

NIH F30/31 Fellowship Application: Tips for Writing the Research Strategy

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You are ready to begin your NIH F31 fellowship! With the help of our F30/F31 Checklist, you now know what to include in your application. Here are some tips that can assist you during the writing process!

I. Knowing Your Audience

Determine the institute where you will be submitting your fellowship

- The NIH is composed of 27 *distinct institutes* with specific biomedical research agendas.
- Be sure to check institute webpages and contact grant officers from these institutes to ensure that your research aligns well with the institute's mission and focus. Make sure to highlight throughout your application how it addresses the institute's mission.

II. Titles – sometimes more difficult to come up with than you think!

- Titles should be as concise as possible, but be sure to include enough detail to cover the main points and implications of the study.

How to be less wordy

- Do not include unnecessary adjectives or redundant words. You may think they are helping to sell your project, but they are not!

Writing titles with impact

- If possible, it is a good idea to include keywords or buzzwords words from your field. Do not oversell your project by claiming it is something it is not, but be sure to make it sound intriguing and relevant in its title.

III. How to formulate specific aims

Relation of aims to each other

- Specific aims should follow a general theme and work towards the common goal of the proposal, but should also be *independent* from each other (i.e. if Aim 1 fails, you should still be able to pursue Aim 2).
- Aims can be based on defining mechanism (hypothesis-driven), or characterizing (usually less hypothesis-driven). A mix is fine, but your entire proposal should not be composed of characterization aims.

Phrasing your aims

- Aims can be phrased and stated in different ways. Common ways include: "To test the hypothesis that...", "To determine/elucidate the mechanism of...", "To examine how...", "To design a..."

Inclusion of subaims

- Many students prefer to break their specific aims down into 2-3 subaims
- Subaims allow for further definition of sub-hypotheses and goals of a specific aim.
- Subaims are also a nice organizational tactic, allowing reviewers to refocus each time they get to a new subaim.

How much is too much...?!?!

- One of the most common reviewer comments is that a proposal is too ambitious.
- Remember, you are only one grad student asking for 2-3 years of funding, so what you propose should be feasible for that period of time.
- Most proposals have 2 aims. However, if each of your aims is "smaller" and does not contain many experiments, it might be wise to include a third aim.

What to include in the specific aims page / brief abstract

- Many students include a paragraph-long, introductory paragraph at the top of their specific aims page. This is a nice addition because it centers reviewers to the science surrounding your proposal, highlights a gap in knowledge that needs to be addressed, and clearly delineates the significance of your work.
- Each aim is typically described in one paragraph: why is this specific question important? How will I address this question (briefly)? How will the results fit into the overall project?

IV. Significance and Background

What do I need to include?

- Try to keep this section to approximately one page. You will have opportunities later on in the document to add more specific background facts when they become necessary.
- Start by broadly explaining why your sub-field is important, then get successively more specific while introducing the key concepts and “characters” of your experiments. When deciding what details to include, ask yourself whether it’s necessary to understand your research question and proposed experiments.
- clearly sign-post the gap in the literature that your research will address with phrases like, “it is unknown whether ...”, “X has not been characterized”, “current techniques have precluded ...”, “Recent advances in technology X provide an opportunity to ...”
- If there is background information that is highly technical but would serve as a valuable addition to your strategy, add it to a specific subaim, not the background section.

What type of spin/how much the project should be sold in this section?

- The final paragraph should highlight the contributions the proposal would make to your field in general. Additionally, you should highlight how each aim would contribute to answering a specific problem, and how those answers would move your field forward.

V. Preliminary data

Why preliminary data is helpful!

- Showing preliminary data indicates that you have already committed a reasonable amount of work to the project and that the direction you are headed in has the potential to be successful.

Where to incorporate it

- Some applicants have a separate section for preliminary data, while others work it into their specific aims approach section. Either of these can work well!

Figure design

- The figure legend must contain a short, descriptive title of figure, along with a few short sentences of description that indicate what is shown in the figure and significance.
- The figure itself should have neat appearance (matching colors or patterns, fonts, etc.), error bars, statistical indicators, etc.

VI. Approach/Experimental Design

For each aim, consider having:

Brief paragraph on background and motivation

- This background will be specific to the aim and will include details that are more tailored to the aim, rather than the overall proposal
- Provides explanation of the gap in knowledge the aim will address

A few background sentences pertaining to the specific subaim (optional)

- Many students also include one or two sentences of background/significance that are very specific to the subaim.

Preliminary data specific to this aim, if you don't have a separate preliminary data section

Small approach paragraph

- Experimental setup/details to show you have thought about how to carry out experiments.

Expected results/alternative approaches

- This part is important – demonstrates critical thinking.
- Describe what you think will happen and why (include references when possible).
- Come up with feasible alternatives in the event of technical challenges with your proposed experiments, and describe why they would be good alternatives.

VII. Revising: How to Critique Your Own Work!

It is difficult to be your own critic!

- Many students look back at their work and wonder, “How did I miss this?” or “How come I did not explain this very well?” It is difficult to catch mistakes in something that is your own work and something you have already looked at for a long time. Take some time off from working on the document and then come back to it with fresh eyes!

Tips and tricks to help you edit your own work

- Use reverse outlining (make a bulleted list of just the main point of each paragraph/section) to get a bird's eye view of the logic/flow
- Re-write your research question on a new piece of paper, and evaluate every section (even every sentence!) in terms of how it directly relates to the research question. If it doesn't, you need to adjust or remove the sentence in question, or possibly edit the research question itself.
- Search for very technical words or jargon. Have you defined them or explained them well enough that a non-expert will understand?
- Carefully consider your acronyms - will your audience *definitely* know what it means (e.g. DNA)? If not, does it *need* to be an acronym/? (do you use it >6 times? Is the original phrase extremely long?) Minimize the number of acronyms you use- it takes a lot of energy from the reader to remember them, and you don't want to tire out or annoy your reviewer! When you do use acronyms, make sure they are spelled out the first time they are used (except extremely well-known acronyms, e.g. DNA)
- When proofreading, read only a page or two at a time. Proofreading in small amounts will help you from becoming bored and losing focus.
- Work with a senior student in your lab or your PI on how to better pick out issues with your fellowship. Actively learning what they look for and how to fix it will help you apply their techniques on your own.

VIII. How to Incorporate Revisions

Most students do not receive a fellowship on the first submission!

- Depending on the institute, success rates range from ~8-26%. Don't give up!

How to address reviewers' comments

- Reviewer comments can be mixed – some will be very helpful and insightful, while others may be less so. Many students believe that if they address *everything*, they will be guaranteed an award upon resubmission. Unfortunately, some reviewer requests may be unreasonable or unfeasible, or outside the scope of your intended topic.
- Thoroughly discuss review comments with your PI and determine which to address through additional experiments or better explanations, and which to “ignore” or provide justification for in your resubmission letter.

How to incorporate revisions

- In the research strategy, you will be asked to either *, [], or change the color of the newly added portions of text or figures (depending on the institute you're applying to)

- In the resubmission letter, After thanking your reviewers for their attention and comments, provide a point-by-point response to each reviewer's comments. Specifically, for each comment, restate the comment in bolded font and then explain your response after the comment.
- You can highlight data you have added, how you may have altered some ideas or proposed experiments, or how you respectfully disagree with what they have to say and why.

IX. Repurposing Your Fellowship

- The American Heart Association (AHA) has a predoctoral fellowship with similar guidelines.
- This NIH page lists funding opportunities for which you may use portions of your F31 for submission: <https://www.fic.nih.gov/Funding/NonNIH>
- This website from Johns Hopkins University lists many predoctoral funding opportunities, some with similar guidelines as F30/31: <https://research.jhu.edu/rdt/funding-opportunities/graduate/>

X. Resources

The Yale Graduate Writing Lab (GWL)

- One-on-one consultations: graduate writing advisors will work one-on-one with you to edit and polish your fellowships so they are ready for submission!
- Peer review groups: these small groups (up to 8 students per group), facilitated by a graduate writing advisor, begin approximately two months prior to the cycle submission date. Students provide and receive feedback on various fellowship sections.

Relevant websites

- Current NIH fellowship opportunities: <https://researchtraining.nih.gov/programs/fellowships>
- Samples: <https://www.niaid.nih.gov/grants-contracts/three-new-f31-sample-applications>

Your PIs, committee members, peers!

- Do not be shy about asking your PI for time to discuss ideas/different parts of your fellowship!
- Committee members may be able to provide you with different perspectives on your fellowship that may strengthen your overall research strategies. Set up meetings with them to discuss the aspects of your research with which they are most familiar.
- Older graduate students are often very willing to provide feedback on your fellowship or offer scientific writing tips. Do not be afraid to ask them for help!