The Concept of Grant Writing

Mohamed Labib Salem, PhD
Prof. of Immunology
Faculty of Science, Tanta University

Director of Competitive Project Unit (CPU)
Tanta University

mohamed.labib@science.tanta.edu.eg
Tel. 017 427 2624
Objectives of the talk

- Duties of the PI
- How to build your CASE (problem)
- How to come into a clear Hypothesis
- The difference between GOALS (aims) and OBJECTIVES
- Tips on Writing the Narrative
"Research is to see what everybody else has seen, and to think what nobody else has thought”

Albert Szent-Györgyi, 1937 Nobel Prize; Medicine Laureate
Grants Mean Money

NIH
Fulbright
NSF
Other US foundation

Mission Department
STDF
RDI
Local University
International Cooperation

Cutting-edge research
Tanta University
Curriculum (Rank)

Erasmus Mundus
TEMPUS
FP7
DAD

Prof. Mohamed Labib Salem, PhD
Competitive Project Unit (CPU), Tanta University
The word *project* comes from the Latin word *projectum* from the Latin verb *proicere*, "to throw something forwards".

*pro-* denotes something that precedes the action; *iacere*, "to throw".

The word *project* thus originally meant "something that comes before anything else happens".
The Principal Investigator (PI) and Co-PIs

- The PI is the owner of the idea.
- Represents the grantee institution.
- Creates/maintains necessary documentation, both technical and administrative.
- Responsible for the scientific and technical aspects of the proposal.
- Assure compliance with bio-ethical laws and regulations, and the grantee institution policies and procedures.
- Ensure the funding organization is acknowledged in publications.

**Co-PIs:** Be careful to select and justify
A Proposal ...
Proposal Main Elements

Problem

Idea Hypothesis

Activities (Tasks) (Action Plan)

Aims Objectives

PI

Prof. Mohamed Labib Salem, PhD
Competitive Project Unit (CPU), Tanta University
6 steps to Good Project Proposal

1. Context
2. Needs Analysis
3. Wider Objective
4. Specific Objective(s)

Constraints
- Partners
- Assumptions
- Risks
- Resources
- Time Frame

Phases, Work Plan, Activities, Inputs, etc.

Dissemination & Sustainability,
Quality Control, Budget, etc.
Problem Statement

• The problem statement (needs assessment) is the key element of a proposal.

• It should be a clear, concise, well-supported statement of the problem to be overcome using the grant funding.

http://www.epa.gov/ogd/recipient/tips.htm
The 5 W + H: The Proposal Railway

1. What (Problem)
2. Why (Significance)
3. Who (PI and Co-PIs) why
4. Where (Facility) why
5. When (Time Line)
+ How (Methods) why
Needs Analysis: The Problem

Actual Situation
Professors/instructors advocate the potential of the Internet to increase access to higher education but are not actively packaging materials/developing content that can be delivered over the Internet.

Desired Situation
Professors/instructors are equipped with the skills to package knowledge for education/training that utilizes the Internet.

What is causing the gap?

How might the gap be closed?

Questionnaire, Interviews, etc.

Many gaps will not be solved by training
The IDEA

How to express your idea is a big deal!!!!!
“All the forces in the world are not so powerful as an idea whose time has come”

Victor Hugo

Think globally and apply locally
Idea: What does it mean???
I WANT an Idea !!!!!!

Brainstorming

Prof. Mohamed Labib Salem, PhD
Competitive Project Unit (CPU), Tanta University
The Challenge

How can I reach a bright idea!!!!
Coming up with a bright IDEA!

- Does it test a hypothesis or a concept?
- Has it or a similar study been done before?
- Is it important and make a difference?
- Does it fill a gap in knowledge or lead to a greater understanding?
- Has it or a similar study been done before?
- Does it worth to spend considerable time thinking, reading and doing?
- Does it fit the focus of my organization, my department, institution, and profession?
What kind of your Idea

- Is it based on your preliminary data?
- Is it based on your own observations?
- Is it based on your reading?
- Is it based on others’ expertise?
- Is it descriptive?
- Is it mechanistic?
- Is it translational?
A dull idea

A bright idea
The Hypothesis

• It is what you hypothesize (suggest) to solve a specific problem

• Remember it’s not your need but the community’s need

• Think globally and apply locally
The Hypothesis

- State it after you present the problem
- Provide the solution for a specific problem.
- It indirectly expresses the goals (SPECIFIC AIMS).
- It should be testable.

- *Funnel the reader to the hypothesis – at the end of the background/significance section*
The Hypothesis

- **Formalized hypotheses contain two variables**

  One is "**independent**" and the other is "**dependent**."

  The independent variable is the one you, the "scientist" control
  the dependent variable is the one that you observe and/or measure the results.
The Hypothesis

If-then statements are the simplest way to formalize hypotheses.

- If skin cancer is related to ultraviolet light, then people with a high exposure to UV light will have a higher frequency of skin cancer.
- If leaf color change is related to temperature, then exposing plants to low temperatures will result in changes in leaf color.

Not all if-then statements are hypotheses.
Building Your Case (Problem)

- Zoom in on a specific problem you want to solve.
- Keep in mind the current literature or gaps in knowledge.
- Demonstrate your knowledge of the issue or problem.
- Demonstrate that funding your project is essential to address the problem or the gap in the knowledge in the field.

Prof. Mohamed Labib Salem, PhD
Competitive Project Unit (CPU), Tanta University
Building Your Case: So What

One way is to start with activities and ask the question “So what?” until you get to the finish line

- People are mailed brochures and see posters. So what?
- So they decide to come to a Saturday workshop. People attend the workshop and say they liked it. So what?
- So they report that what they remember are just those points we wanted them to remember. So what?
- 20% of the people that attended the workshop adopted a new technique for cultivation on their farms.
We need to conduct this research so that

**Scientists and the public understand why the fish are dying** so that

**Decision makers can institute protective land use policies** so that

**People can modify behaviors that damage fish habitat** so that

**Conditions in the stream improve** so that

**Salmon are healthy and abundant.**

http://yosemite.epa.gov/R10/ECOCOMM.NSF/webpage/measuring+environmental+results
Goals (Specific Aims)

State the intent or purpose of the project based on your hypothesis. 2-3 specific aims, 1 sentence each. Leads to the objectives....
Objectives

- The objectives are the hypotheses, but more specific than the aims.
- Objectives discuss who is going to do what, when they will do it, and how it will be measured.
- They are action oriented and often begin with a verb.
- The objective is usually broken down to the tasks that can be measured to determine actual accomplishments.
Objectives

• **What** are you going to do? **What** will happen? (the steps toward your goal)
• **Why** it should be tested?
• **How** will it happen? Using what approach? (i.e. the methodology).
• **Who** will do it? (project management or supervision).
• **When** will it be done? (timeline?)
• **For how many**, or by **how much**? (measurement; how will you know you’ve been successful?)
• **What is the impact** of the expected results?
Objectives

• Be specific- state exactly what you will accomplish.

• Be realistic- don’t promise more than you can deliver.
  – It’s always better to “under promise and over deliver” rather than the other way round

• Be logic- each objective should be a logical step toward the goal.

• At least one objective per problem; 3-4 usually; never more than 5.

• What are the MEASURABLE milestones along the way to meet the goals?
Goals versus objectives

Goal: Our evening computer classes program will help students be better programmers

Objectives: Our evening six months computer classes program will assist the 50 participating students in improving their programming scores in Microsoft Visual Basic Programming Certificate Exams
From Objectives to Outcomes

- **Inputs**: Preliminary data
- **Activities**: how to achieve the objectives (method, service, workshop, educational event)
- **Outputs**: Expected results (products of the activities)
- **Outcome**: change in knowledge, behavior, circumstance, or attitude (impact, significance)
- **Assumption/Difficulties**: expected factors that might emerge and interfere with the performing the project
Your Proposal Network

Problem

Hypothesis

Idea

Goal 1

Goal 2

Goal 3

Objective 1a

Objective 1b

Objective 2a

Objective 2b

Objective 3a

Objective 3b

Task

Task

Task

Task

Task

Task

Task

Task

Prof. Mohamed Labib Salem, PhD Competitive Project Unit (CPU), Tanta University
Tips on Writing the Narrative

Prof. Mohamed Labib Salem, PhD
Competitive Project Unit (CPU), Tanta University
Reasons you are likely to succeed

A Good Idea:
- Novel, exciting
- Interesting and important

Valuable hypotheses:
- Propose mechanistic studies
- Are testable; i.e. to be proved or disapproved by the proposed experiments

A Strong Rationale:
- Based on published literature of applicant or others
- Based on preliminary data of applicant
- Based on novel and exciting idea
Appropriate Specific Aims:
• Logical scientific questions to test the hypothesis
• Clearly and uniquely related hypothesis
• Focused and achievable in grant period.

Tantalizing Preliminary Data:
• Support the hypothesis
• Provide opportunity to discuss possible interpretations of the data
• Demonstrate your productivity
Reasons you are likely to succeed

Clear definition of the Proposed Statistical Methods:
• Discussion of precision and accuracy
• Power calculations used to determine sample size

Involvement of a Statistician in the Design of the Experiments:

Establishment of a Research Team:
• Includes collaborators who provide necessary expertise
Reasons you are likely to succeed

**Carefully Developed Experimental Design:**
- Step by step logical organization
- Each SA evaluates only one variable
- Explanation for why another method will not be used
- Justification and rationale for the proposed methods
- Appropriate controls included and described
- Adequate experimental details are provided
Reasons you are likely to succeed

Clear Definition of the Assumptions and Limitations:

• Identification of the possible problems and pitfalls
• Presentation of the planned solutions
• Definition of precise criteria for determining success
• Levels of sophistication of research methods addressed
Tips for Successful Grant Writing
http://www.aas.org/grants/hints.html

• Read and follow the instructions Write clearly and concisely
• Have a trusted colleague review your proposal
• Clearly explain what you propose
• Start with the end in mind...
• Look at your organization's big picture.
  Who are you?
  What are your strengths and priorities?
  Project your organization into the future.
  Keep your eye on the big picture
Writing Techniques

- Use graphics in methodology
- Use headings and subheadings, bold and underline, no italics
- Look at each introductory sentence of a paragraph, it is the most important part, it is all they may read
- Use the active voice.
- Avoid openers with There is, There are
- Use type faces with serifs, like Times, they are easier to read
- Do not justify
Thank You

Dr. Mohamed Salem