may be done in one lump, or piece-by-piece, but it will be done."



Similarly, by the time you submit a GOOD proposal, it might be the 15th, 20th, or 30th revised version.

So, leave plenty of time for reviews and revisions.

Have and Consult A Brain Trust
Solicit Contributions from Diverse Others

- ORSP Enhanced review (15 days lead time)
- ORSP Research Development Fellows
  researchfellows@olemiss.edu
- Colleagues within the University:
  Coming Soon: ORSP Grant Mentors Program:
- External Colleagues with Success in Field or with Sponsor/Program
- Program Officers at Funding Agencies
- Non-Experts (spouses, partners, in-laws)

Consult the Brain Trust
Solicit Contributions from Diverse Others

- Early on, all proposals will suck.
- Your task: go “from suck to not-suck”
- Rework, rework, and rework again
- Submit the 27th version, not the 1st
- Give yourself time
- Get lots of others to look
- ORSP: Enhanced Review Services

Do Your Homework:
Learn and Follow the Rules (External)

- Sponsor's Sources
  - Solicitation/RFP/BAA
  - Grant proposal guides
- What documents are required?
- Allowable Costs?
- Review criteria?
- Deadlines (including times, formats)
- Required documents, sections, etc.
- Pages/words/margins
- Cost sharing? F&A costs? (29%, 44%, 50%)

Do Your Homework:
Learn and Follow the Rules (Internal)

- Who will cover the cost share?
- How can federal grant funds be spent at UM? ORSP deadlines (including times)
  - ORSP On-Time Proposal: 5 working days ahead
  - Enhanced ORSP Reviews: 15 working days ahead
- Research integrity and compliance
- Intellectual property & confidentiality protection

Do Your Homework: Know the Rules - example

Rules for NSF Project Summaries:

- Self-contained description of the activity that would result if the project were funded
- Not an abstract of the proposal itself
  - Don't refer to "this proposal"
  - Not an introduction
- Written in 3rd person
- State methods and objectives
- Understandable by an educated lay reader
- Separate statements for:
  - Overview
  - Intellectual Merit
  - Broader Impacts

Do Your Homework:
Eliminating Jargon from and NSF Project Summary

"In 2010, then Mississippi Governor Haley Barbour negotiated with AT&T to create the Mississippi Optical Network (MissiON). In this proposal, we describe our vision to use NSF funds to upgrade MissiON, a regional higher education research network. The plan is to: 1) increase aggregate connectivity through the Internet2 POP from 10Gbps to 100Gbps; 2) incorporate for the first time Mississippi's 15 community colleges; and 3) incorporate (and connect for the first time to Internet2) a regional university from the Delta. We plan to enable greater participation in data-intensive research across our state.

Any jargon here?

Any use of 1st person?

Any unnecessary background statements?

Any references to the proposal itself?

Do Your Homework:
Eliminating Jargon from and NSF Project Summary

"In 2010, then Mississippi Governor Haley Barbour negotiated with AT&T to create the Mississippi Optical Network (MissiON). In this proposal, we describe our vision to use NSF funds to upgrade MissiON, a regional higher education research network. The plan is to: 1) increase aggregate connectivity through the Internet2 POP from 10Gbps to 100Gbps; 2) incorporate for the first our state's Mississippi's 15 community colleges; and 3) incorporate (and connect for the first time to Internet2) a regional university from the Delta. We plan to enable greater participation in data-intensive research across our state."

Jargon 1st Person Unnecessary background References to Proposal

Do Your Homework:
A Better NSF Overview Statement

"The Mississippi Optical Network (MissiON), a regional higher education research network, will be upgraded to: 1) increase by ten the bandwidth of MissiON's connection to a national research network—Internet2; 2) incorporate for the first time Mississippi's 15 community colleges; and 3) incorporate (and connect for the first time to Internet2) a regional university from the Mississippi Delta. The enhanced network will enable greater participation in data-intensive research by faculty and students from these community and regional colleges. It will also lead to enhanced data-intensive collaborations between Mississippi's research-intensive institutions and their partners across the nation.

Do Your Homework: Know What the Sponsor Wants
Carefully Parse the External Requirements (Solicitation)

Synopsis of Program:

The STEM-C (Science, Technology, Engineering and Mathematics, including Computing) Partnerships program is a major research and development effort of two NSF Directorates, the Directorate for Education and Human Resources and the Directorate for Computer and Information Science and Engineering, which supports innovative partnerships to improve teaching and learning in science, technology, engineering, and mathematics (STEM) disciplines. STEM-C Partnerships combines and advances the efforts of both the former Math and Science Partnership (MSP) and the former Computing Education for the 21st Century (CE21) programs. It is critical that our nation maintain a competent, competitive and creative STEM workforce, including teachers. Therefore, NSF aims to inspire and motivate the next generation of that workforce, while ensuring that it has the skills, competencies, and preparation to be successful. As we transition to a global, knowledge-based economy that is often driven by information technology and innovation, it is increasingly important that STEM workforce preparation includes a strong foundation in computing. Thus, the STEM-C Partnerships program addresses both the need for advances in K-12 STEM education generally, as well as the need to elevate the inclusion of computer science education.

From MSP, STEM-C Partnerships embraces any of the STEM disciplines --within the natural science, mathematics, engineering, or computer science -- and maintains its commitment to institutional partnerships and opportunities for funding of Targeted proposals in one of four focal areas: Community Enterprise for STEM Teaching and Learning, Current Issues Related to STEM Content, Identifying and Cultivating Exceptional Talent, and K-12 STEM Teacher Preparation. From CE21, STEM-C Partnerships adds a discipline-specific focal area on the teaching and learning of computing and computational thinking, a strong commitment to broadening participation in computing, an emphasis on in-service teacher professional development, and support for the implementation of computer science courses at the high school level. It is expected that the merging of the MSP and CE21 programs will strengthen both and serve as a model for future incorporation of discipline-specific concerns into programs focused more broadly on STEM.

The STEM-C Partnerships program supports Partnerships that promote effective K-12 STEM education, building knowledge of teaching and learning in ways that deepen understanding and stimulate further exploration of STEM

Do Your Homework: Give the Sponsor What it Wants

Make a Checklist

	TARGETED: Prototype	TARGETED: Implementation	CS Ed. Expansion		Clear & Strong	Needs Clarity & Strengthening	Hinted or Murky	Absent
	⊙	⊙			✔	✓	×	✖
GOALS								
INSPIRE and MOTIVATE the next generation STEM workforce, including teachers	⊙	⊙	⊙					
Ensure STEM workforce has SKILLS, COMPETENCIES, and PREPARATION to succeed	⊙	⊙	⊙					
Ensure STEM workforce has a STRONG FOUNDATION in COMPUTING	⊙	⊙	⊙					
ADVANCE STEM EDUCATION GENERALLY	⊙	⊙	⊙					
ELEVATE the inclusion of COMPUTER SCIENCE EDUCATION	⊙	⊙	⊙					
Promote EFFECTIVE K-12 STEM Education	⊙	⊙	⊙					
Deepen K-12 STEM Understanding	⊙	⊙	⊙					
Stimulate STEM Education in-school	⊙	⊙	⊙					
Stimulate STEM Education out-of-school	⊙	⊙	⊙					
Partner LEARNING SCIENTISTS w/discipline-specific STEM teachers/faculty/ researchers/scientists	⊙	⊙	⊙					
Effective preparation, professional development, and support of K-12 teachers	⊙	⊙	⊙					
Change undergraduate training of K-12 teachers	⊙	⊙	⊙					
Development and/or use of TRANSFORMATIONAL Research	⊙	⊙	⊙					