

EE 590
Scientific Research Methods
and Ethics for Engineers

Week 3 Course Notes

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Topics

- Proposing a work
- General proposal outline
 - Introduction
 - Background
 - Problem description
 - Proposed work
 - Work plan
- Ingredients of a proposal – making your case
- Proposal do's and don'ts



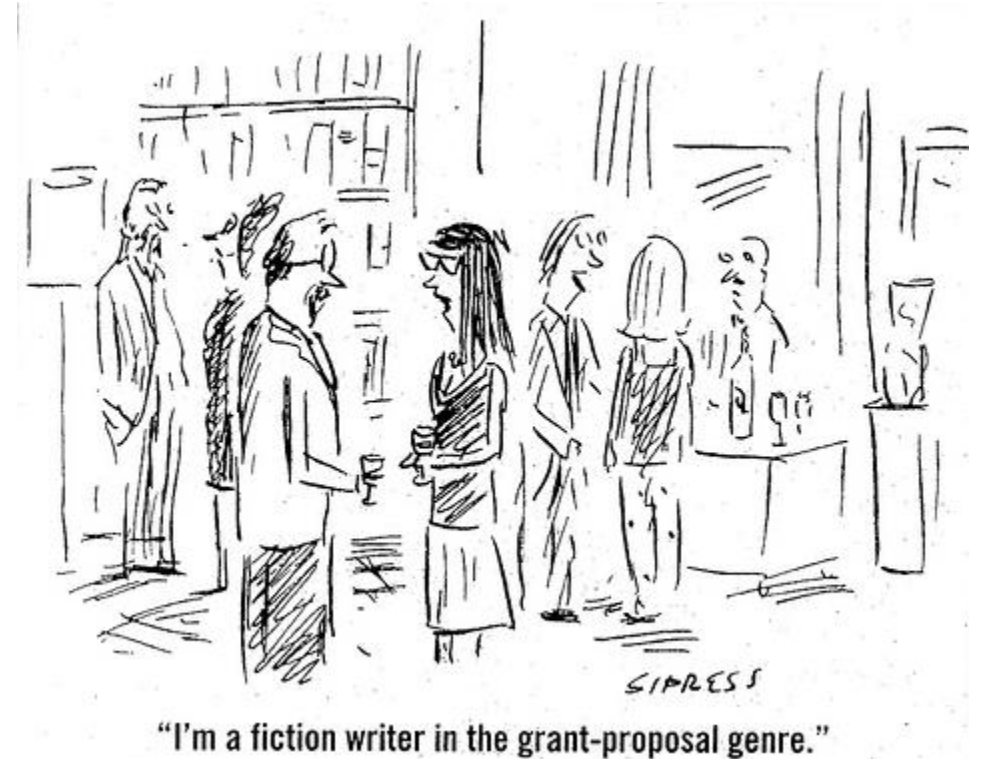
What's being proposed here?

Proposing a Work

- In academic as well as professional life, all work begins with a **written** proposal
 - Academic proposals include
 - **Grant proposals** that offer to carry out scientific research in return for funding 
 - **Thesis proposals** that offer to carry out scientific research in return for a graduate degree 
- The proposal specifies the work to be carried out to **address a specific problem**
 - which problem is going to be addressed
 - how it will be addressed
 - ...

Proposing a Work

- When you submit a proposal, it
 - acts as
 - an offer in your part to carry out a work
 - a promise that you will solve the corresponding problem in a satisfactory manner
 - implies that you will be dedicated to finish the work you offer to carry out as specified
 - You have to «talk the talk and walk the walk»



Source: Reality Check by David Sipress

Proposal Constituents

- A proposal must contain sufficient detail to answer the following questions:
 - What is the problem, and why is it hard?
 - How is it solved today?
 - What is the new technical idea and why should it perform better?
 - What happens if successful?
 - What work will be done and how will it be organized?
 - How will the progress be evaluated?
 - What will it cost?*

*Not required for academic thesis proposals

Outline of a Proposal

- The text of a proposal is typically organized into sections that are aimed at highlighting the different aspects of the proposed work
- The names and orders of these sections may vary from one proposal-accepting agency to the next
- Still, a basic outline would include the following sections in some manner, shape or form:
 - Abstract
 - Introduction/Problem Description
 - Background/Literature Review
 - Impact
 - Method
 - Work Plan
 - Budget

Outline of a Proposal

- Abstract:
 - Presents a general summary of
 - What the problem is – **the principal aim**
 - How it will be addressed – brief work description and division into several **specific aims**
 - What will be achieved at the end – **outcome**
 - How it will affect the way things are done now – **potential impact**

Note: Abstracts are generally considered as freely distributable; so, no proprietary/sensitive information is allowed

Outline of a Proposal

What is the problem, and why is it hard?
What is the new technical idea and why
should it perform better?

- Introduction

/problem description:

- A summary description of the main field of study
 - To put things into perspective
- A detailed account of what the problem addressed in the proposal is
 - The problem must either be novel (not addressed before) or yet unresolved (without a satisfactory solution as of now) for scientific merit*

*Not particularly relevant for term paper proposals for undergraduate classes

Outline of a Proposal

How is it solved today?

- Background/literature review:
 - A detailed description of the previous approaches and methods that addressed the problem and/or similar problems – **scientific literature**

Note: Displaying a detailed knowledge of the relevant literature is essential to convince people that you know what you are saying

Outline of a Proposal

What happens if successful?

- Impact:
 - The underlying assumption in proposing a work is the importance of the corresponding problem
 - Since the problem is an important one, a satisfactory solution must be changing things for the better in a substantial manner
 - The evaluators of the proposal must be convinced of that
 - This requires a **detailed projection of how things will be improved** once the proposed work is completed successfully

Outline of a Proposal

- Method:
 - The specifics of the work carried out must be provided in the Method section of the text
 - This requires a sufficient level of detail for each and every step of the proposed work
 - Along with preliminary results indicating that the approach that will be followed is expected to be successful
 - Explanations, mathematical derivations, graphical illustrations,...
 - A picture is truly worth a thousand words

What work will be done and how will it be organized?
How will the progress be evaluated?

Note: Ambiguity in the Method section cannot be tolerated!!!

Outline of a Proposal

- Work plan:
 - Carrying out the work detailed in the Method section takes time and effort
 - A detailed work plan is needed to specify the time periods when a specific step will be accomplished along with the generation of intermediate results
 - that will help monitor the work progress according to the plan
- What work will be done and how will it be organized?
How will the progress be evaluated?

Outline of a Proposal

What will it cost?

- Budget:
 - Outside of thesis work, research projects cost real money
 - Thesis work also costs money, but it is the thesis advisor's responsibility to get it
 - The project evaluators must know how much they will have to spend to get the proposed work done

Proposal «Do»s and «Don't»s

- The essential economy of a work proposal:

The potential outcome must be worth the time and effort and the discomfort (and the money) put into it

- Two basic principles:
 1. Write concisely, otherwise people will not read it
 2. Write plainly and clearly, otherwise people will misunderstand it

Proposal «Do»s and «Don't»s

- Proposal no-no's:
 - Making simple typographical, grammatical or pagination errors
 - Straying from the format requested by the granting agency soliciting the proposals
 - Lying or misrepresenting* the scientific/technical background, previous work, capabilities, etc..
 - Missing the submission deadline

* Plagiarism is also unacceptable → presenting someone else's idea as your own



Source: <http://www.gocomics.com/moderately-confused/2008/05/08>