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

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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

<table>
<thead>
<tr>
<th>Faculty Member</th>
<th>Role</th>
<th>Area of Expertise</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name (Title)</td>
<td>Mentor</td>
<td></td>
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<tr>
<td>Name (Title)</td>
<td>Co-Mentor</td>
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<tr>
<td>Name (Title)</td>
<td>Advisory Board Member</td>
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<tr>
<td>Name (Title)</td>
<td>Collaborator</td>
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<tr>
<td>Name (Title)</td>
<td>Consultant</td>
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</table>

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?

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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
ADMINISTRATIVE NOTE:
During the review of this application, reviewers and/or NIH staff noted that one or more biosketches did not comply with the required format (NOT-OD-15-032). An electronic notification has been sent to the contact Program Director/Principal Investigator and Signing Official for this application, to ensure that future applications use the correct biosketch format. NIH has the authority to withdraw such applications from review or consideration for funding.
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
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
Complete the Grant Application

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- “See” application from reviewer’s perspective
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
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…”)
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“See” application from reviewer’s perspective
### Timeline for Specific Aims and Benchmarks/Milestones of Research Progress

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<thead>
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<th>Benchmarks/ Milestones</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
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<tbody>
<tr>
<td>Summary of Specific Aim 1a</td>
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<td>![Progress Arrow]</td>
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<tr>
<td>Summary of Specific Aim 1b</td>
<td>![Progress Arrow]</td>
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<tr>
<td>Summary of Specific Aim 2a</td>
<td>![Progress Arrow]</td>
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<tr>
<td>Summary of Specific Aim 3</td>
<td></td>
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### Timeline for Specific Aims and Milestones of Research Progress

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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”

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PHS Assignment Request Form

Funding Opportunity Number: Pre-populated from announcement information.

Funding Opportunity Title: 

Awarding Component Assignment Suggestions (optional)
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: 

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: Up to 100 characters allowed

Rationale for assignment suggestions (optional)
Entry is limited to 1000 characters.

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

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.

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

<table>
<thead>
<tr>
<th>Expertise:</th>
<th>Each entry is limited to 40 characters</th>
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</table>

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
- Publications
- Position/Title
- Recognition (e.g., honor, award)

- 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
Hello XXXX,

We have less than 10 minutes (must be done by 5pm) for Dr. ZZZ's DOD ... approved.
Please confirm by email once you have approved this as this is extremely urgent.

Thank you!

Regards,
YYYY
Not everything that can be counted counts.
Not everything that counts can be counted.

Research Plan Section
3. Specific Aims
4. * Research Strategy

Candidate Section
2. Candidate Information and Goals for Career Development

Quote Investigator suggests crediting sociologist William Bruce Cameron
http://quoteinvestigator.com/2010/05/26/everything-counts-einstein/

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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?

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

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

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Top 10 Problems Reviewers Cite in Applications

By NIH Staff
Posted April 1, 2022

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
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

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NIH: one round of applications
Pink Sheet: Reviewers’ Comments
Bell Curve of Reviewer’s Grant Applications

Definitely do not fund

Fine

Definitely fund

Great

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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!