WRITING AN EFFECTIVE SURF PROPOSAL

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February 2017

Goals of this presentation

- **Introduce the genre** of research proposal, explain its importance
- **Explain the features** of each section of the SURF proposal
- Discuss **common mistakes** writers might make in each section
- Share **sample papers and experiences** from two successful proposals

Slides will be available on SFP website

Key Genre for Scientific Writers: the Research Proposal

Common goals of a research proposal:

- Introduce proposed research
- Provide background and explain rationale for study
- Describe methodology and explain its rationale
- Propose a timeline
- Propose a budget*
- Provide preliminary results*
- Anticipate outcomes and impact*

* These are not goals for a typical SURF proposal

Why do scientists write proposals?

1. **Intellectual reason**: The process of writing the proposal is a process of **idea creation and development**

2. **Rhetorical reason**: To **convince readers** that the project is worth the time, money, and energy it will demand from everyone involved

Why learn to write a good proposal?

- Most science and engineering research is expensive
- The majority of STEM research done at U.S. universities depends upon funding from external grants
- Most external grants are highly competitive

Rhetorical goals of the SURF proposal

1. Make the reader confident they understand **what you plan to do** in your research
2. Convince the reader that this work is **important and useful**
3. Convince the reader your plan for carrying out the work is **realistic** given the existing constraints
4. Assure the reader that **you** are **well-prepared** and capable of carrying out the plan

Proposal Parts

- Introduction/background
- Objectives
- Approach
- Work Plan
- References

Introduction/background

- What is the problem you are trying to solve? How did the problem arise?
- Why is solving this problem interesting or important?
- What previous work has been done to define and address the problem?
- How does your work fit into the larger ongoing work of your mentor? How will your work contribute to that larger project?
- Show familiarity with the existing literature through content and citation

Introduction/background: Possible pitfalls

- Too broad
- Too narrow
- Failure to articulate a problem clearly
- Failure to situate the problem in a narrative of previous research

Objectives

- What do you aim to accomplish? Be specific about what you will calculate, model, simulate, or study.
- What new things will we know once your research has been successfully completed?
- What assumptions or conditions will guide and/or limit your work?
- What are your criteria for success?

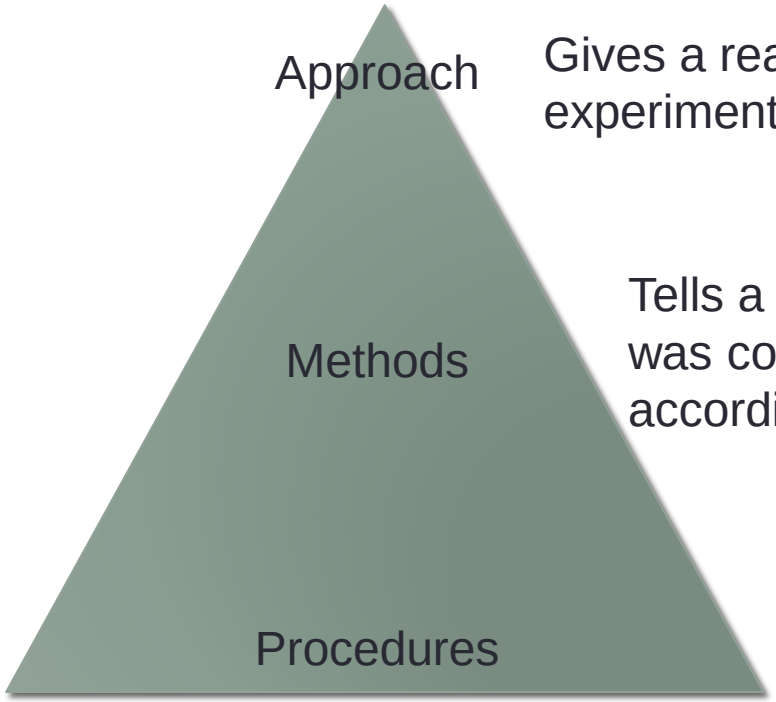
Objectives: Possible pitfalls

- Writing a personal statement
- Disjunction between introduction and objectives
- Lack of specificity
- Unrealistic objectives

Approach

- How will you accomplish your objectives? (Be specific.)
- What are the key steps or milestones for your work? How long will each take?
- What challenges do you anticipate, and how will you respond to them?
- What equipment or other resources will you need, and where will you get them?
- Who are your collaborators, and what do you need from them?

How does an approach differ from methods?



Gives a reader an introduction to how you plan to carry out an experiment (for grant proposals)

Tells a reader in considerable detail how an experiment was conducted, so that he/she can evaluate the data accordingly (for research articles)

Tells a reader in exhaustive detail how an experiment is to be conducted, so that it could be precisely carried out and replicated (maintained within a lab to ensure a successful experiment)

Approach: Possible pitfalls

- Needs equipment that may be unavailable
- Unrealistic given time frame
- Requires skills you do not yet have and which are difficult to learn
- Developed approach on your own, instead of in consultation with mentor
- Need assistance of a collaborator who may not be available

Work Plan

- Offer your reader a schedule of your principle activities and milestones

Work Plan: Possible pitfalls

- Unrealistic
- Insufficient detail

References

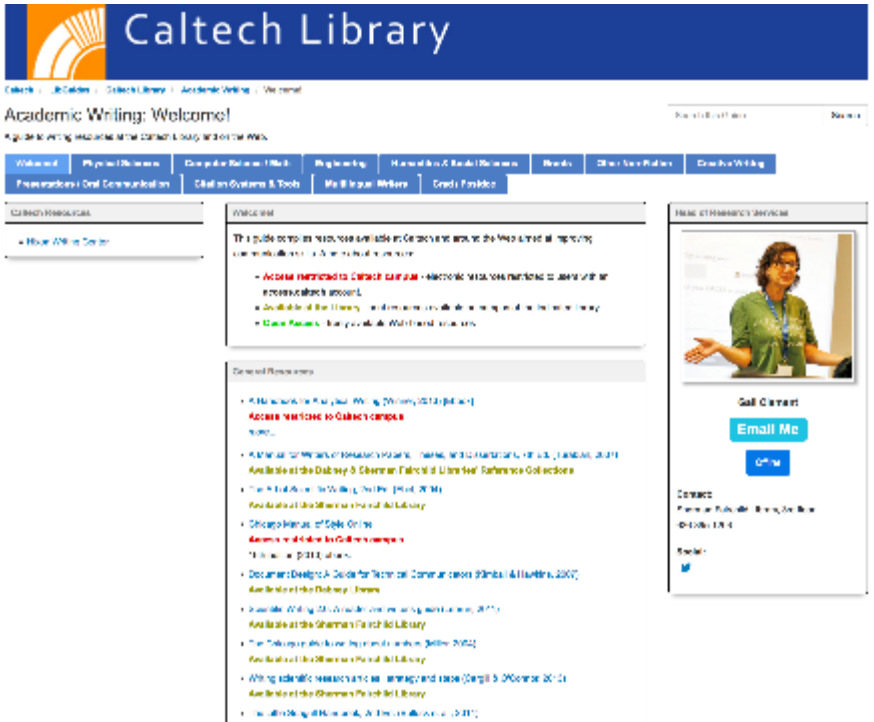
- List all research articles, review articles, and other writing you have consulted to prepare your proposal and use in-text citations as appropriate
  - Take careful notes to avoid plagiarism
- If you have incorporated writing or language from prospective mentors or peers, attribute those sources
- Use a consistent citation system, as recommended by your prospective mentor

Audience

- Prospective mentor: has high level of specialized knowledge)
- Outside evaluators: have area knowledge, but not detailed knowledge of the lab's ongoing projects
- Student-Faculty Programs Staff: non-scientists
- Reviewers will consider
  - Is the proposal well thought out?
  - Has the student given a clear statement of what s/he will do?
  - Does the student have the skills/knowledge/engagement to be successful?
  - Is the student likely to achieve the goals?
  - Is the project plan realistic?
  - Does the research have the potential for publication in a refereed journal or presentation at an academic conference?

Style

- Write in scientific English with the goals of clarity, concision, and accuracy
- Strive to communicate complex ideas in simple ways
- If writing scientific prose is new to you:
  - Talk to mentors
  - Talk to tutors
  - Study models
  - Consult guidebooks



http://libguides.caltech.edu/writing

What makes a SURF proposal challenging?

- Proposals are often written by experts in a field, rather than novices
- Writing about technical matters in a clear manner takes practice and revision, which take lots of time

Process

- Meet with mentors and/or co-mentors
  - Ask questions
  - Get references
  - Read papers
- Write a proposal draft
- Solicit feedback on your draft
  - From mentors
  - From peers or Hixon Writing Center tutors
- Revise
- Applications due February 22nd, 2017

Writing is not a linear process—it is a cycle of research, thinking, talking writing, responding to feedback, and revision

Support in the Hixon Writing Center

One-to-one tutoring by appointment (sign up via access.caltech.edu)

Additional support for SURF proposals

- Session A: **Drop in one-to-one tutoring** with peer tutors
  - Saturday, 2/11 12 p.m. – 2 p.m., SFL 328
  - No appointment needed

- Session B: **Small group workshops** led by peer tutors
  - Saturday, 2/18, 12 p.m. – 2 p.m., SFL 328
  - Make an appointment: http://writing.caltech.edu/workshops

Student experiences

- Roohi Dalal
- Tiffany Zhang

Questions, comments?

- Hixon Writing Center
  - Professional and peer tutors available for one-to-one conversations Sunday-Friday
  - http://writing.caltech.edu

- Student-Faculty programs office
  - http://sfp.caltech.edu/students
  - This presentation will be posted on the SURF website