Getting Started on your Grant Application:
The “Big Picture” and Specific Aims

Content adapted from “NIH Mentored Career Development Awards (K Series) Part 3” Thomas Mitchell, MPH, at UCSF
Getting Started

• Reviewers recognize that an individual with limited research experience is less likely to be able to prepare a research plan with the breadth and depth of that submitted by a more experienced investigator.

• Nevertheless, *a fundamentally sound* research plan must be provided.
Strategies that work – Common mistakes to avoid

Build a team: Don’t try to go it alone!

1. Seek opportunities for collaboration.
2. Identify collaborators to fill gaps in your expertise, especially a mentor or collaborator who is well known.
3. Consider multidisciplinary approaches.
4. Recruit senior colleagues who can provide advice and periodic peer-review of your grant application (e.g., overall scope, specific aims, methods)
Find a Good Idea: The idea must be creative, exciting, and worth funding.

1. Concentrate ideas in your area of expertise that would make a broad impact. *You will be judged on this.*

   1. Just moving science forward is not enough; so, tie your science to curing, treating, or preventing disease.

2. Do your homework; make sure your topic fills a gap in the existing literature.

3. Pose interesting, important, and *testable* hypotheses, whenever possible.

4. Keep in mind that your topic should fit the mission of the funding agency/institution.
Apply good grant writing fundamentals: Improve the chances of a fundable 1st round score, if you:

• Address a clearly defined problem.
• Extend our knowledge by proposing interesting, important, and testable hypotheses that build on previous research.
  • buzzwords: paradigm shifting, transformative, enabling technology, nano-anything
• Propose a scope of work that is appropriate to the track record of the principal investigator.
  • Reviewers are likely to look at your biosketch to count publications
Applying the fundamentals of good grant writing

“This application is overly ambitious and lacks focus.”

Two common approaches to developing a research plan for a grant application:

1. “Value added” approach
2. “Less is best” approach
“Value added” approach

- In this approach, specific aims typically focus on a common *topic* in which there are critical gaps in our knowledgebase.
- Each specific aim is thought to increase the potential “value” of the project.
  - As additional aims are added, the project can easily become “overly ambitious” in scope.
  - Because these projects often lack a unifying central issue or research question, they may be viewed as “lacking focus.”
“Less is best” approach

- In this approach, you address a clearly defined problem, in which each specific aim contributes to addressing that problem.
- These applications are easier to write and easier to understand.
- By proposing a more modest scope of work, you minimize your vulnerability in review while maximizing your ability to do an outstanding job on all aspects of the proposed research.
Distinctive Features of a Research Plan for a Mentored K award

3 key things to remember when designing a research plan for a K award.

1. The research plan is a *training vehicle*. The research plan should be well integrated with your career development training plan.

2. The research plan is a *means to achieve independence*. The research plan should be viewed as a precursor for a subsequent R01.

3. Mentored K awards provide *limited funding*. The scope of the research plan needs to be appropriate and feasible, given the modest resources available in a mentored K award.
   - A “*modular*” approach: might include several small projects, such as secondary analyses of existing data, leveraging ongoing cohort studies or clinical trials, or conducting a small pilot study.
Summary and Specific Aims

• Length: 1 page

• Style: Non-technical.
  • Write this section for all study section members.

• This section must include everything that is important and exciting about your project – but without a lot of detail.

* A great resource for writing NIH grant applications is The Grant Application Writer’s Workbook by Stephen Russell and David Morrison. It is available online at www.grantcentral.com.
• The *flow of logic* must be so clear and compelling that reviewers at the study section meeting will be able to follow it, even when someone else is talking to them at the same time.

• Together with the Significance and Innovation subsections, it is one of the most important parts of the application in terms of capturing the affirmative vote of the majority of reviewers.
Introductory Paragraphs

• Develop a compelling argument for funding.
  • The secret to creating a compelling flow of logic in this section is to appropriately link its components, one to another.

• Begin with an interest-grabbing sentence that immediately establishes the relevance of your proposal to human health.
  • Describe *the scope of the problem* (such as number of people affected, morbidity/mortality, costs to society).
  • Describe *the gap in knowledge* that your project will address (that is, from a research perspective, what we don’t know that we need to know in order to move forward; provides rationale for specific aims).
Introductory Paragraphs

- **State the objective of this application**
  - This component defines the purpose of your application, which is to fill the gap in knowledge identified in the 1st paragraph.
  - This must also link to your long-term goal as the next logical step along a continuum of research.
  - Emphasize the “product” of the research, not the “process” that produced it.
    - For example, “to study” something would not be an appropriate goal; what you want is what the study will produce.
Introductory Paragraphs

• If your project is *hypothesis-driven*, state your central hypothesis.
  
  • Your central hypothesis must link to the objective, because the objective will be accomplished by testing your hypothesis.
  
  • The purpose of the hypothesis is to provide focus for your research project and, therefore, your grant application.
  
  • Tell reviewers how your hypothesis was formulated – either on the basis of your own preliminary data or on the published work of others.
Introductory Paragraphs

• **State your *long-term goal.*
  • It should be relevant to public health and be broad enough to give the impression that this study is part of a larger research plan that will continue beyond the bounds defined in the Specific Aims.
  • It should reflect your “niche” area of research
    • K-grant: the area in which you will be the acknowledged expert.
    • R-grant: the area that you have unique proficiency to execute aims
  • It must be realistic (i.e., something that is clearly achievable over a finite period of time).
    • For example, if you are a cancer researcher, it would not be credible to write that your long-term goal is to cure cancer.
Introductory Paragraphs

• End with a rationale that tells reviewers what will become possible after the research is completed that is not possible now.
  • The gap in knowledge discussed above represents a problem because its continued existence blocks the next step in the field from being taken.
  • This is where you can excite reviewers: the rationale can truly be exciting because it conveys that the expected outcomes will clearly advance your field.
Specific Aims

• Each aim should consist of 1-2 sentence(s): be concise and concrete; *clarity* is the goal.

• Emphasize “product” over “process.”

• Keep the number of aims to a minimum (2-4).

• Aims should be able to “stand alone”: they can be related but must be *independent* (i.e., they do not depend on a particular outcome of a previous aim).

• Include rationales, when needed.