MARCH DATABASE SEMINARS

SESSION 2:

MONDAY, FEBRUARY 12, 2023

1. OVERVIEW OF NIH APPLICATIONS
2. CREATING AN AIMS PAGE

PART 1

OVERVIEW OF THE FORMAT FOR INVESTIGATOR INITIATED APPLICATIONS (R01,R03,R21)

THE INVESTIGATOR INITIATED PROGRAM AT NIH

For grants, we write applications; for contracts we write proposals. The term we use in this course is **application.** The degree of independence of the investigator varies by grant type -

- R applications are investigator-initiated. It is the research you want to do, not the research NIH wants you to do. F and K grants are also investigator-initiated
- U grants (U01, UG series) are cooperative agreements in which NIH is your partner.
- Contracts are to do what NIH wants you to do.

THE R SERIES

- R01 – No budget limit, but permission must be obtained one month in advance if > $500K/year. If < $250, budget can be modular (less detail). Max duration is 5 years.
- R03 – Small grants program. $100K direct costs over 2 years.
- R21- Developmental grants. $275K direct costs over 3 years. Less need for prior data.
- R34 - NIH Clinical Trial Planning Grant. Permits early peer review of the rationale for a proposed clinical trial and supports development of essential elements of a clinical trial. Usually project period of one year, sometimes up to 3. Usually, allows for a budget of up to $100K direct costs, sometimes up to $450K. Used only by some NIH institutes/centers.

F AWARDS: INDIVIDUAL FELLOWSHIPS AND TRAINEESHIPS
http://grants.nih.gov/training/F_files_nrsa.htm

- F-series applications, also known as NRSA or Kirchstein awards (PHS 416.1).
  - F-31 is predoctoral.
  - F-32 is post-doctoral.
  - F-30 is just for MD-PhD students.
- Applications include both scientific plan and a proposed training program. Must be full time in research. Easier to get than some other grants, but huge variation by institute (from 10% to 60%!).

K AWARDS: MENTORED GRANTS

http://grants.nih.gov/training/careerdevelopmentawards.htm

- K-Series. Mentored faculty grants. Must commit 75% to research. Usually 5 years. Need strong environment.
  - K01 – "biomedical, behavioral, or clinical sciences". Generally for PhD's
  - K08 – "biomedical and behavioral research, including translational research" restricted to "clinical doctoral degree holders".
  - K23 – "patient-oriented research" for "clinical doctoral degree holders".
  - K99-R00 (kangaroo) – K-R hybrid. 3 years of post-doc + 2 years of junior faculty support
  - See also special D-SPAN version of K99-R00 for "groups underrepresented in neuroscience research"

GRANT TYPE AND NIH AGENCIES

- All 27 NIH agencies/centers and 5 offices provide funding for R01's but always check that the institute supports your kind of grant.
- These are updated regularly, but as of a few years ago
  - R21: only 17 agencies (major exclusions – NCI, NIDDK, NHLBI)
  - R03: only 14 agencies (major exclusions – NICHD, NCI, NIDDK, NHLBI), but NCI and NICHD both have some special R03 programs
  - F31: 23 agencies
  - F32: 20 agencies

FUNDING ANNOUNCEMENTS (FOA) ORDERED FROM MOST TO LEAST INDEPENDENT

- PA (program announcement). These indicate the NIH is interested in certain topics or approaches that are investigator-initiated. A PA can sometimes fund an application with a borderline score.
- PAR. A PAR is a PA with special review (R), usually by the Institute, rather than the NIH Center for Scientific Review
- CA (cooperative agreement – U series). An arrangement in which responsibility for the research is shared between NIH and a PI. These are always set up by NIH.
- RFA (request for applications – thus grants). They provide a great deal of the thinking behind an approach and a topic. Some room for initiative in design and execution.
- RFP (request for proposals – thus contracts) RFP's provide the above plus very strict "deliverables". Virtually no room for investigator initiative

PROBLEMS WITH RFA's & RFP's

1. Everyone wants to get into the act!
2. Private sector competition. Some companies do nothing but contract work.
3. Have to guess what they're thinking
4. Can be "wired" for centers that are specialized in the research.
5. No credit for original idea
6. Less opportunity for scientific creativity

BUT IF YOU WANT TO SHOP AROUND

- All federal grant opportunities can be found at

  http:/www.grants.gov

- How to apply to an NIH grant can be found at:

  https://grants.nih.gov/grants/how-to-apply-application-guide.html

- And don't forget foundations! An online foundation directory can be found at:

  https://fconline.foundationcenter.org/

  Foundation support can be very helpful in getting started
  - Modest funds and no/small indirects
  - Usually (not always) less competitive than NIH
  - Consider local foundations

DUE DATES FOR APPLICATIONS. ALL GRANTS BELOW USE SF424 (R&R) FORM			
new			
R01 Research Grants	February 5	June 5	October 5
Other Research Grants: **R03, R21, R33, R21/R33, R34, R36**	February 16	June 16	October 16
Research Career Development: **K series**	February 12	June 12	October 12
renewal, resubmission, revision			
R01 Research Grants	March 5	July 5	November 5
Other Research Grants: **R03, R21, R33, R21/R33, R34, R36**	March 16	July 16	November 16
K awards	March 12	July 12	November 12
new, renewal, resubmission			
Individual National Research Service Awards: **F series**	April 8	August 8	December 8

PAGE LIMITS
http://grants.nih.gov/grants/forms_page_limits.htm

Observe the page number limits provided in the table below, unless the FOA specifies otherwise.	PAGE LIMITS
Introduction to Revision or Resubmission Applications	1 page
Specific Aims	1 page
Research Strategy (Item 5.5.3 of Research Plan) For R03, R21, F series	6 pages
Research Strategy (Item 5.5.3 of Research Plan) R01, R21/R33, R33,	12 pages
Biosketch (per person)	5 pages
Appendix (see instructions on what is allowed in appendix)	No page limits

TECHNICAL DETAILS

BUT THEY MATTER!

FONT

- Use Arial, Helvetica, Palatino Linotype or Georgia typeface, a black font color, and a font size of 11 points or larger. *Applications have been returned unread because of the wrong font!*
- A symbol font may be used to insert Greek letters or special characters; the font size requirement still applies.
- Type density, including characters and spaces, must be no more than 15 characters per inch.
- Type may be no more than six lines per inch.
- Use black ink that can be clearly copied.
- A smaller type size is acceptable in figures and tables (including legends) but use black ink and follow the font typeface requirement. Must be legible

PAPER SIZE, MARGINS, FORMAT

- Use standard size *(8 ½" x 11")* sheets of paper.
- Use at least one-half inch margins (top, bottom, left, and right) for all pages, including continuation pages. No information should appear in the margins, including the PD/PI's name and page numbers.
- Use only a standard, single-column format.
- Single-sided and single-spaced.
- Consecutively number pages throughout. No suffixes (e.g., 5a, 5b) and no unnumbered pages.

APPEARANCE

- ½ inch margins are recommended as minimal but you can have larger margins.
- Anything that produces white space is good. DO NOT have any pages which are pure text from top to bottom!
  - Use paragraphs frequently, separated by at least 6 points (1/2 line)
  - Take the time to make sure your tables and figures are very clear and well-placed. A table or figure with its heading should be completely self-explanatory.
  - Bulleted or numbered lists always help.
  - Too many or unexplained abbreviations are application killers

NO WEB SITES IN YOUR APPLICATION

- Unless otherwise specified in a solicitation, Internet website addresses (URLs) may not be used to provide information necessary to the review because reviewers are not obligated to view the Internet sites. Moreover, reviewers are cautioned that they should not directly access an Internet site (except to review publications cited in the Biographical Sketch or Progress Report Publication List) as it could compromise their anonymity.

PROGRAM OFFICERS AND GRANT MANAGEMENT SPECIALISTS

These are NIH staff members who work for one of the NIH institutes and oversee a scientific program and the progress of grants in their portfolios.

Program officers (PO) deal with all scientific issues once the study is funded.

Grants management specialists (GMS) deal with budgets.

PO and GMS are assigned at time of study section assignment and can attend the review meeting.

KEY POINT: the program officer has nothing to do with the review process, but strong support from a program officer can help a proposal that is on the funding border get funded. This is because all study section priority lists are forwarded to an institute council that makes final decisions on funding.

PROGRAM OFFICERS CAN BE HELPFUL

- Discuss plans with them and learn if your application is relevant to their mission
- May have insights into study sections
- Can give you feedback on the review, especially if they attend the review, which they often do
- May advocate for funding
- Will help you administer the grant if you get it

PROGRAM OFFICERS CAN BE HELPFUL (cont'd)

- Will often read your grant for you, but must give them advance notice, usually 6 weeks of more before deadline
- The must approve your budget one month in advance if it is over $500K/year
- When you contact them the first time, good to have a summary of your grant idea in writing
- BUT THEY ARE NOT STUDY SECTION – THEY DO NOT DECIDE THE MERITS OF YOUR APPLICATION!

PART 2

THE SPECIFIC AIMS PAGE

BUT BEFORE YOU GET TO AIMS

TWO KEY SECTIONS USUALLY READ BEFORE AIMS	
Project Summary/Abstract	**Project Narrative**
A succinct and accurate description of the proposed work	Communicates the public health relevance of the project to the public
30 lines of text or less	No more than 2-3 sentences

NIH INSTRUCTIONS FOR AIMS

- State concisely the goals of the proposed research and summarize the expected outcome(s), including the impact that the results of the proposed research will exert on the research field(s) involved.
- List succinctly the specific objectives of the research proposed, e.g., to test a stated hypothesis, create a novel design, solve a specific problem, challenge an existing paradigm or clinical practice, address a critical barrier to progress in the field, or develop new technology.

GOALS OF AIMS

- The most important goal of the AIMS page is to ENGAGE the reviewer in the problem and your solution.
- Excite the reviewer by providing goals that are interesting and new.
- Impress the reviewer with goals that will advance the field and establish your research niche. Get the reviewer to want to see your research done.
- But also
  - Establish a road map for your approach. The specific aims of a study can be hard to understand without some context as to why and how you are undertaking these aims
  - Convince the reader that you think scientifically

ORGANIZATION OF THE AIMS PAGE

1. Overview
   a. Opening paragraph – A concise statement of the need
   b. Second paragraph – A brief explanation of how you will address that need
   c. An indication of the setting of your study
2. List of the Aims and Hypotheses
3. Impact statement – Describe what you think will change if your research succeeds

FIRST PART OF AIMS: THE OVERVIEW

The first paragraph of the AIMS page should be an overview that:

1. Identifies the scientific and public health need you are addressing. Precisely what need is being filled by this research?
2. Summarize your solution to that need
3. Orient your reader to your study by providing a brief picture of the nature, size, location and type of study you will undertake

Keep in mind the words in the instructions: concisely, succinctly

MORE ON THE AIMS OVERVIEW

- The rationale for the study, and the public health value should not be placed in the overview section. That belongs in impact, at the end
- Remember that the project summary/abstract should have been read before the aims, so no need to replicate it, but to summarize it and highlight need and solution.
- The overview paragraph of AIMS is read more closely than the project summary/abstract

FIRST PARAGRAPH OF THE AIMS OVERVIEW - NEED

- Strong opening sentence that begins to frame the problem in a way relevant to the mission of NIH.
- Must be more than descriptive.
- Then a few sentences on what is known and what is not known.
- End on what is the real critical need in the field.
- Need can be either scientific or clinical, ideally both
- Avoid simple declarations of prevalence. (millions of people die of cancer each year). It sounds banal.

WHICH IS THE BETTER "NEED" STATEMENT?

- Prostate cancer is a leading cause of cancer death in men, killing 200,000 Americans a year.
- Prostate cancer mortality, a leading cause of cancer death in men, has declined more than 50% in the past 20 years and no one knows why.

SECOND PARAGRAPH OF THE OVERVIEW: YOUR RESPONSE TO THE NEED

- Start with the long-range goal which is a solution to the need you have identified.
- Then move to describing generally the objective and/or central hypothesis of this application
- The response you propose must match the critical need you have established in the first paragraph
- This is the hardest to write
- It has to be a quick 2-4 sentence summary of the specialness of your solution and why it addresses the need you have identified.

THIRD PART OF OVERVIEW: DESIGN

- The key design features of the study need not be a separate section of overview but are best woven into the solution part of the overview.
- For example: “In a large, population-based study of middle-aged hypertensive, we will…
- But it that is awkward or difficult to say, the key design features can have their own sentence or two.

THE OVERVIEW SECTION OF AIMS

- Take a lot of time to craft these 5 -10 sentences in one or two or three paragraphs.
- They summarize the main message you want your reviewer to get.
- You must have thought a great deal ahead of time if you are going to make a strong case in this overview
- You also must be very familiar with the state of the field

SPECIFIC AIMS AND HYPOTHESES

- In some circumstances, it might be good to have a single overarching aim, with subsidiary aims
- Alternatively, you can have several aims, but exceeding three is not recommended.
- Aims work well when accompanied by hypotheses that provide specificity to aims that are more general. They can be subsets of the main aim or of subsidiary aims, for example:
    - Aim 1 – we aim to…… by testing the following hypotheses:
        - Hypothesis 1 A
        - Hypothesis 1 B

CONCEPTUAL VS PROCEDURAL AIMS

- Aims can be seen as either a setting out of the scientific aims of the study (the concepts that you are assessing) or of the procedural aims of the study (the steps you will take)
- Aims probably has to do a bit of both to be convincing
- Usually works better to try to organize aims conceptually, with procedural aspects playing a secondary role

FINAL PARAGRAPH: THE IMPACT STATEMENT

- After the specific aims, 1-2 sentences (no more) that explain what will happen to science and/or to public health if your research succeeds.
- This is IMPACT, the single most important evaluation criterion at NIH
- Even the greatest science will not get well reviewed if it has little IMPACT.
- Always keep in mind, the NSF is about SCIENCE, but NIH is about HEALTH

AIMS IN DIFFERENT TYPES OF STUDIES

- Observational research will have larger and more general aims than clinical trials and often test a few hypotheses
- Clinical trials must have one central hypothesis, but can have secondary hypotheses
- Research in the early stages of understanding will be less detailed than later research when more is known and can include hypothesis-generating aims.

AIM DANGERS
(based on study section experience)

- Do not repeat the abstract as the overview in AIMS. This irritates some reviewers
- Some studies list just aims without hypotheses. This will often come in for criticism, unless the field is so new, and the design so exploratory as to justify absence of hypotheses
- Do not be too vague and general in AIMS. Try for the same level of specificity as you use in the rest of the grant.
- Be sure that the APPROACH section parallels AIMS (make sure that the specific aims provide a road map to the application)