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
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. Clearly explain **what you plan to do** in your research
2. Make the case that this work is **necessary/useful**
3. Show that you have a **realistic plan** for carrying out the work
4. Demonstrate 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?

- **Approach**: Gives a reader an introduction to how you plan to carry out an experiment (for grant proposals).

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

- **Procedures**: 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

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 academic 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, 2016

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

• Small group workshops in the Hixon Writing Center
  • Session A: Tuesday 2/17, 4-4:50 p.m.
  • Session B: Sunday 2/21, 12-1:30 p.m.

• Details regarding sign-up at writing.caltech.edu/students/workshops
Student experiences

• Xiaomi Du
• Suchita Nety
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