Grants and Grant Writing

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Why should you apply for grants?

- You may actually need money for your PhD project

- To gain experience in conceiving and selling ideas

- To gain a key skill that will be useful in your career

- To improve your CV

Why should you apply for grants?

Who here has applied for a grant?

What was the grant?

What kinds of grants are out there?

- Small grants – most likely the ones you will target

- Fellowships

- Major research grants / seed grants / network grants

- Targeted grants versus blue skies

Grant Writing Advice Part 1

- Read the call very closely, multiple times

- Follow the rules exactly, including formatting requirements

- Study the funder

- Use language from the call and funder in your proposal

https://studentspace.org.uk/
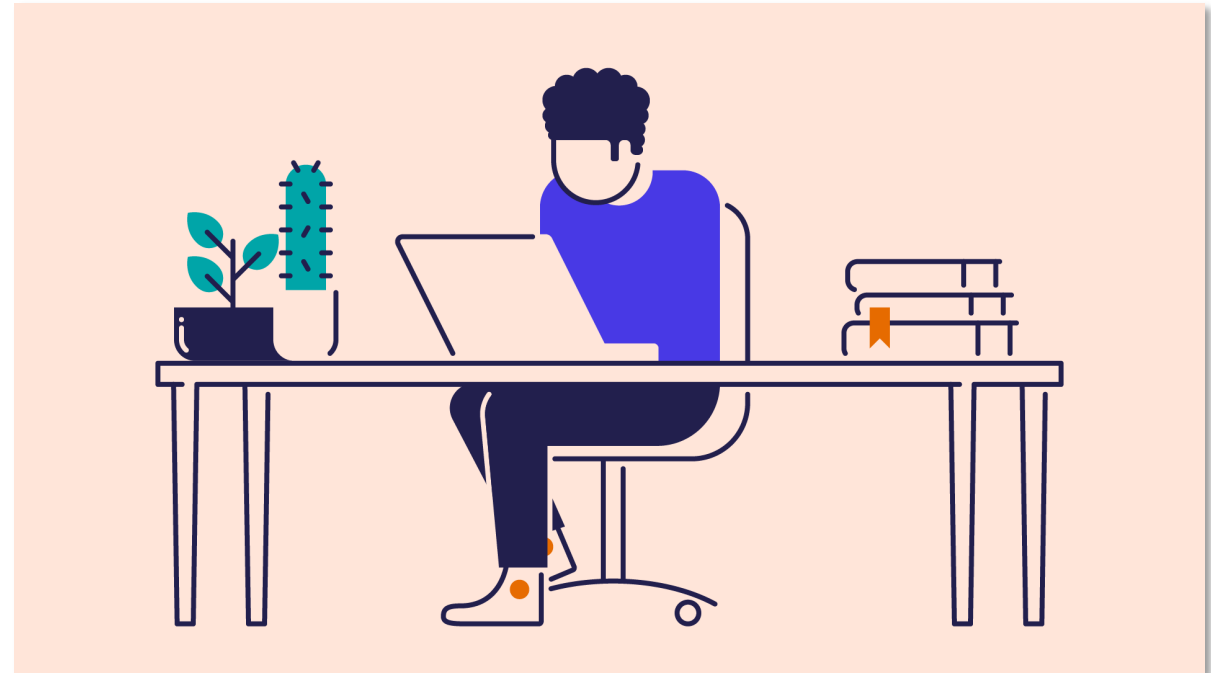
Grant Writing Advice Part 1

- Find some examples of previous successful proposals

https://dictionaryblog.cambridge.org/

Structure of grants

- Summary / abstract
- Define the knowledge gap / need / pain
- Goals and objectives
- Methodology
- Preliminary results / proof of concept
- Timeline / gantt chart / milestones
- Project management
- Outputs and evaluation
- Risk mitigation
- Budget
- References

Structure of grants

Summary / abstract

- Have a well-balanced summary that both convinces on importance of work and makes clear what you will do
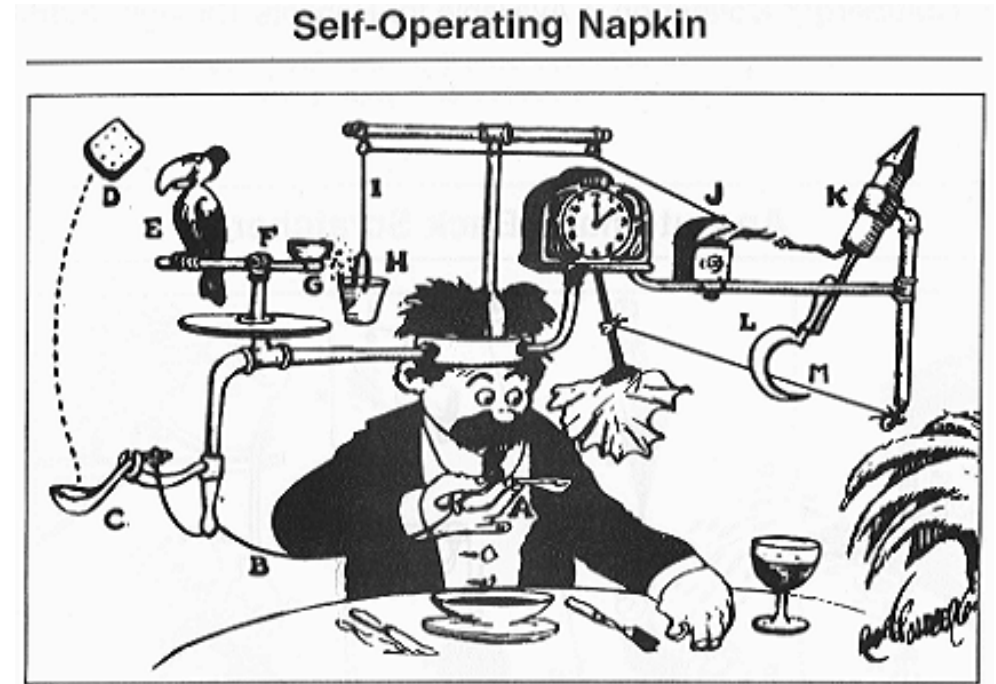
Structure of grants

Define the knowledge gap / need / pain

- This is quite possibly the most important part of proposal

- The 'pressing need' should align with funder's goals

- What do I mean by pain?

- Best if filling knowledge gap eases pain

- Criticise previous work, but remain positive

Structure of grants

Goals and objectives

- Have some simple and clever way to solve the problem

- But, simplicity trumps cleverness

- Novelty is good, but not essential

Self-Operating Napkin

https://en.wikipedia.org/wiki/Rube_Goldberg_machine

Structure of grants

Methodology

- Level of detail depends on grant, but often great detail not necessary. You just need to be convincing.

- This part is important, but not as important as you might think.

- Needs to be achievable. See previous slide on simplicity.

Structure of grants

Preliminary results /
Proof of concept

- Good chance for nice figures in grant

- Trade-off between showing feasibility and need for more money

Reasons to write a proof of concept (POC)

Less waste

POCs prevent you from **dumping resources into projects** that are unlikely to succeed.

More funding

Investors are **more likely to fund a project** that has been proven viable.

Better planning

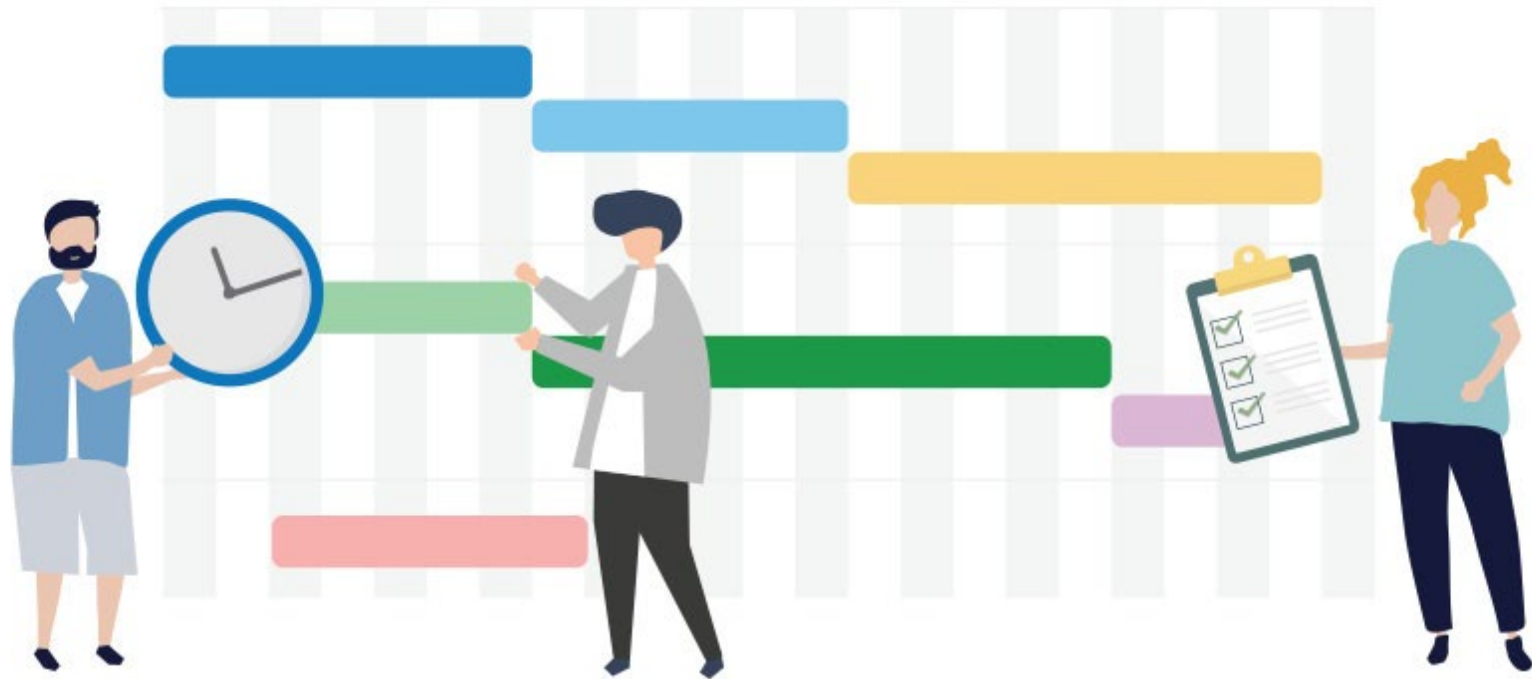A POC will make you **think about project logistics** before you even get started.

Fewer roadblocks

Challenges to viability will stick out to you when writing a POC and can **inform project direction.**

_zapier

Structure of grants

Timeline / gantt chart / milestones

- What do I mean by milestones?

Structure of grants

Project management

- Who will manage whom?

- Who ensures the work gets done?

- Which people collaborate on which objectives?

- How is project monitored (and potentially evaluated)?

Structure of grants

Outputs and evaluation

- This is more than just journal articles

- How useful for the academic community, other communities?

- Will you do any outreach / dissemination?

- What will be the impact of the project?

- Read the grant call and funder's objectives again

Structure of grants

Risk mitigation

- What challenges / problems might you encounter?

- What could cause the project to fail?

- What plans do you have in place
  if A or B goes wrong?

https://drawception.com/game

Structure of grants

References

- These will often be micro-formatted to fit space

- Should not be a literature review, but you want to show you have done your homework and are aware of preceding relevant work

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What is missing here?
-personnel & institution
-background

Grant Writing Advice Part 2

What are the key features of successful proposals?

What makes for a well-written grant?

Grant Writing Advice Part 2

Repetition is OK

- Grant likely will have a summary or abstract. Nevertheless, the first paragraph of main text should summarise it.

- Then, the first page of the grant should summarise the whole grant, including background and objectives.

- You may have summary of methods under objectives before the more-detailed methods section.

- You will mention key outputs/results multiple times.

Grant Writing Advice Part 2

Follow general scientific writing advice

- Write from the reader's perspective – give them text and content where they expect to find it.

- Use active voice and short sentences (17-23 words).

- Short paragraphs with clear topic sentence at top (reviewers will be skimming the proposal!)

- Use sub-headers, italics, bolding and underline to emphasise key text and ease transitions.

Grant Writing Advice Part 2

Follow general scientific writing advice

- Keep it simple and understandable by non-experts

- Avoid long blocks of dense text – less is more

PhenoChange will launch a trans-continental network to monitor plant phenology of the dry tropics. Currently, controls on the timing of leaf display and the associated fluxes of energy and matter are a major uncertainty in earth system modelling [32], particularly for the dry tropics [35], limiting projections of vegetation responses to climate change. Tropical dry biomes, which cover 18% of the global landmass, are critical to climate-vegetation feedbacks but are still understudied [36]. The recently launched IPCC Report 6 - WGII [37] highlights the relevance of phenology and the persistent lack of information from tropical regions. Likewise, the UNEP Frontiers 2022 report [38] describes phenology mismatches as a frontline research topic. A critical barrier to progress has been the lack of coordinated and geographically representative phenology data [39]. New technologies, specifically near-surface phenology - the use of repeated images from digital cameras, or PhenoCams [20,40], will allow PhenoChange to overcome this barrier. PhenoChange will provide the first cross-continent, standardised observations of the phenological behaviour of tropical dry vegetation, and lay the foundation for funding of a fully pan-tropical network.The use of digital cameras to repeatedly capture images of vegetation over days and years has revolutionised phenological monitoring, yet globally linked PhenoCam networks have limited coverage in the dry tropics, particularly in Africa (Fig 1). This gap is problematic because the vegetative phenology of terrestrial ecosystems underpins their role in carbon, hydrological and fundamental biogeochemical cycles [41]. When leaves flush, in what quantity and how these patterns vary across different components of the ecosystem (e.g. trees versus grasses) determine fluxes of mass and energy, in particular controlling the acquisition phase of the carbon cycle [21,41]. In order to reduce uncertainty on the role of terrestrial vegetation in carbon budgets, detailed knowledge of phenological patterns is essential [18,32,41]. This is particularly true in the dry tropics, which are the most annually variable and poorly constrained terrestrial carbon flux [42], and where the basic processes controlling phenology are disputed [10]. The PhenoChange project will fill this critical gap by initiating a global network of camera-based phenological observation in the dry tropics, beginning with an exemplar set of sites across rainfall gradients in South America and Africa (Fig 1), continents which together hold ~80% of the dry tropics [36]. There is an urgent need for systematic monitoring across landscapes and continents to determine how and why leaf phenology in tropical dry ecosystems (TDEs) varies in space and time. The uniting environmental characteristic of the dry tropics is high seasonality to water availability, yet different TDEs vary markedly in their phenological response to this [21]. The trees in some TDEs leaf out months *before* the rainy season begins, while trees in other TDEs only leaf out after the rains arrive [10,43]. Some TDEs (savannas) have an ecologically significant grassy component that displays divergent phenological timing from trees, whereas other TDEs (e.g. dry forests and thickets) have no biogeochemically meaningful grassy component. This heterogeneity in phenological behaviour is poorly described, with mechanistic underpinnings poorly understood.

Phenological metrics for TDEs derived from satellite data are not currently fit for purpose to directly enter earth system or biogeochemical models [32], or document how TDEs are changing in response to climate change. They cannot reliably distinguish tree from grass signal in savannas [44]. They miss critical observations during the rainy season, or other times when there is cloud cover [45]. They are often too coarse spatially and temporally to monitor change at the ecosystem level [46]. PhenoChange is motivated by the key role for PhenoCams in providing standardised, near-earth observation data on the phenological timing of TDEs, with downstream implications for earth system models, and monitoring and predicting TDE responses to climate change.

Objectives Obj 1) Establish a multi-site and multi-layer PhenoCam system across two continents. We have selected three sites in Brazil that are paired with three in Africa along a rainfall gradient. The Brazilian sites are part of the broader e-Phenology network led by PP Morellato and already have some cameras installed, but only for monitoring the tree canopy. We will install additional cameras to monitor the herbaceous layer in Brazil, and a full set of cameras to monitor both the tree canopy and herbaceous layer at African sites.

Obj 2) Determine how tree versus grass signal influences phenological metrics calculated from Earth Observation (EO) data. Trees and grasses can differ in phenological timing [21,44]. This can cause problematic inferences if EO data are naively fed directly into biogeochemical models [46]. For example, some studies have taken phenological metrics from EO data as

Grant Writing Advice Part 2

Other key advice

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- Allocate the time necessary to write an excellent grant

- Get feedback on multiple drafts of the proposal

What grants can you apply for?

- Grants from the DTP (ORVCF, ARC, PIP, PDS)

- Edinburgh in-house grants such as Davis Expedition Fund, Weir Fund, Innovation Initiative Grants, Elizabeth Sinclair Bequest, etc

  https://www.ed.ac.uk/institute-academic-development/learning-teaching/funding/fund-opps

  https://www.ed.ac.uk/biology/current-students/undergraduate/opportunities-careers-graduation/funding-for-expeditions-travel-abroad

  https://www.ed.ac.uk/student-funding/financial-support/travel/university-funds/science-engineering

- Grants from societies like Society of Systematic Biology, British Ecological Society, National Geographic, Royal Geographical Society, Botanical Society of Britain and Ireland, etc.

What grants can you apply for?

What other grants should we list here?