

R01 Grantsmanship Strategies - Tips for submitting your best application possible

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Climbing onto the grant writing rollercoaster...



Core elements of successful grant applications

- ❑ The science and the question under study
 - Novelty, innovation, significance
- ❑ How the science is communicated
 - Grantsmanship



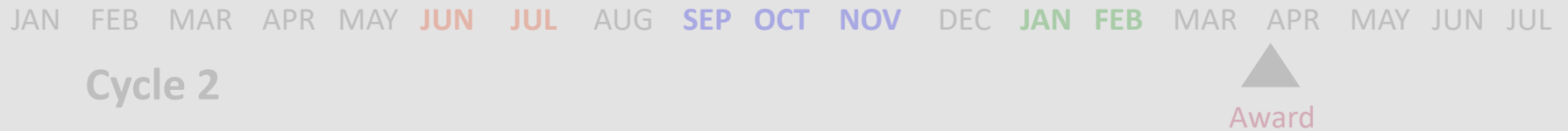
Effective grant writing

- Even if it the best idea ever - **a poorly written grant will never get funded!**
- An excellent grant application has the following:
 - A compelling question
 - Clear thought and expression
 - A strong and testable hypothesis
 - Well developed aims that will address the hypothesis
 - Rigorous experiments and well-described approaches that will allow you to complete the aims and answer the research question
 - Clearly delineated impact on the scientific area of interest or public health.

Grants process at the National Institutes of Health (NIH)



Submission-to-award time line



To be eligible for an NIH R01 grant application

- Investigator Status
 - Advanced degree appropriate to the research (expertise, publication record)
 - Level of position at which your institution allows employees to apply
 - eRA Commons profile
- Research Goal
 - Appropriate for the NIH Mission and goals
 - Appropriate for an NIH Institute (NIH [Matchmaker](#))
 - Matchmaker can also be used to find a Program Director with the same expertise
 - Appropriate for a funding opportunity announcement
- Institution qualifies for support and has resources to support the work



Before you put the application together, develop your ideas

- Write a concept page
 - Brief description of the research idea (abstract/specific aims)
- **Talk to NIH staff, especially a Program Director in your field**
 - They can help you to determine whether the idea fits the priorities of the funding agency you are targeting and help identify funding opportunities
- Talk to colleagues and mentors
 - Get their feedback early and often throughout the process
 - Circulating your research plan should not be seen as the final step
- Refine and shape ideas based on feedback and further review of the literature

Components of an application that influence reviewers

- Scientific Components
 - Abstract
 - Specific Aims
 - Research Strategy
 - Human Subjects and Vertebrate Animal Sections
- Administrative Components
 - Biosketch(es), Letters of collaboration
 - Resources & Facilities
 - Budget

Applications are written to align with review criteria

Review Criteria

- Significance
 - rigor of prior research
- Investigators
- Innovation
- Approach
 - rigor of prior research
- Environment

Application Sections

- Research Aims, Purpose
- Biosketches
- Research Strategy
- Research Methods & Analysis
- Resources

Scientific components

Abstract, Specific Aims, Research Strategy

Communicate your ideas clearly, directly, and consistently

If you can't explain it simply, you don't understand it well enough.

— Albert Einstein

When beginning to write the application consider

- Your project must be written in a way that the science proposed elicits excitement.
 - Write for the reviewer who has just had the worst day ever.
- Think globally, act locally!
 - Have a long-term vision that the application will help you towards.
 - Don't make the current project the be-all and end-all.
- Play to your own strengths and establish your niche.
 - Don't focus simply on what's trendy.
 - Do focus on what you and your team do best.
- Present the application so that it's visually appealing to read — use headings, spaces, indentation, figures and tables.

Formulate your hypotheses

Ideally, a hypothesis should:

- Give insight into a research question.
- Be testable and measurable by the proposed research methodology.
- Spring logically from the experience of the researchers.

Make sure that you:

- Provide a rationale for your hypotheses explaining how they were derived
- Provide alternative possibilities for the hypotheses that could be tested
 - may want to include an explanation why you choose the ones you did over others

Abstract

- Is the summary of the proposal and, if funded, is available to the public
- The abstract should introduce the reader to the problems you are addressing, the overall hypotheses you are testing, and the main approaches and experimental plan you are using.
 - What are the gaps in the field?
 - What do you intend to do?
 - Why is the work important?
 - How are you going to do the work?
- Avoid excessive use of jargon and abbreviations. Be consistent with wording and terminology throughout.

Specific Aims

- A critical section – provides the reader with an overview of the entire project
 - You must hook the reader to want to champion your application
- The Specific Aims section should contain the key elements about your proposal:
 - why you want to do the work – specific goal of the proposal and a long-term goal of the research program
 - What is the gap in knowledge and why is this a critical gap to fill?
 - what you want to do – central hypothesis and questions/approaches (i.e., aims) to test it

Specific Aims page

- An **introductory** paragraph
 - Should include the hook, define the field/topic, the gap in knowledge, and the critical need.
- A **second** paragraph
 - Introduce the solution that fills the gap in knowledge (what, why, how). Your long-term goal/overarching research goal. Your working/central hypothesis and the rationale behind it (previous studies/preliminary data).
- **Research Aims**
 - 2 – 4 Aims. Related but not dependent on each other. Provide the rationale and a brief description of the approaches to be used to test the hypothesis.
- **Summary** paragraph
 - Creates a firm, broad base to support your entire proposal. Highlight the innovation of the project and the expected outcomes (if not done already). State the kind of impact the project is likely to have if successfully completed.

Specific Aims – Do's and Don'ts

- Design your aims so that the results don't depend on only one outcome, but where one or more different outcomes would also be of interest.
 - Different outcomes should make sense with your central hypothesis and preliminary data
- Avoid having too many aims
- Avoid overly descriptive aims
 - Characterizing an expression is doable, but unlikely to yield a significant finding alone. Include descriptive findings in your preliminary data.
- If appropriate, include a diagram to show how the aims are related.
- Use consistent terminology.

Research Strategy – 12 pages (R01); 6 pages (R21, R03)

- Significance section

- Create a compelling, condensed story of your project. Information about the topic and the scope of the problem.
- Create a well-grounded basis for your study through a **critical review of the relevant literature** – include research highlights and gaps in knowledge, and strengths and weaknesses of prior research.
- Defend why the study needs to be done, is relevant, necessary, and its implications

- Innovation

- Consider conceptual and technical innovation

- Approach

- Preliminary data; methodology; statistical analyses
- Rigor of prior research and reproducibility

Research Strategy – Importance of preliminary data

- Preliminary data
 - Preliminary data are critical to show both
 - How you established the rationale for the hypotheses AND
 - Establish that you have the right expertise for executing the experimental plan and interpreting the results.
 - Establish the feasibility of the approach
 - Should be clear, legible, and NOT overinterpreted
 - Can be your data (unpublished or published) or from other published studies as long as it is appropriately and clearly cited as such.

- Tip: Whenever possible, publish first!

Administrative components

Biosketch, Facilities/Resources, Budget

The Biosketch (4 pages)

- Personal statement describing why you are well-suited to lead the project, and explain factors that might have affected past productivity.
- Cite up to four publications, or research products, that highlight your experience and qualifications.
- Describe up to five of your most significant contributions to science.
- Publication link (make sure it works; and that YOUR papers appear)
- List your ongoing/completed relevant research support to provide evidence that you can manage an award.
- Biosketches from all key personnel and collaborators who will contribute substantive effort.
- Keep the biosketch updated and current.

Facilities and Resources

- Provide sufficient details of your scientific work environment and available resources that will contribute to the probability of success.
- Include description of appropriate resources available to you through collaborators.
- Get letters of support from your department and collaborators attesting to the resources and expertise available to you and describing the institutional investment in your success as an investigator.

Budget

- Modular vs non-modular
 - Your budget should be appropriate for the science you are proposing.
 - Do not pad your budget or intentionally under-budget
 - Provide a budget justification that is detailed and in line with the costs requested.
- Key personnel must have effort assigned to a project.
 - Understand your institutional policies about assigning effort and taking salary.
- Establish a relationship with your Office of Sponsored Research to know what can be charged to a project (and what cannot).

Things to Avoid and Things to Do

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Tobacco Control Research Branch

Division of Cancer Control and Population Science

Formerly: U. Pittsburgh Cancer Institute



Join the Conversation
@NCIBehaviors

Avoid common grantsmanship mistakes

- Typos, formatting issues, tiny figures, no figure legends
- Excessive use of jargon; dense writing, with convoluted arguments and ideas
- Lack of consideration or disrespectful treatment of relevant literature (you don't know who the reviewers will be or who they know!)
- Budgets/justifications are unrealistic or vague; personnel effort is underestimated or too extensive for science proposed
- No evidence of collaborators (i.e., working in a vacuum) or expertise in a particular area
- Assuming that everyone who will read your application is an expert in your area and will know what you are talking about!

Avoid common scientific mistakes

- Overinterpreted or missing preliminary data
- Inappropriate sample size
- Lack of feasibility or appropriate physiological models
- Outdated techniques or approaches, superficial design
- Too broad/ambitious or too narrowly focused
- Incremental advances/ not pushing studies much beyond the preliminary data

Do

- Start early in planning and developing your ideas – don't rush putting together an application
- Know what's available to you
 - Local resources to help build preliminary data
 - Collaborators and mentors for honest feedback
 - NIH and NCI Program Staff
- Identify ways to pursue new exciting observations –
 - Different funding mechanisms and opportunities (NIH, foundations and other organizations)
- Publish whenever possible

How to find an NIH program director (project officer)?



Research Portfolio Online Reporting Tools
(RePORT)

QUICK LINKS

RESEARCH

ORGANIZATIONS

WORK

[Home](#) > [RePORTER](#) > Matchmaker Results

Matchmaker Results

PROJECTS

PROGRAM OFFICIAL

Matching Text

tobacco cancer



https://projectreporter.nih.gov/reporter_MatchmakerResults.cfm?tab=PO



eRA Intranet



Secure Email and Fi...



Tools & Resources |...



HHS Learning Portal

1 2 3 4 5

Program Official	IC
KIMMEL, HEATHER L	NIDA
KAUTZ, MARY A	NIDA
VOLLINGER, ROBERT	NCI
LEVINTOVA, MARYA	FIC
PERKINS, SUSAN N	NCI
WALTON, KEVIN	NIDA
BLAKE, KELLY D	NCI

Click on the name to see specific projects that align with your research.

Choose the institute that best matches your career focus. This could be a long-term relationship.

Feel free to speak with more than one program director.

Program Off

[KIMMEL, HEA](#)

[KAUTZ, MARY A](#)

[VOLLINGER, ROBERT](#)

[LEVINTOVA, MARYA](#)

[PERKINS, SUSAN N](#)

[WALTON, KEVIN](#)

[BLAKE, KELLY D](#)

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HHS Learning Portal

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NIDA

NIDA

NCI

FIC

NCI

NIDA

NCI

Reading a Funding Opportunity Announcement (FOA)

- Be careful: what may appear as boilerplate might actually be unique to a given FOA.
- Note the term “required”.
- Program staff listed at the end of the FOA are your first points of contact

Example Grant Applications

<https://cancercontrol.cancer.gov/IS/sample-grant-applications.html>

Take-Home Advice

- Develop good management and writing skills.
- Identify and maintain contact with mentors.
- Always get feedback from multiple sources.
- Ask questions, and for help, when you don't understand.
- Don't lose sight of the big picture (why you do what you do).
- Take time to celebrate accomplishments.



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