Best Practices for Competitive Applications: Research Grants, Fellowships and Career Development Awards

Jaime S. Rubin, Ph.D.
Dept. of Medicine
College of Physicians and Surgeons
Columbia University

Course: "Funding and Grantsmanship for Research and Career Development Activities"

http://grantscourse.columbia.edu/

Course Policies:

Please, No:

- Recording of Presentation
- Screen Shots of Presentation
- Posting to Social Media
- Sharing of Course Material with those Outside of Course

Thanks, Jaime Rubin

Approaches for Competitive Applications

- **Identify Funding**
- Prepare to Write the Grant Application
- Complete the Grant Application

Identify Funding

- Identify appropriate funding agencies
  - Government
  - Non-government
- Identify appropriate funding mechanisms
  - Research
  - Training/Career Development
- Create a calendar of application deadlines for identified funding programs
  - Known current year deadlines
  - Possible future deadlines based on last year's deadlines

Approaches for Competitive Applications

- Identify Funding
- **Prepare to Complete the Grant Application**
- Complete the Grant Application

Prepare to Complete the Grant Application

- Speak with Agency Program Officer
- Speak with colleagues who are/were awardees
- Review funded applications if possible
- Review agency's review criteria
- Review agency's review process
- Identify what will make the application more competitive
  - Research and/or career development arrangements
  - Access to core facilities/research resources
- Strengthen "Preliminary Work/ Pilot Data"
- Who will write confidential letters of reference?

Research and Career Development Arrangements

- Multiple Principal Investigators (research awards)
- Multiple Mentors (mentored awards)
- Advisors (mentored awards)
- Co-investigators/Collaborations
- Subcontracts to other institutions
- Multidisciplinary/Interdisciplinary

Mentors/Advisory Committee

- Scientific area per Mentor/Committee member
- Schedule of meetings

Research Training Mentors and Advisors		
Faculty Member	**Role**	**Area of Expertise**
Name (Title)	Mentor	
Name (Title)	Co-Mentor	
Name (Title)	Advisory Board Member	
Name (Title)	Advisory Board Member	
Name (Title)	Advisory Board Member	
Name (Title)	Collaborator	
Name (Title)	Consultant	

Prepare to Complete the Grant Application

- Identify and meet with Co-investigators, Collaborators, Consultants, Advisors
  - Identify roles and responsibilities
  - Administrative requirements (e.g. if other countries/institutions are involved)
- Identify necessary core facilities and other research resources
- Meet with research administrators
- Human subjects, lab animals, and any other regulatory issues?

Approaches for Competitive Applications

- Identify Funding
- Prepare to Complete the Grant Application
- **Complete the Grant Application**

Complete the Grant Application

- Review the application instructions
- Identify the different components
- Create a checklist (sequence, date of completion)
- Create an outline
  - Content, Length of section (*vis a vis* page limits)
- Identify and delegate responsibilities for the different components
  - Technical/Scientific
  - Administrative – e.g. budget
  - Regulatory
  - Draft letters of collaboration/support

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Complete the Grant Application

- Confirm page limits for each component
- Create a schedule for any required meetings
- Determine:
  - Shared computer drive/folders
  - Naming of files (e.g., by version # or date)
  - Track changes?
  - Font, margin, format of literature citation
- Set a firm time-line for each responsibility
  - Writing milestones
  - Absolute deadline date for final compilation

Complete the Grant Application

- Read instructions
- Never assume that reviewers "will know what you mean"
- Refer to literature thoroughly and thoughtfully
- Explicitly state the rationale of the proposed investigation ("the hypothesis of my study is…")
- Discuss limitations and potential "challenges" and how these will be addressed (e.g., "alternate approaches")
- Include well-designed tables and figures
- Present an organized, lucid write-up (use an outline)
- Ask colleagues ("pseudo reviewers") to review/comment
- "See" application from reviewer's perspective

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Include Well-Designed Tables and Figures

- Include explanatory caption with the figure (not buried in text)
- Not overly complicated
- Informative, even if printed in black and white
  - Relying too much on colors may be problematic
- Easy for the reviewers to read and understand
- Not too small (including text)
- Not every figure from a presentation (oral, poster) or journal article is appropriate for a grant application
- Tips:
  - Try to have Figure and relevant text on the same page
  - Bold label in text (e.g., **Fig. 4**) so it's easier for reviewers to locate relevant text for individual Figure

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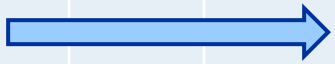
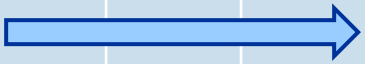
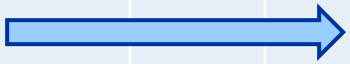
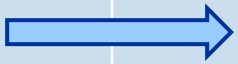
- **"See" application from reviewer's perspective**

Timeline for Specific Aims and Benchmarks/Milestones of Research Progress

Benchmarks/ Milestones	Year 1	Year 2	Year 3
Summary of Specific Aim 1a			
Summary of Specific Aim 1b			
Summary of Specific Aim 2a			
Summary of Specific Aim 2b			
Summary of Specific Aim 3			

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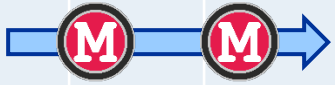
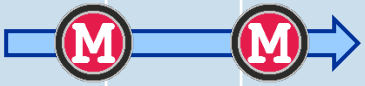
Summary of Specific Aim 1b			
Summary of Specific Aim 2a			
Summary of Specific Aim 2b			
Summary of Specific Aim 3			

Specific Aims: Milestones

- Specific Aim 1a Milestone:
- Specific Aim 1b Milestone #1:
- Specific Aim 1b Milestone #2:
- Specific Aim 2a Milestone #1:
- Specific Aim 2a Milestone #2:
- Specific Aim 2b Milestone #1:
- Specific Aim 2b Milestone #2:
- Specific Aim 3 Milestone:

Elements of a Good Proposal

- Feasible
- Relevant
- Unique
- Innovative
- Clear
- Brief
- Consistent

Anticipate Questions
and
Answer them before
they are asked

Don't Do the Minimum

- "Optional": Does not mean don't do
  - PHS Assignment Request Form: Request an Institute, specific Study Section, reviewers' areas of expertise
- F and K applications:
  - 3-5 Letters of Reference; May submit up to 5 strong letters
- Research applications:
  - Letters of Support; e.g., from collaborators, core facility directors, provider of a "unique research resource" (in some cases, would also include Biosketch)
- When appropriate, fill the page – ½ page of text means you have nothing more to say
  - K awards: "10. Description of Institutional Environment"

PHS Assignment Request Form

OMB Number: 0925-0001
Expiration Date: 09/30/2024

Funding Opportunity Number:

Funding Opportunity Title:

Pre-populated from announcement information.

Awarding Component Assignment Suggestions (optional)

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If you have a suggestion for an awarding component (e.g., NIH Institute/Center) assignment, use the link below to identify the appropriate short abbreviation (e.g., "NCI" for National Cancer Institute) and enter it below in the boxes for "Suggested Awarding Components". All suggestions will be considered; however, not all assignment suggestions can be honored.

Information about Awarding Component can be found here: https://grants.nih.gov/grants/phs_assignment_information.htm#AwardingComponents

Suggested Awarding Components:

Suggestions are considered with other assignment factors. Not all suggestions can be honored.

Study Section Assignment Suggestions *(optiona*

Study Section Assignment Suggestions *(optional)*

If you have a suggestion for a study section assignment, use the link below to identify a study section(s). Enter the short abbreviation for that study section in the boxes for "Suggested Study Sections." Remove all hyphens, parentheses, and spaces. All suggestions will be considered; however, not all assignment suggestions can be honored.

For example, enter "CAMP" if you wish to suggest assignment to the NIH Cancer Molecular Pathobiology study section, or "ZRG1HDMR" if you wish to suggest assignment to the NIH Healthcare Delivery and Methodologies SBIR/STTR panel for informatics.

Information about Study Sections can be found here: https://grants.nih.gov/grants/phs_assignment_information.htm#StudySection

Suggested Study Sections:
Only 20 characters allowed

Suggestions are considered with other assignment factors. Not all suggestions can be honored.

Rationale for assignment suggestions *(optional)*

Entry is limited to 1000 characters

Up to 1000 characters.

PHS Assignment Request Form

List individuals who should not review your application and why *(optional)*

Entry is limited to 1000 characters.

Provide sufficient information (e.g., name organization affiliation) to correctly identify each individual. Provide specific reason why an individual should not review your application. Information will be considered, but listing an individual does not guarantee they will not be on review panel.

Identify scientific areas of expertise needed to review your applic

Note: Do not provide names of individuals

Identify scientific areas of expertise needed to review your application *(optional)*

Note: Do not provide names of individuals

1

Expertise:
Each entry is limited to 40 characters

Limit your answers to expertise. DO NOT enter the names of individuals you'd like to review your application.

Real Estate

Don't let any Real Estate go to waste

Use different components of an application to highlight/restate points you want to make sure reviewers don't miss. e.g.,:

- Key Findings (your role)
- Publications (productivity)
- Position/Title (career advancement)
- Recognition (e.g., honors, awards)
- Biosketch: Personal Statement
- Letters of Support
- Facilities and Resources
  - Research and career development activities

Avoid the 3 D's!!

Day of Deadline Drama!!

Missing/Incomplete required component

Missing/Incomplete component that would have made the application more competitive

Just realized that research involves human subjects

Problem with research compliance issue

Problem with the budget

Missing signature

Component does not meet formatting requirements

Investigator

- Competent
- Enthusiastic
- Thorough
- Professional

Personal Statement/ Candidate's Background

When describing a previous research experience:

- Why?
  - This Area of Research
  - This Mentor/Lab Group
  - This Institution
- What was the hypothesis/scientific question?
- Why was the study important?
- What were the findings and conclusions?
- What were your role and responsibilities?

Personal Statement/ Candidate's Background

When describing a previous research experience:

- What did you learn and accomplish?
  - "Intellectual aspects"
  - Do not focus on technical aspects
- Why the transition from one research project/area/mentor/institution to the next?
- How/Why did your interests change or evolve?
- Cite any resulting publications/abstracts
- Describe any honors, awards and resulting conference/workshop presentations

Possible Problems Specific for Mentored Fellowship & Career Development Awards

Mentor

- Too many other responsibilities (e.g., administrative, clinical)
- Too many other mentees (e.g., students, post-docs)
- Not appropriate scientifically
- Too junior
- Limited experience as a mentor
- Limited funds to support proposed research

Possible Problems Specific for Mentored Fellowship & Career Development Awards

Institution

- Limited scientific/technical resources (e.g., core facilities, biostatistical support, patient population)
- Limited career development opportunities (e.g., courses, workshops)
- Limited opportunities for career advancement

Besides Funding….

- Diversity and Inclusion are Important
- Role Models are Important
- Mentors are Important
- Colleagues are Important
- Be Open to New Ideas and Challenges
- Take Advantage of Unique Opportunities
- Networking – whether by accident or on purpose - is Important

Know When to Stop

"Less is More"

"first popularized by architect Ludwig Mies van der Rohe as a precept for minimalist design and architecture"

"I did all you can do with a clarinet. Any more would have been less"

Artie Shaw, clarinetist

"Enough is Enough"

"Too Much of a Good Thing is Still Too Much"

https://usdictionary.com/idioms/less-is-more/
https://www.azquotes.com/author/22298-Artie_Shaw

Common Problems with Grant Applications from New Investigators

- Does not address/follow funding agency's mission, specific instructions, budget limits, etc.
- Overly ambitious
  - e.g., $, time, expertise, career level, resources
- Fishing expedition
- Not hypothesis driven
- Descriptive, not mechanistic project
- No or insufficient preliminary data
  - Demonstrates feasibility of project, scientifically as well as by investigator's team

Common Problems with Grant Applications from New Investigators

- Study design
  - e.g., Control groups(s), Unfocussed
- Issues with Statistical aspects/Power analysis/ Data analysis
- Does not adequately describe access to "research resources"
- Unrealistic budget (too large or too small)
- Methodologies beyond the expertise of investigator or research team
- Not independent of previous mentor's research

Top 10 Problems Reviewers Cite in Applications

By NIH Staff

Posted April 1, 2022

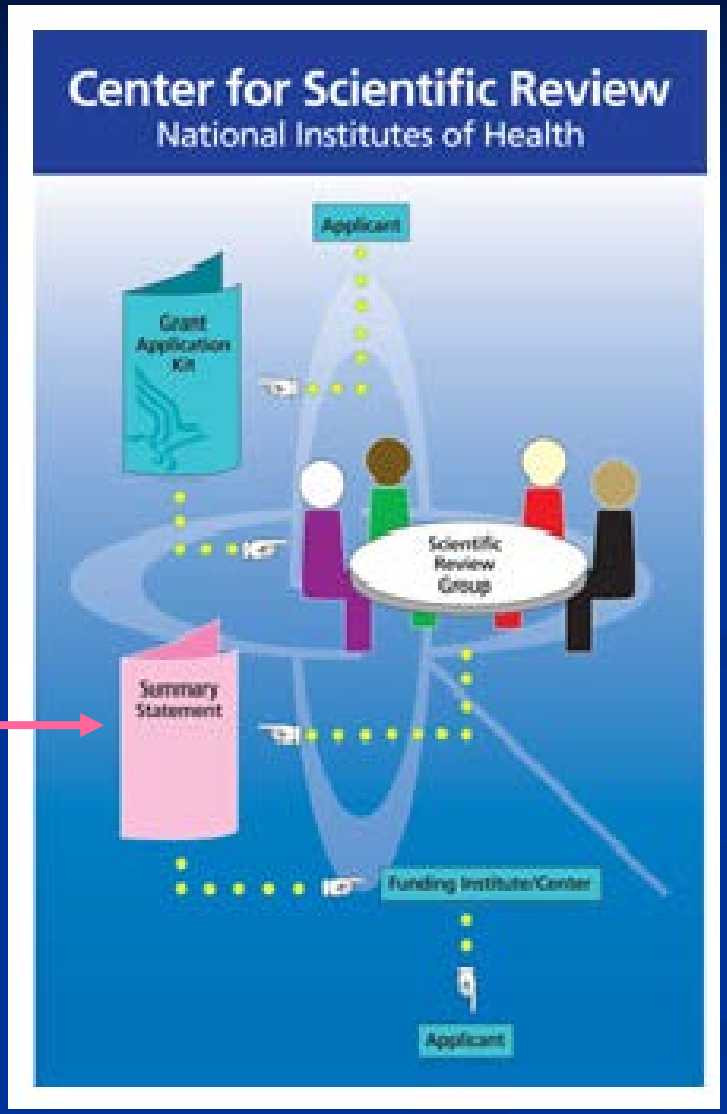
Share Tweet Share 0 Comments

As you prepare your grant application, avoid these common pitfalls! Here is a list of the most frequent problems reviewers in the NIH Center for Scientific Review (CSR) cite when they critique grant applications:

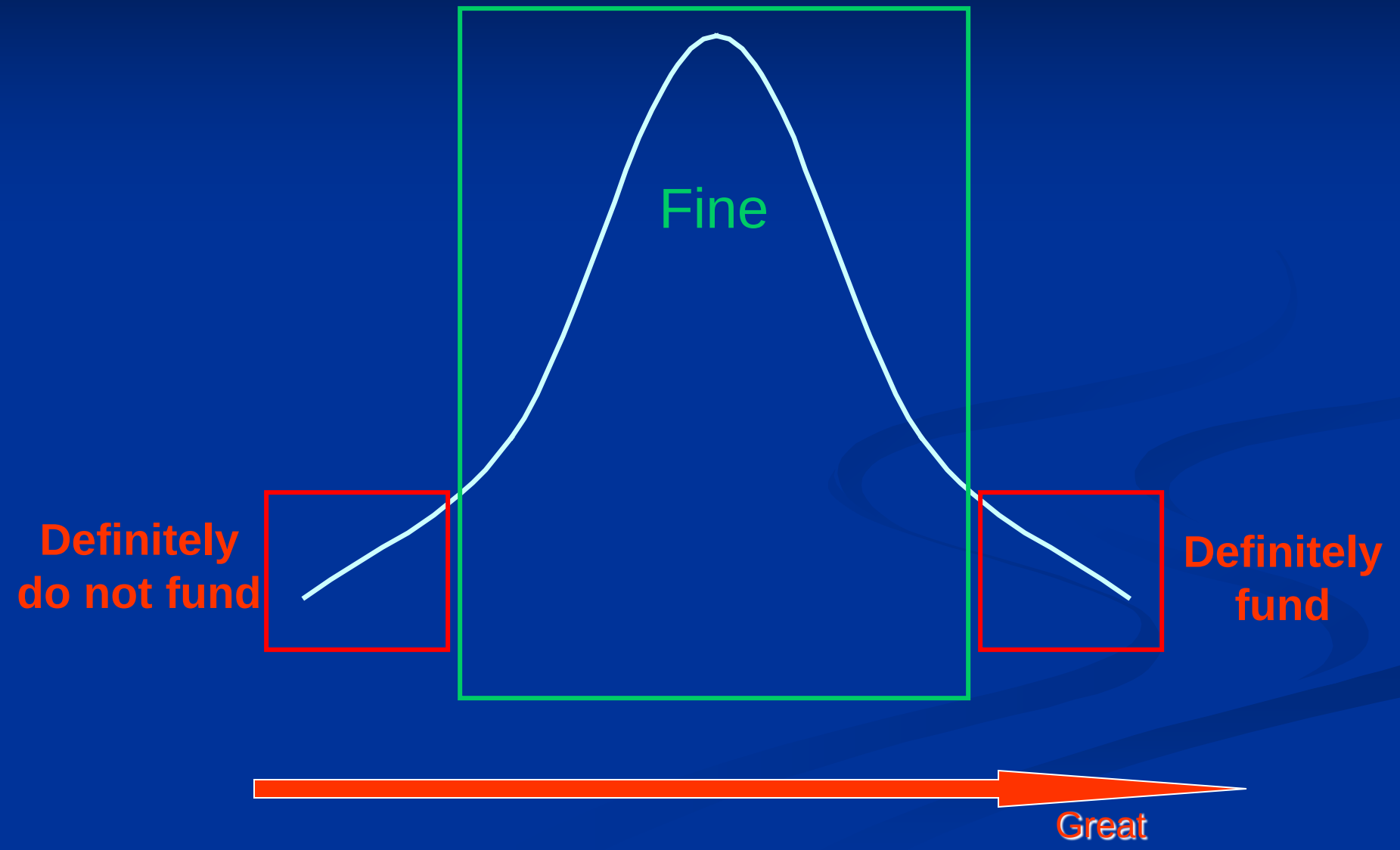
1. Lack of new or original ideas
2. Absence of an acceptable scientific rationale
3. Lack of experience in the essential methodology
4. Questionable reasoning in experimental approach
5. Uncritical approach
6. Diffuse, superficial, or unfocused research plan
7. Lack of sufficient experimental detail
8. Lack of knowledge of published relevant work
9. Unrealistically large amount of work proposed
10. Uncertainty concerning future directions

NIH: one round of applications

Pink Sheet: Reviewers' Comments



Bell Curve of Reviewer's Grant Applications

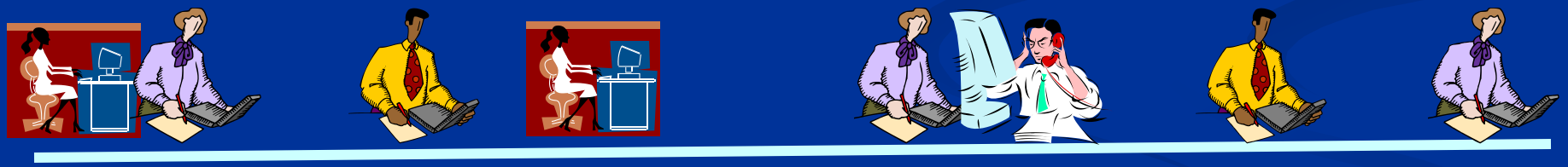


Poor Statistics

Research Resources not Adequately Described

Career Development/ Research Training Plan not Comprehensive

Figure Caption Font too Small



All Components of the Application are as Strong as Possible

Good Luck!