Science writing major assignment: research proposal

Draft due 15 May, final due 5 June

March 6, 2020

Applying for research funding is a common task for scientists around the world. In this assignment, you will write a research proposal for your Honours project, in the style of a funding proposal.

Imagine you are applying for a $15,000 scholarship to cover your living expenses while you complete your Honours project (this is not uncommon in other countries). To win the scholarship, you have to submit a proposal explaining what you are planning to study, why, and how you will complete the project (within the timeframe for Honours).

Your goal is to convince the reader, a physicist not in your field, that your project addresses an interesting problem, that you are developing an understanding of the relevant physics, and that your project is well planned out and likely to succeed.

This should be a useful exercise because it requires you to demonstrate your knowledge of the physics of your project, plan out (with your supervisor) how you will complete the project, and communicate this information persuasively to a general physics audience.

Since this assignment is based on a funding proposal, we are going to follow the rules of funding proposals. You will follow a strictly defined format, given below, and you will group information under an imposed set of section headings. How you organise information within these headings is up to you. The proposal will be assessed against a set of criteria, also given below.

Getting feedback on your writing is important to help you make improvements. So, you will submit a draft version of your proposal on the date given above. It will be read by a volunteer physicist, who will give you feedback. You can then revise your report into its final version.

Proposal format

The proposal must be no more than 5 pages, including references. Any content over this limit will not be assessed. All pages must be formatted as follows:

- Single column, single spaced
- Margins no less than 1 cm on all sides
- All text except references must be in 12 pt Computer Modern/Times New Roman, or equivalent serif font.
- References can be in 10 pt font.
- Figures and equations are permitted. Both should be appropriately referenced in the text.
- References (no more than 20) are required. Any common numbered referencing style can be used.

Sections

The proposal must have the following sections, in this order: Title, Author, Supervisor, Context and aims, Background, Project description, Project plan and feasibility, References.

The content of these sections is described below. Some sections will be longer than others.

Title

Give the title of your project

Author

List your name and U number

Supervisor

List your supervisor(s) and their department

Context and aims

Introduce the field, motivate your project and identify what problem you are solving or what you will be doing. Clearly state the aims of the project. This, and the rest of the proposal, should be readable to a non-specialist physicist. It should be similar in style to the short introductions often used for Honours/PhD theses. Ask your supervisor or us for an example if you are unsure of this style.

Background

Present the background information necessary to understand your particular project. This should involve, for example, surveying/evaluating previous work and describing underlying theory. Make sure the background is directly relevant to your project.

Project description

Describe, as concretely as possible, what you are going to do in your project and how you will achieve the aims stated in the first section. Justify the methods you have chosen (e.g. why that technique, and not another? Why that class of materials?). Explain how your project fits into what has been done in the field. Make sure you clearly differentiate what is new, original research, and what is redoing what has been done before.

Project plan and feasibility

Give a breakdown of how you are going to spend your time. For example, time might be spent reading literature/ working through basic problems, training on equipment, doing various different experiments/performing original theoretical calculations, analysing data, writing your thesis. Indicate where other people need to be involved in the project. For example, you might need a technician to build something, or you might be supervised in the lab by a PhD student for a specific experiment.

Evaluate your project and consider whether it can be completed in the time available to you. Identify any major roadblocks and suggest alternate plans, if necessary. For instance, has all the equipment been purchased, and is it all available when you need it? Is your primary supervisor going overseas during an important time and do you have a plan for continuing to make progress?

References

List all references in a numbered reference style.

Marking criteria

In the proposal, we are looking to find out if you have a good understanding of the project and the plan for completing it, and if you are able to communicate this information clearly to a general physics audience. Markers will be asked to consider the following questions:

- Is the proposal clear and logically structured?
- Is the proposal written at a suitable level?
- Is the proposal written to a professional science standard (spelling, grammar, formatting including equations, figures, tables, word choice etc)?
- Is the project well motivated?
- Are the aims clear?
- Is the background information both sufficient and relevant?
- Does the proposal clearly explain how the aims will be achieved?
- Are figures or tables used appropriately to complement the text?
- Has the feasibility of the project been well-justified?
- Is information referenced appropriately?
- Would you fund this project?

Hints and tips

- This is a piece of persuasive writing – you want to convince the reader to fund your project. But, as a scientist, your tools of persuasion are evidence (appropriately backed up) and logic.
- Make sure the aims are concrete, and reasonable given your expertise and the time limit of the project. You are not going to be "building a 10-qubit quantum computer" or "detecting new superheavy elements" in an Honours project.
- Clearly delineate your work, and your role, from that of others. It is fine that you don't do everything yourself, but it should be obvious what you will do. E.g. you will "work with PhD student Smith to design an optical cavity former, which a technician will build" or "My supervisor

Jane Williams took the raw data for the project during a beamtime run in January. I will process and analyse the data, and fit it to the model in Equations 2-7".

- Concentrate on including only necessary information. Make clear why it is important for your particular project. Avoid the temptation to reproduce background material from other work, since it is likely much of it is not necessary for your particular project.