

IOWA STATE UNIVERSITY

Office of the Vice President for Research

Grant Writing Tips

Presented by Ann Russell and Michael Gallagher

Who are Your Presenters?

- Ann Russell, Ph.D.
 - Adjunct Associate Professor, Dept. of NREM
 - Former NSF Program Director
- Michael Gallagher, M.A.
 - Grants Hub proposal editor

Presentation Goals

- Offer tips for communicating your ideas optimally
- Offer tips for avoiding frequent proposal writing issues
- Encourage discussion with peers related to first two goals, since this subject is somewhat subjective

Topics Not Covered (and why)

- We aren't focusing much on proposal content. We're focusing more on how to present proposal content.
- We are trying to supplement the grant writing session ISU typically brings in.

Presentation Outline

- Main Topics:
 - Strategies for Organizing your Proposal
 - Editing your Proposal
 - Using Graphics in Proposals
 - Formatting Tips
 - Utilizing Solicitation/Agency Language
 - Varying Sentence Length
 - Displaying Confidence in Writing
 - Avoiding Copy/Paste Pitfalls
 - Guiding Your Reader With Transitions

Presentation Outline (cont.)

- Activity:
 - Reviewing proposal writing in small groups

Strategies for Organizing Your Proposal

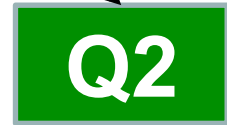
Start with your big idea, then outline:

- Context, Conceptual Framework
- Questions
- Background (Preliminary Data)
- Objectives
- Hypotheses to test
- Methods/Procedures
- Broader Impacts
- Timeline of activities
- Budget

Context, Conceptual framework:



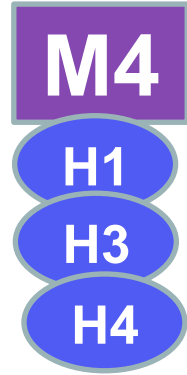
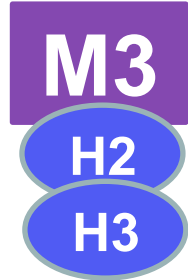
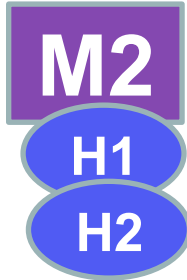
Question to Address:



Hypotheses:



Methods:



BI, Timeline, Budget

Organizing

- Headings & subheadings follow outline
- Check to see that:
 - You can follow the thread for each question posed, through all the sections
 - You have the personnel/expertise/studies covering all the points
 - Everything proposed has a budget line

Example: Follow the golden thread for Q1

Q1. How does C allocation to different belowground pathways and processes differ among forest types that vary in belowground C allocation (BCA)....?

Q2. What are the consequences of these differences for nutrient cycling?

OBJECTIVE 1: To quantify total BCA and the proportional patterns of allocation.....

H1: The absolute and relative proportions of total BCA allocated to fine roots, AMF, exudates, and free-living microbes vary with total BCA.

Pathway a – Detrital inputs increase with BCA (H1a).

PROCEDURES

1. Belowground Carbon Allocation

1a. BCA Calculations: We calculate total BCA as:.... (H1a)

Editing Your Proposal

- Use spellcheck and grammar check!
- Check for consistency across ALL parts of the proposal, including the Budget.
 - If you skipped the outline before, do it now!
 - For each activity proposed, reviewers should be able to trace a direct line:

Questions → Objectives → Hypothesis → Activity → Methods →
Timeline → Budget

- The process is iterative
 - E.g., If activities are proposed that aren't supported in the Budget, it's back to the drawing board for either the proposed activities or the Budget.

Editing Your Proposal (cont.)

- Finish a complete draft in time for friendly review by 2 types of peers
 - Someone who knows the topic well (but will not try to scoop you!)
 - Someone in that general field, but not specialized in your topic
 - You will likely get both types of reviewers and you need to convince both types
- Discuss with reviewers the criticisms that you didn't understand

Using Graphics in Proposals

- A picture can tell a thousand words
- Pictures take up space, so it has to be great, and this usually takes time
- Start working on this at the very beginning
- Think of a diagram that will be in the next rewrite of the major textbook in that field
- Use the diagram as a means of exchanging ideas with colleagues
 - This is the fun, creative part – enjoy it!
 - Generally, it is an iterative process

Using Graphics in Proposals (cont.)

- Find an illustrator who will commit to creating the final product **early** in the process
 - Although s/he won't start working on it until you have a near-final draft
- For drafts, work in an easy software, such as Powerpoint.
- Keep it in Powerpoint, if possible, in case changes are needed at the last minute
- Keep the font size as large as possible
- Avoid using all caps in labeling

Using Graphics in Proposals (cont.)

- Size objects to avoid large empty spaces
- Remember that some reviewers will print a B&W copy, so test print it in B&W:
 - Does the color coding work well?
 - Is the font legible for old eyes?

Graphics Example

CONCEPTUAL FRAMEWORK

Our conceptual framework for understanding the belowground drivers of productivity, biomass accumulation and nutrient cycling in forests is organized around the following two questions:

Q1. How does C allocation to different belowground pathways and processes differ among forest types that vary in belowground C allocation (BCA) under conditions of similar soils and climate?

Q2. What are the consequences of these differences for nutrient cycling?

We address these questions from the following conceptual framework (Fig. 1). Forests allocate

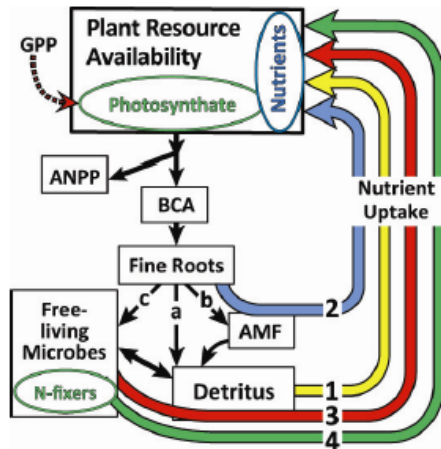


Fig. 1. Belowground C allocation pathways (a-c) and the mechanisms of influence on nutrient cycling (1-4), described in text.

a substantial proportion of their photosynthate belowground, referred to here as BCA. Once C is transported from leaves to roots, it has at least three alternative anabolic pathways: **a)** allocation to fine root (FR) growth and, consequently, to FR detrital production, which also supports free-living microbes; **b)** direct transfer to arbuscular mycorrhizal fungi (AMF), which have a symbiotic relationship with fine roots; and **c)** root exudates that support rhizosphere heterotrophs. The quantity and partitioning of the anabolic components among these pathways influence plant nutrient uptake via at least four distinct mechanisms (Fig. 1): **1)** mineralization of soil organic matter (SOM) in bulk soil; **2)** exploration of soil and scavenging of nutrients; **3)** rhizosphere priming; and **4)** support of asymbiotic N-fixing microbes.

Aboveground net primary productivity (ANPP) also contributes to detrital production (not depicted in Fig. 1), as does FR production; however, rhizosphere priming and AMF relationships are unique to fine roots. It is important to note that there are many other C fluxes also NOT shown in Fig. 1; in particular, all of

these anabolic components of BCA are accompanied by catabolic or respiratory fluxes.

Ideally, the best approach to evaluating the relative importance of the belowground drivers would be to test directly all of the pathways and consequences implied by this conceptual framework, comparing results among systems that varied in total BCA and its allocation. If only belowground processes were that straightforward to quantify! Of course, they are not. Thus, our conceptual approach consists of characterizing and assaying suites of microbial, soil, and plant processes, in combination with mass balance studies of C, N, P, Ca, Mg, Mn, and K at the plot level. These ecosystem-level measurements will allow us to constrain, and interpret results of studies done at smaller scales. We will employ this approach in forests with the same soil type and climate, but differing in C-cycling attributes, including BCA, and thereby allowing for direct comparisons among contrasting allocation patterns of C. The train of logic that motivates our conceptual approach, organized by pathway of BCA allocation paired

Using Graphics in Proposals (cont.)

- Make sure that graphics are “color blind accessible”
- Test, using:

<http://www.color-blindness.com/coblis-color-blindness-simulator>

- This is a requirement for some solicitations

Formatting Tips

- Read all of the guidelines, as sometimes it's not straightforward
 - E.g., NSF: font size Arial 10 is minimum, BUT no more than 6 lines/inch
- Think of the worst case: older reviewers (with bad eyes), reading a B&W copy on a plane late at night, along with 18 other proposals
- Make an outline of your proposal and align the heading type/style with that outline

Formatting Tips (cont.)

- Space between sections, even if it's just half a line
- Avoid large blank areas
- Break up long stretches of text with figures/ diagrams if possible

Utilizing Solicitation/Agency Language

- In general, yes
 - Helps PO and reviewers clarify subdivision to which proposal belongs
 - Helps you focus on tailoring proposal for that specific call
- However, in some cases, avoid overuse of this language
 - E.g., NSF, use of ‘transformational’
 - Some reviewers are turned off by overuse of buzzwords

Positive Example

From RFP 2.3 DOE Carbon Cycle Science in 2013:

- TES seeks to improve the representation of **terrestrial ecosystem processes in Earth system models**, thereby improving the quality of climate model projections..... TES seeks to focus its research on ecosystems that are globally important, climatically sensitive, and comparatively understudied or underrepresented in Earth system models [e.g., **tropical moist forests**]. Preference will be given to projects that demonstrate **strong potential feedbacks and wide geographic applicability**.

Positive Example

From Summary Statement of my proposal:

- Significance: **Relating directly to DOE TES goals**, the proposed studies will advance our understanding of plant controls over **soil biogeochemical processes** of the **tropical moist forest biome**. This knowledge will be incorporated into **coupled models with wide geographic applicability** and capacity for **identifying strong feedbacks due to climate change**.

Negative Example

- From NSF-BIO-DEB-Ecosystem Science Website:

“Projects that are **potentially transformative** -- that is, those that **may change the conceptual basis** of ecosystem science and have broad implications for future research -- are given particular priority.”

Negative Example

- Negative example of use of this language in a proposal:

The mechanistic, quantitative insights attained in this project would be **potentially transformative and may change the conceptual basis for** numerical models of future forest C cycling and global climate.

Varying Sentence Length

- Most common style issue I encounter in proposal writing = unnecessarily long sentences
- Leads to confusion and/or unenjoyable reading
- There is nothing wrong with short sentences!
 - Varied sentence length is recommended for all writing – not just for proposals
 - Using short sentences also goes hand-in-hand with brevity, which is tremendously beneficial when dealing with strict page limits

Example

- “During the first five years of the project, we will be utilizing the model created by Johnson and Bennet for teaching K-12 students chemistry, using each year’s workshops to analyze and evaluate its effectiveness, eventually leading to the creation of an improved version of the model.”

Example (cont.)

- Possible rewrite:
 - “During the first five years of the project, we will utilize the model created by Johnson and Bennet for teaching K-12 students chemistry. We will then use each year’s workshops to analyze and evaluate the model’s effectiveness. Using this information, we will eventually create an improved version of the model.”

Example

- “Researchers will also conduct standard usability and design evaluations with participants, taking them through various prototypes while participants offer audible impressions, allowing the researchers to understand the thinking process of the participants.”
- What would you do to improve this sentence? Or, do you like it as is?

Example (cont.)

- Possible rewrite:
 - “Researchers will also conduct standard usability and design evaluation with participants, taking them through various prototypes while participants offer audible impressions. This will allow the researchers to understand the thinking process of the participants.”

Example

- “However, in order to supply energy to an average house with present solar panel designs, multiple costly solar panels are often needed, and most homeowners are not willing to pay this initial cost.”
- What would you do to improve this sentence? Or, do you like it as is?

Example (cont.)

- Possible rewrite:
 - “However, in order to supply energy to an average house with present solar panel designs, multiple costly solar panels are often needed. The initial cost of these solar panels is higher than what most homeowners are willing to pay.”

Varying Sentence Length

- There's also often room to shorten sentences that are unnecessarily wordy
- Example:
 - “By monitoring more than 300 US students, this project aims to answer the question of how frequent video game playing affects students’ attentiveness in their classrooms.”
 - What would you do to improve this sentence? Or, do you like it as is?

Example (cont.)

- Possible rewrite:
 - “By monitoring more than 300 US students, ~~this project aims to answer the question of~~ how frequent video game playing affects students’ attentiveness in their classrooms.”
 - “By monitoring more than 300 US students, we will examine how frequent video game playing affects students’ attentiveness in their classrooms.”

Displaying Confidence in Writing

- Common issue: use of weak language in proposal writing
 - “We hope . . .”; “We believe . . .”; “We will try . . .”; “If we . . .”
- You don’t want to come across as if you have doubts in yourself or your project
- Instead:
 - “We expect to . . .”
 - “Once we . . .”
 - Better yet: “We will...”

Example

- “If successfully completed, we envision that the educational resources and tools created by our group will be utilized by teachers and implemented in K-12 classrooms.”
- What would you do to improve this sentence?
Or, do you like it as is?

Example (cont.)

- Possible rewrite:
 - “Once we complete the tools and resources, teachers will implement them in their K-12 classrooms.”
- Supplement these statements with supporting details (e.g., commitments from teachers)
- Budget support also lends strength

Avoiding Copy/Paste Pitfalls

- Make sure to adapt the text to the solicitation
- Also, adapt the text stylistically so it flows with the rest of the proposal
- Unchanged copy/past text is often obvious
 - Sudden tense change
 - Reference to multiple PIs on a single PI proposal (or, vice versa)
 - Unusual repetition, or referencing a concept that has not yet been explained
- Can reflect poorly on PI including lack of interest in the project or an inattentiveness towards detail

Using Repetition

- Can be utilized as a useful reminder
- Paraphrase, don't completely restate
- This can also help with reinforcing ideas when used strategically
- If it doesn't function that way, edit it out, as repetition can be boring or indicate a lack of material

Avoiding Jargon

- Be mindful of using esoteric language that the reviewers may not know
- When in doubt, offer brief explanations of terms and concepts
- The last thing you want to do is make a reviewer's task more difficult
- You also want to give the reviewer credit for having basic knowledge on the broad topic. So, although you can include an 'Intro' level explanation in a phrase or short sentence, don't belabor it

Guiding With Transitions

- Transitioning between sentences and paragraphs is essential for creating a well-written proposal that's easy for a reviewer to read
- **Think of it as guiding the reviewer from one thought to the next**
- This includes using transition words, transition sentences, and referencing content from the previous sentence to establish a connection

Guiding With Transitions (cont.)

- “In particular”; “Additionally”; “Alternatively”; “Specifically” . . .
 - Don’t need to necessarily start a sentence: “In particular, K-12 students tend to . . .” vs. “K-12 students, in particular, tend to . . .”
 - Changing the placement of the transition is helpful for creating some variety in your sentences

Guiding With Transitions (cont.)

- If you're struggling to come up with a way to transition between two sentences, it might be necessary to add in a transition sentence to help connect the two thoughts
- This can also be useful if you want to avoid overusing transition words

Example

- Original: “Additionally, we will continue studying the students as they progress through their next three school years. Specifically, we’ll monitor their stress levels, academic performance, and physical health.”
- Possible change: “Additionally, we will continue studying the students as they progress through their next three school years. During these years, we’ll monitor the students for signs of duress. This includes tracking their stress levels, academic performance, and physical health.”

Guiding With Transitions (cont.)

- Often, you can transition between two sentences by referencing part of the first sentence in the following sentence
 - Example: “We will study cost benefits of implementing solar cells in moderate and large sized high schools. When choosing **these high schools . . .**”

Activity

- Get into small groups
- Read through the handout one paragraph at a time and discuss possible ways to improve the text
- Concentrate on writing style and presentation, not content

Grants Hub Contact Information

- Call: 515-294-4220
- Email: grantshub@iastate.edu
- Browse: www.grantshub.iastate.edu
 - You can submit service request forms from this link