

# Introduction

## Research Grant Proposal Writing: Attaining Essential Quality for Success

A. S. M. A. Haseeb  
Research Clusters, IPPP and  
Dept. of Mechanical Engineering  
University of Malaya



Workshop on Research Grant Proposal Writing: Attaining Essential Quality for Success, Research Clusters, IPPP, University of Malaya, 06 Nov 2019

### References

- S. Finger, Advice on Writing Proposals to the National Science Foundation, Carnegie Mellon University, April 2015
- Adventures in Grantseeking: NSF, TAMU – Texarkana, May 2018
- G. A. Hazelrigg, Honing Your Proposal Writing Skills, National Science Foundation
- NSF, A Guide for Proposal Writing
- 2013 NSF CAREER Proposal Writing Workshop, University of South Florida
- Grant Proposals (or Give me the money!), The Writing Center, University of North Carolina at Chapel Hill
- Art of Grantsmanship, Human Frontier Science Program
- A. M. Coelho, Jr., Formula for Grant Success, <<https://www.youtube.com/watch?v=A1Zb5117qGs>>
- Writing Guide for NSERC Grant Applications, The Word Company, Ottawa
- T. M. Pinkston, Academic Career Workshop: Writing Research Proposals, USC
- Regents of the University of Michigan, Updated in 2014 by Christine Black (Originally produced by Don Thackrey)
- Principal Investigators Association, Executive Report: How to Write a Winning NSF Proposal
- University of Sheffield, Technical Report Writing for Engineers
- <https://www.futurelearn.com/courses/technical-report-writing-for-engineers/0/steps/40128>
- <https://www.thebalancesmb.com/writing-goals-for-grant-proposal-2501951>
- S. A. Jones, Proposals, Biomedical Engineering, Louisiana Tech University
- <https://www.editage.com/insights/how-to-write-a-problem-statement-for-my-research>
- <https://chandoo.org/forum/threads/the-connections-between-milestone-activities-deliverables-project-phase.16738/>
- Univ of Michigan, The Proposal Writer's Guide: Overview
- UNISA, Engineering research project: proposal
- Elena Kallestinova, How to Write a Compelling Grant Abstract, Yale Center for Teaching and Learning
- RT Erasmus, Writing a Grant Funding Proposal: General Overview, Choosing the topic, Abstract and Executive Summary



## Steps in research

1. Identify research topic
2. Initial review of literature
3. Identify research question
4. Continued review of literature
5. Formulation of hypothesis
6. Determine research approach
7. Design research/experimental plan
8. Implement research plan
9. Interpret results
10. Write papers /reports

- Write a proposal
- Seek for funds

## Groundwork

### Know your field:

- What is the current state-of-the-art
- Who are the top ten researchers
  - What they are doing right now
  - Where they get their funding
  - What they consider to be key research issues

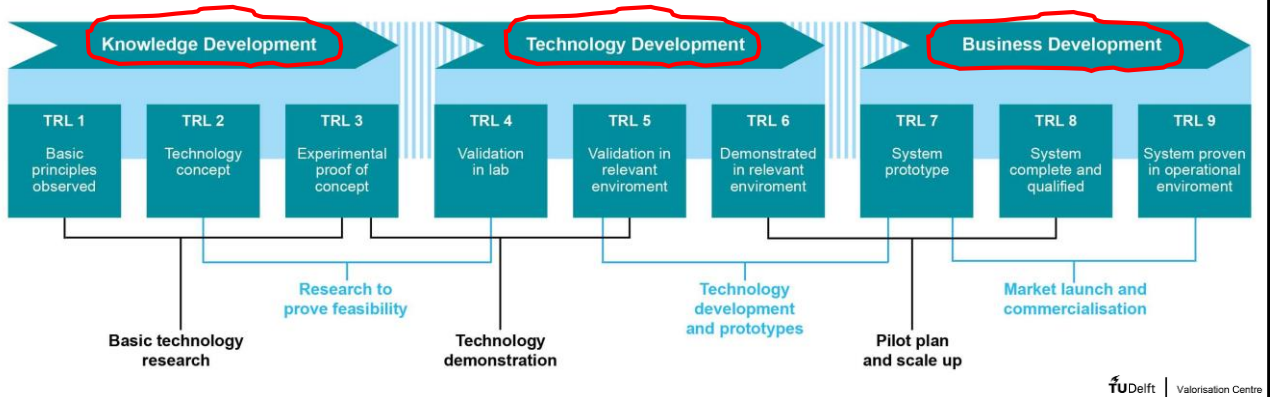
## Contents

- Research & Development Spectrum and Research Funding Schemes
- Proposal Evaluation and Audience
- Overview of the Workshop

## Research and Development

- Research and Development – Covers a wide spectrum
- Defined by technology readiness level
- Identify the stage where your proposal is

## Development pathway for new technologies: Technology readiness levels (TRLs)



TU Delft | Valorisation Centre

- If your proposal focuses an artifact/product → probably development
- If it focuses on knowledge → Research

Primary emphasis: Exactly what will your research contribute to knowledge base?

## Funding schemes

### University of Malaya

- IPPP
- IIRG

### Ministry of Education (MOE)

- Fundamental Research Grant Scheme (FRGS)
- Long Term Research Grant Scheme LRGS
- Transdisciplinary Research Grant Scheme TRGS
- Prototype Research Grant Scheme PRGS

### Ministry of MESTECC

...

**Others...**

## Fundamental Research Grant Scheme (FRGS)

### Scope of Funding

The objective is the development of good quality human capital and encourage the **generation of theories, concepts and new ideas** that can accelerate new discoveries and innovative creations.

### Qualification Criteria

1. The research must be able to generate new ideas/theories/concepts/methods/models/processes; and
2. The research has to **improve a policy, methodology and existing solution model**; or
3. The research covers humanitarian and community issues with the purpose of increasing the value of life in the country and the world; or
4. The research has a potential to contribute to the country's strategic agenda.

## Long Term Research Grant Scheme (LRGS)

### Scope of Funding

LRGS is a fundamental research, involving more extensive scope, a long period of time and requires a high commitment. LRGS can *generate theories and new ideas* that advanced in a strategic niche to *expand the boundaries of knowledge*.

### Qualification Criteria

1. The research must be a *fundamental research* that is able to produce a theory, new ideas and innovative creations heading towards a strategic niche for the development of frontier knowledge; and
2. The research is able to strengthen excellence and *expand knowledge, especially in cutting edge fields*, specifically the niche that have been identified; and
3. The research covers humanity and community issues with the purpose of increasing the value of life in the country and the world; or
4. The research has a potential to contribute to the country's strategic agenda

## Trans-Disciplinary Research Grant Scheme (TRGS)

### Scope of Funding

Trans-disciplinary Research Grant Scheme of the Ministry of Education (TRGS-KPM) aims to boost the *generation of theories*, concepts and new ideas that can accelerate new break-through discoveries which surpasses the boundaries of knowledge and innovative creation.

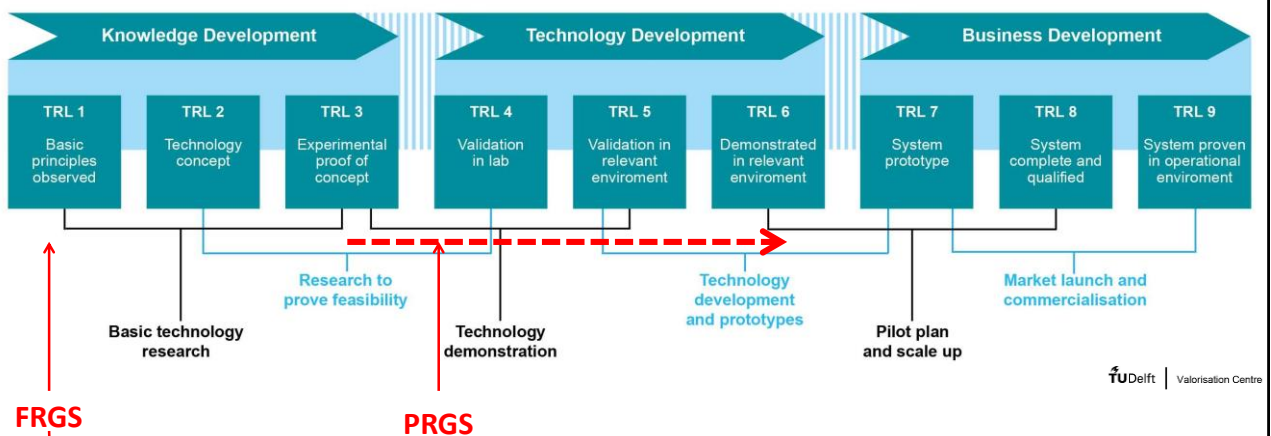
### Qualification Criteria

1. The research must be able to generate new ideas/theories/concepts/methods/models/processes; and
2. The research has to *improve a policy, methodology and existing solution model*; or
3. The research covers humanitarian and community issues with the purpose of increasing the value of life in the country and the world; or
4. The research has a potential to contribute to the country's strategic agenda.

## Prototype Development Research Grant Scheme (PRGS)

The PRGS Research Grant Scheme was established for the development of prototypes for bridging the gaps between laboratory discoveries and research up to pre-commercialization. This includes *proof of concept, evaluation, up-scaling, pre-clinical testing and field testing*.

## Development pathway for new technologies: Technology readiness levels (TRLs)



These words **MUST NOT** be in your objectives → “develop,”  
“design,” “optimize,” “control,” “manage,” and so on.

## Contents



- Research grant application → **highly competitive**
- Number of proposals → much higher than grants available
- Only top proposals are funded
- A lot of efforts are necessary to be at the top

### Proposals are evaluated by

- *Peer Reviewers*
- *Funding agency*



## Audience of your proposal

- Peer Reviewer
- Funding agency



*Write your proposal to satisfy the audience*

## Funding agency as your audience

- Understand the philosophy/expectation of the funding agency
- Read the funding agency mission/guidelines *very very carefully*
- Follow strictly the guidelines /instructions



*Tailor proposal to meet funder's criteria*

## Peer Reviewers as your Audience

- Write proposal not for yourself but for reviewers
- Must convince the reviewers (and of course funding agency)

### In simple terms reviewers would want to know:

- What is it about (research objective)?
- How will you do it (approach)?
- Can you do it (you and your facilities)?
- Is it worth doing (intellectual merit and broader impact)?

*Reviewers will critically judge your proposal in detail based on funder's criteria*

## Who are reviewers

### Reviewers likely to have mixed background:

- May have general background in your area, but not expert or have depth of knowledge on your topic
- Others may have expert knowledge in your specific topic

**You need to satisfy both groups**

### They work under tight time schedule:

- Have to evaluate tens of proposals in a couple of days
- Exhausted, under pressure

## You need to convince reviewers:

- Make your proposal so compelling → reviewers get excited about it
- Persuade reviewers → your ideas are so important that they will give your taxpayers' money
- Anything that makes your proposal difficult to read → work against you

## Make reviewers' job easier: Make them happy

- Do not make reviewers work hard to understand your proposal
- Help reviewers to easily understand : your idea, why it is important, why it is feasible
- Develop logical sequence → use headings, subheadings for them to follow
- Clearly indicate key elements in proposal → not make to them work hard to find answers
- Do not make them: synthesize your ideas, figure out anything for themselves...
- Address all review criteria
- Reviewers will not assume that you know things that you failed to say
- Use plain language → simple, short sentence

## Characteristics of a Good Proposal

- Scientifically sound
- Reviewers like it → they understand it, agrees with it
- Responsive to mission /guidelines of funding agency → you followed instructions, both **content** and **format**
- Likely to succeed

## Elements of success

- Good research ideas
- Spend adequate time to prepare
- Good proposals
- Satisfied reviewers
- Good luck !

## Contents



## Example from FRGS

### Detailed proposal of research project

- (a) Research background including Hypothesis /Research Questions and Literature Reviews**
- (b) Objective(s) of the Research**
- (c) Methodology**
  - Description of Methodology*
  - Flow Chart of Research Activities ( Please enclose in the Appendix)*
  - Gantt Chart of Research Activities (Please enclose in the Appendix)*
  - Milestones and Dates*
- (d) Expected Results/Benefit**
  - Novel theories/New findings/Knowledge*
  - Research Publications*
  - Specific or Potential Applications*
  - Number of PhD and Masters (by research) Students*

## Topics to be covered

- Introduction
- Different sections of a typical research proposal will be discussed in detail:
  - Title
  - Executive summary/abstract
  - Introduction/literature review
  - Research questions, hypothesis, objectives; novelty; significance
  - Research methodology
  - Research planning: activities, Gantt chart, milestones
  - Expected results/benefits
- Useful tips on proposal writing will also be shared