WRITING AN EFFECTIVE SURF PROPOSAL

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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

- Project scope too broad
- Project scope 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?

<table>
<thead>
<tr>
<th>Approach</th>
<th>Methods</th>
<th>Procedures</th>
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<tbody>
<tr>
<td>Gives a reader an introduction to how you plan to carry out an experiment (for grant proposals)</td>
<td>Tells a reader in considerable detail how an experiment was conducted, so that he/she can evaluate the data accordingly (for research articles)</td>
<td>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)</td>
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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 feasibility and clarity of goals
Reviewers will consider

• Is the proposal well thought out?

• Do you give a clear statement of what you will do?

• If you have SURFed before, does your proposal demonstrate a higher level experience and depth?

• Is it likely that you will be able to make sufficient progress toward the project goals you outline?

• Does the research have potential for publication in a journal or presentation at a 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.
“When you draft from scratch, produce whatever you can as quickly as you can. Then start the most productive part of the writing task—revising.”

-Joseph Williams, author
SURF 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 22\textsuperscript{nd}, 2018

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

**COMMON BARRIERS TO WRITING:**

- Too Busy
- Prefer Pressure of a Deadline
- Afraid to Write Something Bad
- Don’t Know WHAT to Write
- Don’t Know HOW to Start

**TIPS TO OVERCOME WRITING BLOCKS:**

- **Start Small:** Set aside short but focused blocks of time for small steps/goals.
- **Invent Your Motivation:** Create an earlier deadline for yourself, & prioritize.
- **Collaborate to Motivate:** Schedule a meeting with a tutor, friend, or your mentor.
- **Write Anyway:** A rough, disorganized first draft is still a useful start!
- **Start with what you know:** Start writing the easiest content or section you know the most.
- **Determine what you don’t know:** Figure out what you still need to learn or brainstorm.
Support in the Hixon Writing Center

Make **one-to-one tutoring appointments** with our STEM Writing Specialists, Generalist Writing Specialists, or peer tutors (sign up via [access.caltech.edu](http://access.caltech.edu))

**Drop in one-to-one tutoring** with peer tutors
- Sunday 2/11, 3-5 p.m., SFL 326
- Sunday 2/18, 3-5 p.m., SFL 326
- No appointment needed—first come, first served
- Pizza will be served
Student experiences

• Alex Wuschner
• Sarah Steele
Questions, comments?

• Hixon Writing Center
  • http://writing.caltech.edu
  • writing@caltech.edu

• Student-Faculty programs office
  • http://sfp.caltech.edu/students
  • sfp@caltech.edu

This presentation will be posted on the SURF and HWC websites