Slides taken from and occasionally modified from https://simon.peytonjones.org/great-grant-proposal/

How to write a grant proposal ...that gets funded

Simon Peyton Jones
Epic Games

March 2023

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How to write a project proposal ...that gets you an M.Sc.

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Edits for IPP:
J Douglas Armstrong, February 2025

Academic Research Grant
Doing research needs funding human resources, equipment, time…

Commercial R&D Project
Use company time and resources to develop product

Informatics Project Proposal
Use supervisor time and UofE resources to get M.Sc.

These are all just sales pitches.

Your job is to convince the reader to part with a resource/money against a promise that it will be put to good use.

Sales happen at one or more of three levels:

Head: This is clever and solves a problem.

Heart: The world be a better place

Wallet: You will end up with more money

The state of play

- Even a strong proposal is in a lottery for resource; but a weak one is certainly dead

- Many research proposals are weak

- Most weak proposals have readily-fixable flaws

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Audience

- Your proposal will be read **carefully** by one or two **experts**. (your supervisor/s). You must convince them.

- But it will **certainly** be read **superficially** by **non-experts**… and *they* will be decision makers / markers. You absolutely must convince them too.

- Some influential readers (external examiners, auditors) will give you one minute max.

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The vague proposal

1. I want to work on better type systems for functional programming languages
2. **Give me the money**

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The vague proposal

1. I want to work on better type systems for functional programming languages
2. **Let me do my M.Sc. Project..**

Give me the money –> Let me do my project
Hopefully you get the idea now, I won't keep doing these in future slides.

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The vague proposal

1. I want to work on better type systems for functional programming languages
2. **Give me the money**

You absolutely must identify the problem you are going to tackle

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The vague proposal

So what? Why should I care?

1. I want to work on better type systems for functional programming languages
2. **Give me the money**

You absolutely must identify the problem you are going to tackle

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Identifying the problem

- What **is** the problem?
- Is it an **interesting** problem? That is, is it research at all?
- Is it an **important** problem? That is, would anyone care if you solved it? (this is known as **impact**)
- Having a "customer" helps

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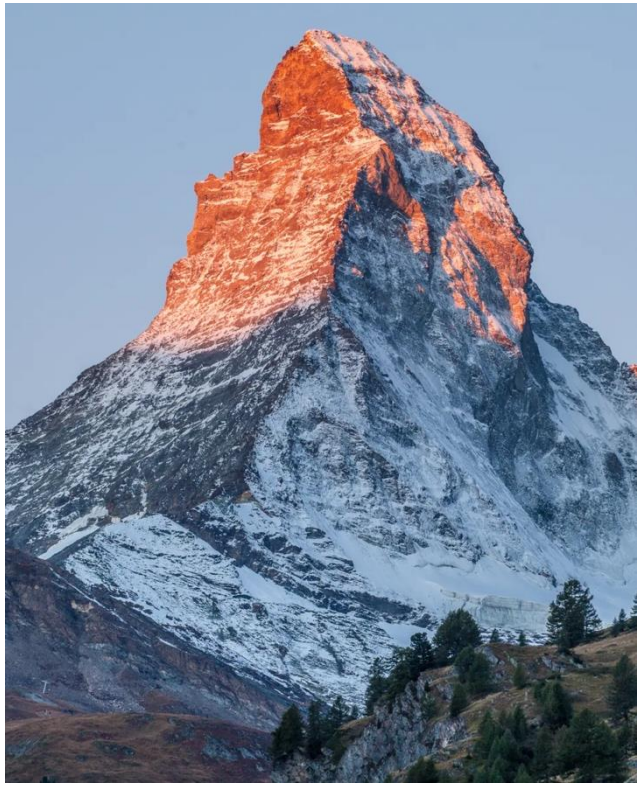
Why is Impact important?

If we perceive our role aright, we then see more clearly the proper criterion for success: a toolmaker succeeds as, and only as, the *users of their tool succeeds* with their aid. However, shining the blade, however jewelled the hilt, however perfect the heft, a **sword is tested only by cutting**. That swordsmith is successful whose clients die of old age.

Fred Brooks "The Computer Scientist as Toolsmith", Comm ACM 39(5), March 1996

The aspirational proposal

1. I want to solve the problem of avoiding deadlocks and race conditions in concurrent and distributed programs
2. **Give me the money**



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The aspirational proposal

1. I want to solve the problem of avoiding deadlocks and race conditions in concurrent and distributed programs
2. **Give me the money**

It is easy to identify an impressive mountain

But that is not enough: you must convince your reader that you stand a good chance of climbing **part of** the mountain

Lots of dead bodies

Identify your contribution

- **Wider context**: Explain the path to the big goal
- **Specific Objectives:** Explain your role in solving one of those steps
- **Why you and why now?**

Your idea

- Identify a promising pathway up the mountain: give real technical "**content**", so an expert reader could (without reading your doubtless-excellent papers / CV etc) have some idea of what the idea is
- Offer objective **evidence** that it's a **promising** idea:
  - Results of preliminary work
  - Prototypes
  - Publications / Other literature
  - Applications
- Many, many proposals are buzz-word-compliant, but lack almost all technical content. **Reject**!

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The I'll-work-on-it proposal

1. Here is a (well-formulated, important) problem
2. Here is a promising idea (…evidence)
3. We're a great team (…evidence)
4. We'll work on it
5. **Give me the money**

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The key question
How would an unbiased observer know if your research had succeeded?

i.e., aims & objectives

Suspicious phrases

- “Gain insight into…”
- “Develop the theory of…”
- “Study…”
- “Produce a database of…”

The trouble with all of these is that there is no way to distinguish abject failure from stunning success.

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Good phrases

- “We will build an analyser that will analyse our 200k line python program quicker than package X”
- “We will build a prototype walkabout information-access system, and try it out with three consultants in hospital Y”

The most convincing success criteria involve identifiable “customers”

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Related work / background

- **Goal 1**: demonstrate that you totally know the field. Appearing ignorant of relevant related work is certain death.
- **Goal 2**: a spring-board for describing your promising idea

- But that is all! **Do not spend too many words on comparative discussion**. The experts will know it; the non-experts won't care.

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Methodology and work plan

Work Package 2.1(a):
Use the Leo2 prover to build a detailed model of endomorphic defibrillators. Survey competing approaches. This work will take 3.5 weeks.

- Concentrate on (a) your idea, and (b) your aims/objectives/success criteria. We trust you to manage the minute details
- But if there is research risk in some aspect, you must describe those, and fall-back positions

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The ideal proposal

1. Here is a problem
2. It's an important problem (evidence…)
3. We have a promising idea (evidence…)
4. We are a world-class team (evidence…)
5. Here is what we hope to achieve, and how we'll know if we have succeeded.
6. Here is a sketch plan of how we're going to get from our idea to that destination
7. **Give us the money. Please.**

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The ideal proposal

Say all this as quickly as possible.
Assume that your readers will read no more

1. Here is a problem
2. It's an important problem (evidence…)
3. We have a promising idea (evidence…)
4. We are a world-class team (evidence…)
5. Here is what we hope to achieve, and how we'll know if we have succeeded.
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The Heilmeier Catechism

George Heilmeier
DARPA director
1975-77

- What are you trying to do? Articulate your objectives using absolutely no jargon.
- How is it done today, and what are the limits of current practice?
- What is new in your approach and why do you think it will be successful?
- Who cares? If you are successful, what difference will it make?
- What are the risks?
- How much will it cost?
- How long will it take?
- What are the mid-term and final “exams” to check for success?

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The Most Important Thing

- Above all, convey your enthusiasm for your field.

I have this amazing idea and I'm going to change the world. All I need is the chance to do it.

Writing a research proposal

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Attend the tutorials

- Most of the key elements of IPP are covered there
- Exchange ideas with classmates
- Get input from tutors

Talk to your supervisor

- Refine idea
- Discuss specific methods and approaches

Read the rubric

- Understand what you **must** include to pass IPP
- Understand how IPP is going to be marked.

Use the template

- Stops you missing an essential section
- Means markers know where to find everything.

Help each other

Ask others to read your proposal critically
Revise, and ask someone else
Repeat. Repeat. Repeat.

- Cheap: what someone thinks after a 10-minute read is ***really really*** Important
- Informative: after reading 20 proposals by others, you'll write better ones yourself. Much better. Much, much better.
- Effective: dramatic increases in quality. There is just no excuse for not doing this. And yet few people do that

Educate your proof readers

- Give them a check-list of things to look for
- Strongly discourage them from correcting spelling and grammar, except just before submission
- Ask them to spend **30 minutes max** reading. A proposal MUST convince fast.
- Then get their feedback through a face-to-face **conversation**.
  - Friend: “I didn’t quite understand X”
  - You: “Oh ,I meant that Y and Z”
  - Friend: “Aha… why don’t you just write that down?”

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Rubric

Assessment Item	FAIL / insufficient	PASS/fair	PASS/good	PASS/excellent
Motivation and Background	No attempt is made at the work or, a cursory attempt is made that fails to cover the literature provided by the proposer or does not demonstrate even superficial inderstanding of the relevant literature to the extent that the understanding of the project is doubtfull.	A title, brief relevant motivation statement and techically correct summary of the essential literature are provided. Some aspects of the literature review may be vague, incorrect in details or demonstrste limited undertanding but there is sufficent understanding to make a start.	As fair but the depth of unsterdanding of the literature is more extensive and correct in detail OR there has been a significant effort to extend the literature beyond that initially provided by the proposer	As good but BOTH the depth and extent of the literature review are excellent.
Method / Approach	It is not clear to the reader what the research methodology to be used will be	The methodology is described in sufficient detail to understand what the research approach will be and why it is relevant to the topic. It may be fairly high level and lack a wider appreciation of alternative methods. A basic evaluation plan is in place.	As fair but the evaluation criteria will be more convincing and the expected outcomes clearly defined.	As good but the methodology will be more reobustly described with consideration of alternative approaches and a convincing argument provided for the best approach for the research. Otherwise all aspects will be convincing.
Research Plan	The research plan does not describe a coherent plan of work for the projects or ignores any obvious risks.	The workplan contains a breakdown of the project into three or more tasks with an approximate timeline, at least one milestone and a Gannt chart. The plan will be broadly sound but may contain minor inconsistences. The risk analysis is present but likely not fully developed.	As fair but the workplan is more fully developed with no major inconsistencies and the risk/mitigation plan, dependancies and needed resources are more mature	The implementation plan is comprehensive in every respect and very convincing.
Responsible Research	The assessment of the ethical implications of the research is missing or is not sufficient.	Ethics at a minimum have been considered appropriately for the project. There is a wider consideration of some other aspects of responsible research siuch as a data management plan or software license scheme.	As fair but the wider aspects of responsible research have been comprehensibely addressed with all relevant aspects described competently.	As good but the the analysis of responsilbe research shows a more impressive depth of understanding with potentially new areas identified by the student.
References	Citations and/or references are incorrect or missing	Citations and literature are mostly cited correctly	Literature and citations are correct	n/a

To pass, all 5 aspects should achieve a PASS/fair mark.

A good or excellent in any section can compensate for a single fail/insufficient

DRAFT

IPP Checklist	Draft	Complete
I have a project title		
I acknowledge the University's guidance and policies on plagiarism / scholarship and realise the work I submit for IPP must be my own.		
I have clearly stated the problem that needs to be solved.		
I identified the aims and objectives of the project.		
I have a clear motivation statement that provides a reason why a reader might want to read the rest of my project proposal (including significance, feasibility and beneficiaries)		
I have a concise literature review that covers the essential background.		
I have described the approach/methods I want to use to address my research question.		
I have explained why I think the approach/method is appropriate		
I have outlined the approach I will use to evaluate my research findings		
I have summarized the expected outcomes of my project		
I have a narrative description of the high-level tasks.		
I have estimated the time each task will take and provided brief justification for why I think it will take this time and if there is uncertainty around the time a task might take, I have made this clear		
I have identified dependencies between tasks		
I have identified one or more milestones in the plan that I can use to check the schedule is on time or trigger corrective action if running late		
I have identified any resources that my project will need to access		
I have a combined the plan narrative into a graphical Gannt chart		

DRAFT

Additional slides I chose not to use at https://simon.peytonjones.org/great-grant-proposal/

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