A BEGINNERS GUIDE TO GRANT WRITING AND REVIEW

Slides contributed by:
Nancy Desmond (NIMH)
Margaret Jacobs (NINDS)
Richard Ikeda (NIGMS)
Luis Santana (Univ. Washington)

Enhancing Your Chances

- Talk to NIH: Look through the NIH web site to identify appropriate Institutes. Call the Program Directors at the Institutes to discuss your idea.
- Make sure your application is assigned to the correct Study Section. Discuss potential Study Sections with both Program Directors and Scientific Review Administrators.
- Craft your application carefully.

How do I know who to call?

- Visit NIH institute web pages to see what different institutes support and what their interests are.
- Go to CRISP and search on your topic at http://crisp.cit.nih.gov/
- Ask colleagues who do similar work who supports it

For Fellowships or New PIs Identify a mentor(s)

- with a track record
- with a commitment to you & your career goals
- need not be your research advisor
- more than one is OK!

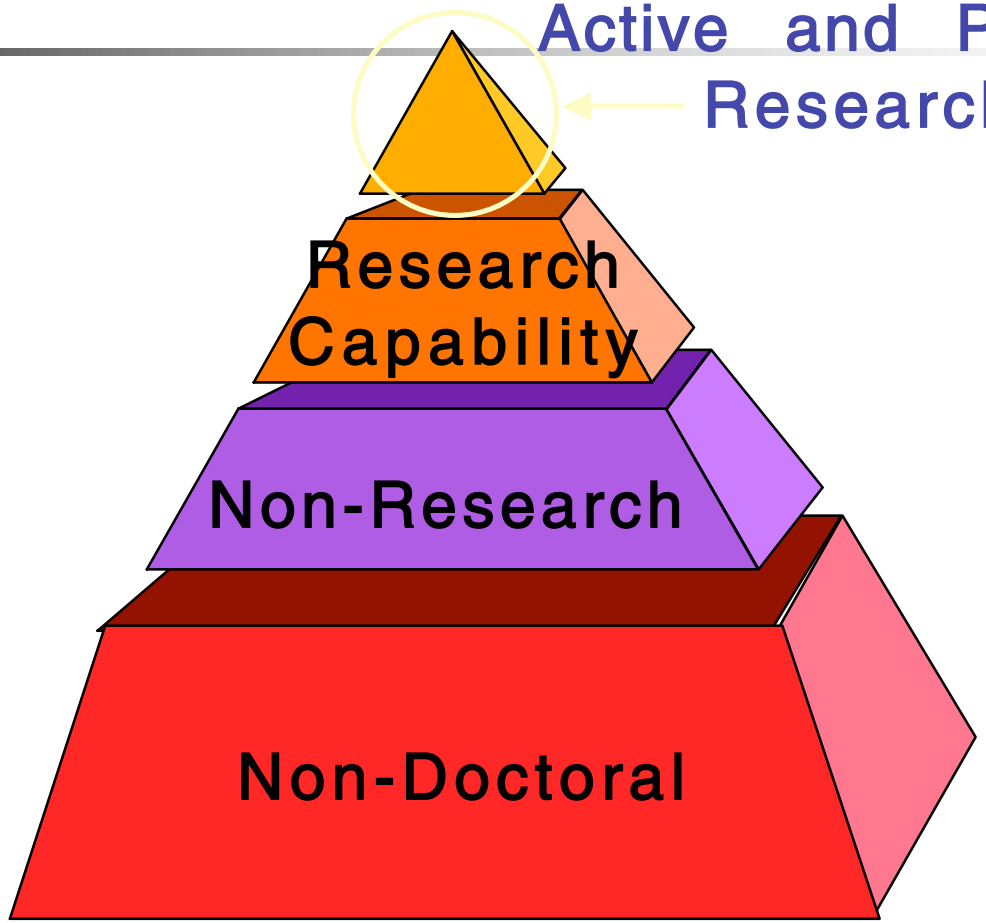
It Pays to Plan ahead

- Grant writing takes time…probably more time than you expect
- Bounce ideas off mentors & colleagues
- Talk to program staff
- Decide on your target deadline
- Get organized

Know Your Audience

- Reviewers are scientists from academe and industry.
- Reviewers do review for study sections in addition to their regular job

SELECTION OF PEER REVIEWERS



Scientific Community

Don’t be creative…make the reviewers’ job easier

- Use the correct forms (PHS398 or PHS416)
- Follow the instructions
- Follow the recommended format
- Fill the forms out completely
- Don’t guess—ask questions

Demonstrate mastery of your research topic

- Explicitly state your rationale.
- Cite the appropriate literature thoroughly.
- Include preliminary data.
- Identify problematic aspects of hypotheses or techniques; indicate back-up strategies.
- Provide expected/alternative outcomes and interpretations.
- Don’t forget your training/career development plan!

Grants Have Several Parts: All of Them are Important

- Face Page, Budget, and BioSketches
- Abstract
- Resources
- Research Plan
  - Specific Aims
  - Background & Significance
  - Preliminary Results
  - Research Design
  - Human Subjects, Vertebrate Animals…

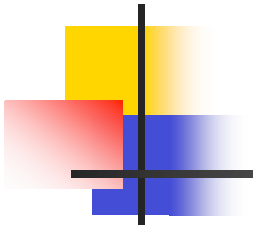
Be creative but pragmatic…

- Formulate your Specific Aims
- Seek feedback
  - Focused?
  - Feasible?
  - Realistic (not overly ambitious)?
  - Good training vehicle for you?
- Did I say “Focus”? Be certain every aim and experiment is clearly related to the overall goal of your proposal.

For An Effective Specific Aims Section:

- Background (introductory paragraph)
  - Overall Goal (Big Picture)
  - Put your area of research in perspective
- Summary of preliminary results

Background and Significance



- Do not write it as a review article
- Highlight controversies and how they will be solved by the proposed experiments
- Link controversies and outstanding issues to relevant sections in your grant

Clarity is a Virtue, Especially in the Research Design

- Restate aim
- Rationale
- Approach/expected outcomes
- Potential Pitfalls

Consider the review criteria

- The candidate: your background and potential to develop into an independent researcher
- Research plan: its scientific merit, significance, feasibility & relationship to your career plans
- Training/career development plan: its components & how well it fits the research plan
- The sponsor: his/her track record as both a researcher and mentor
- Institutional environment & commitment to the training/career development of the candidate

Keep The Basic Review Criteria in Mind:

- Significance
- Approach
- Environment
- Innovation
- Investigator
- Human Subjects/Vertebrate Animals

Crafting The Application

- Write clearly and don't assume that the reviewers know all that you know.
- Explain the importance and impact of the project.
- Organize the specific aims around testable hypotheses.
- Present a coherent and detailed research plan based that is based on the preliminary results that are available.
- Explain how expected results will be interpreted. Mention problems and pitfalls that may be encountered. Provide alternative plans when appropriate.

Help the reviewers do their jobs

- Use a “reviewer-friendly” format.
- Present the proposal in “bite-sized bits.” Use section headings, bold type, etc. to enhance readability.
- Be concise!
- Walk the reader through the experiments. Don’t just present a list of methods.
- Include an explicit timeline.

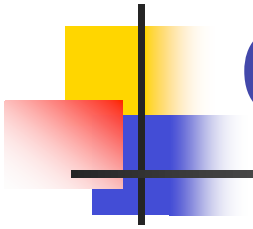
A strong research proposal…

- Has well-defined Specific Aims.
- Proposes novel, interesting & focused experiments.
- Is likely to advance knowledge.
- Provides supporting Preliminary Data.
- Has an appropriately detailed Experimental Design.
- Documents appropriate scientific expertise.
- Has a reasonable & justified budget.
- Training applications need other strengths too.

Improving The Application

- Typos and poor grammar leave a negative impression.
- Don’t be overly ambitious. (In a summary statement, the adjective ambitious is usually not a positive comment.)
- Write a strong application not a long application.
- Start early, Finish early, Put the application away for a week-then reread it.

Get a Review from Colleagues



- At least 4-6 weeks before your grant is due
- At least one person outside the field
- Is it clear?
- Do aims seem connected?
- Are there typos, missing citations, etc?

Don’t assume…don’t be sloppy

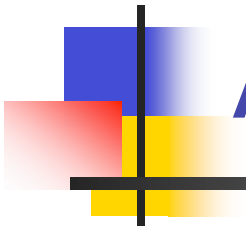
- Don’t assume the reviewers will *know what you mean*…be clear.
- Watch grammar. Avoid jargon.
- Make sure you’ve completed all required sections in the indicated order.
- Get in-house critiques well in advance of the deadline.
- Spell check and
- Read your application carefully before submitting.

About Using Color…

- Grants come to the NIH in hard copy
- Multiple copies of your application are made for reviewers
- They only see black and white

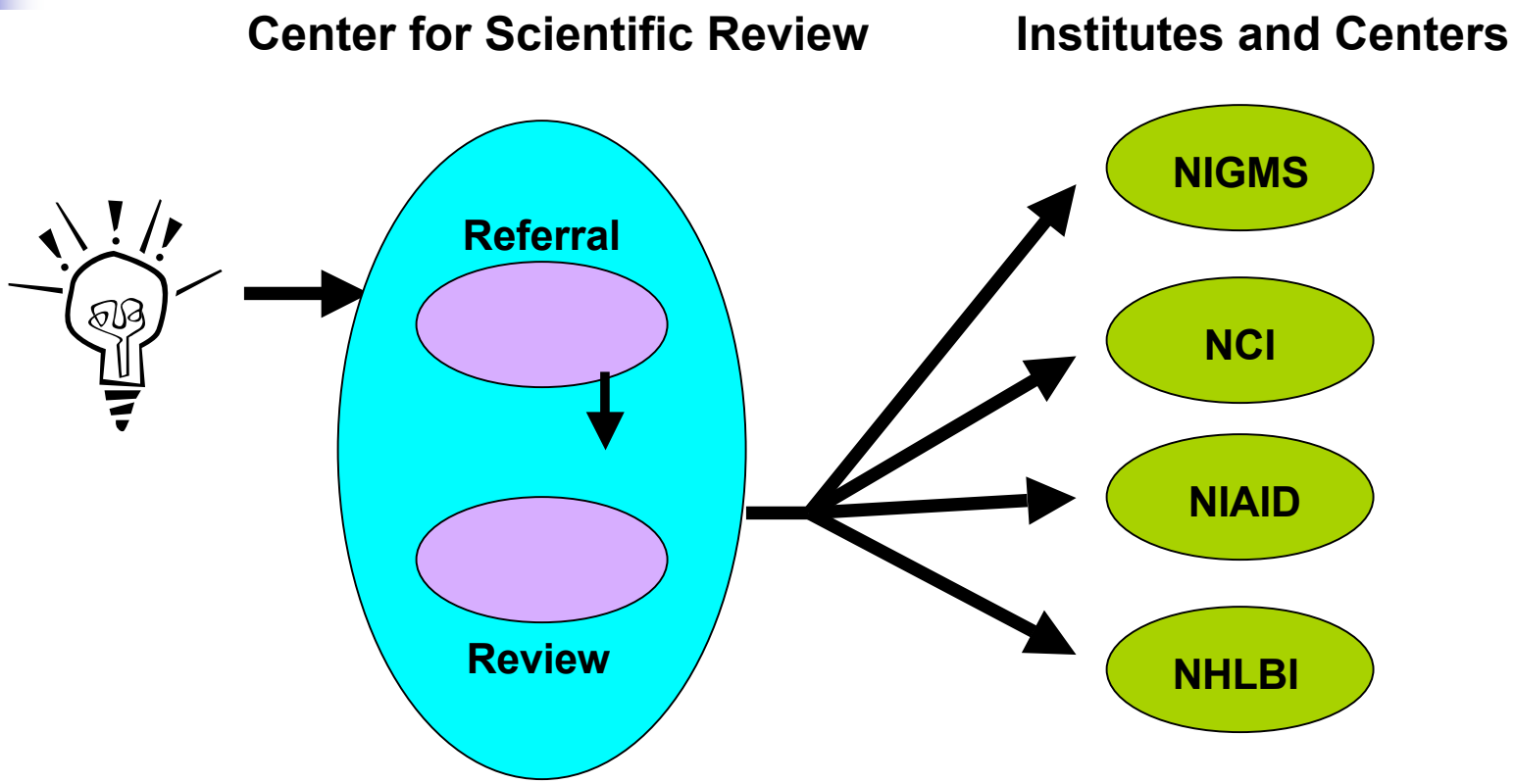
Common problems to avoid

- Lack of new or original ideas
- Absence of an acceptable scientific rationale
- Lack of knowledge of relevant, published work
- Overly ambitious research plan
- Superficial or unfocused research plan
- Questionable reasoning in experimental approach
- Lack of experience with an essential methodology
- Insufficient experimental detail



After Your Grant is Submitted

Referral, Review, and Funding



Role of Study Section

- Scientific Review Groups (SRGs) are to evaluate the scientific or technical merit of an application
- SRGs do NOT make funding recommendations

Study Sections

- Reviews conducted by Center for Scientific Review (CSR) and individual Institutes/Centers (IC's)
- Each standing study section has 12-24 members, primarily from academia
- Study sections managed by Scientific Review Administrator (SRA)
- As many as 60-100 applications are reviewed at each study section meeting

When You Have Your Assignment

- You may call the SRA to find out about sending additional information
- Rosters are posted approximately 30 days before the study section meets
- Look at the roster when it is posted.
  - Expertise
  - Conflicts of Interest

Before The Review

- The SRA is your point of contact prior to the review meeting.
- Your program administrator is your point of contact after the review meeting.

No-Nos – Don't Do These

- Do not contact a study section member prior to the review.
- Do not contact a study section member after the review.

What Happens at the Review?

- The SRA assigns each grant to three reviewers well before the meeting.
  - Primary, secondary, and discussant
- Before the meeting, reviewers submit their comments to IAR.
- SRA determines (with Chair) what applications appear to fall in the lower half.
  - These applications may be streamlined at the beginning of the meeting.

Streamlining

- Occurs at the beginning of the review meeting
- Applications are not discussed
- Applicants receive critiques of reviewers that were written before coming to the meeting

At The Meeting

- After streamlining, discussion of applications in upper half.
- Each assigned reviewer makes comments
- Discussion by group in general about points of agreement/disagreement
- Everyone votes a score based on what they heard in the discussion and the recommendations by the reviewers

The Review Criteria

- Significance: Does the study address an important problem? How will scientific knowledge be advanced?
- Approach: Are design and methods well-developed and appropriate? Are problem areas addressed?
- Innovation: Are there novel concepts or approaches? Are the aims original and innovative?
- Investigator: Is the investigator appropriately trained?
- Environment: Does the scientific environment

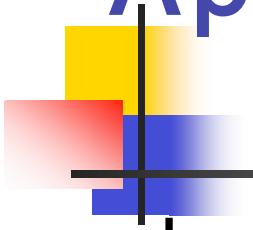
After the Review Meeting

- Scores are entered into database and released.
- SRAs prepare summary statements with revised critiques

Summary Statement

- Overall resume and summary of discussion
- Essentially unedited critiques
- Priority score and percentile ranking
- Budget recommendations
- Administrative notes
- Animal/human subjects concerns

Common Problems in Applications



- Lack of new or original ideas
- Absence of an acceptable scientific rationale
- Lack of experience in the essential methodology
- Questionable reasoning in experimental approach
- Uncritical approach
- Diffuse, superficial, or unfocused research plan
- Lack of sufficient experimental detail
- Lack of knowledge of published relevant work
- Unrealistically large amount of work
- Uncertainty concerning future directions

You Get Your Summary Statement: Now What?

- Scored applications
  - Wait for your summary statement
  - Do not call the SRA
  - Call your program administrator
- Unscored applications

What if my application is not scored?

- Wait for the comments from the reviewers.
- Call your program administrator
  - Rewrite
  - Rewrite and submit to different study section

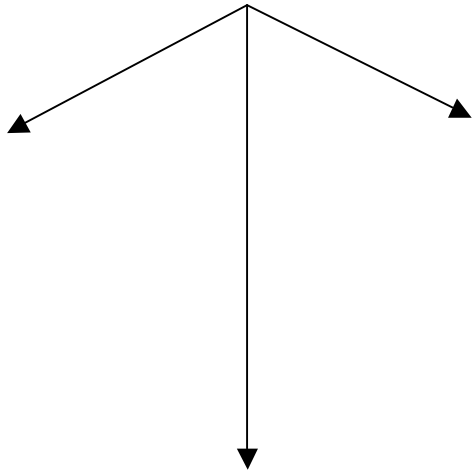
If you need to revise

- Discuss the summary statement; get help in revising.
- Be polite.
- Be responsive to all of the reviewers' criticisms.
- Put all ego aside. If in doubt, do it their way.

How to Respond to Criticisms

- Some criticisms are fairly easy to address:
  - The preliminary data in Figure 1 could be interpreted as chromatid exchange, but the PI did not discuss this possibility.
- We have new preliminary data (shown in section) OR
- This is true, and I appreciate the reviewer's taking the time to point it out. I have included this possibility my discussion of our preliminary data…

Others are more difficult…
"The research plan is overambitious."



Remove a large section(s) of the grant?

Reach a compromise?

Argue against removing any experiment?

Last, but hardly least…

- Celebrate your efforts.
- Don't forget to call us.
- Have **f u n** doing science.