

**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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<https://simon.peytonjones.org/great-grant-proposal/>

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

Simon Peyton Jones  
Epic Games

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March 2023

### **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

# 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.

# The vague proposal

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

# 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.*

# 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



# 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

# 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

# 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**



# 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

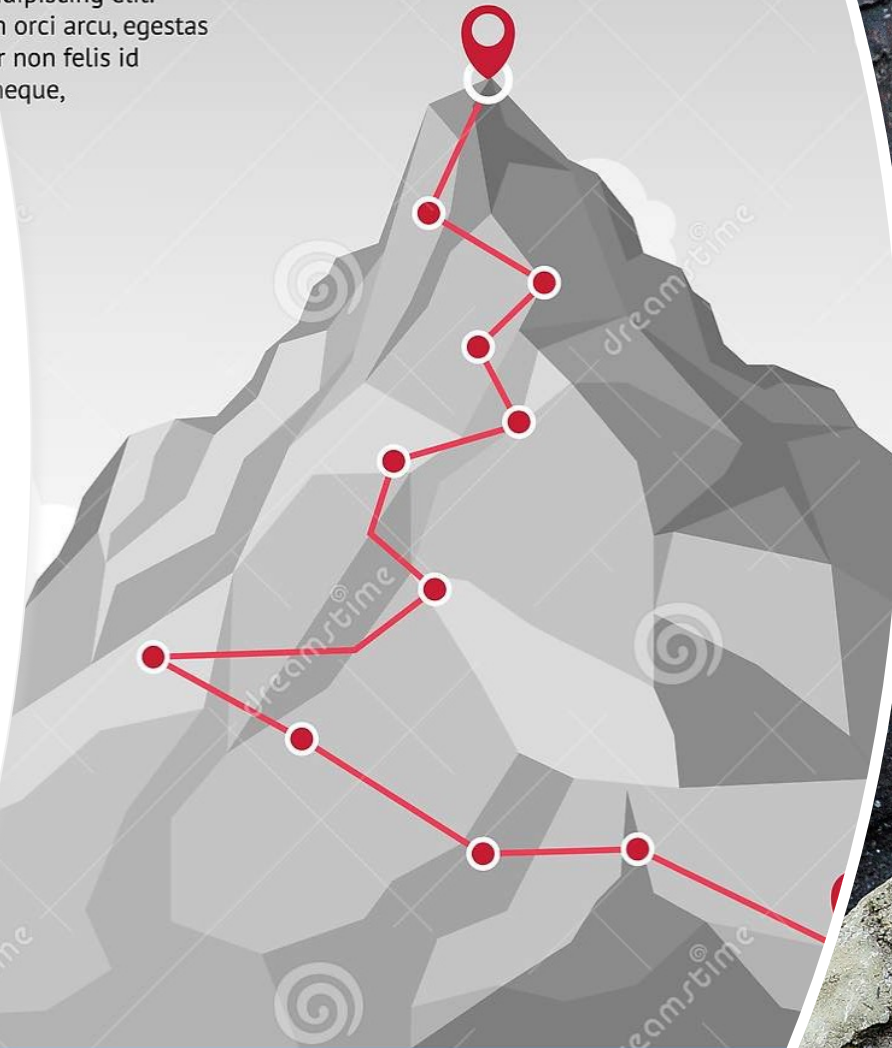


# Identify your contribution

- **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?**

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# 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!**

# 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**



# The I'll-work-on-it proposal

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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.

# 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”

# 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.

# 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

# 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.**

# 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...)
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5. Here is what we hope to achieve, and how we'll know if we have succeeded.
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# The Heilmeier Catechism

- 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?



George Heilmeier  
DARPA director  
1975-77



# 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

Largely taken/modified from <https://simon.peytonjones.org/great-grant-proposal/>

## 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?"