

Tips on Writing National Research Service Award Predoctoral Fellowship Proposals From Real  
NRSA Reviewers

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Abstract

This is a collection of recommendations for writing National Research Service Award (NRSA) F31 predoctoral fellowship training grant proposals. These recommendations were generated by reviewers on the F12B study section devoted to Psychopathology, Developmental Disabilities, Stress and Aging to highlight features of the most successful applications we review as well as to address features that most frequently engender critical comments from reviewers. We have geared our comments specifically for predoctoral applicants applying via the F31 mechanism, but most of what we say also applies to the other NRSA awards (F30, F32).

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## Tips on Writing National Research Service Award Predoctoral Fellowship Proposals From Real NRSA Reviewers

As National Research Service Award (NRSA) training grant (F31, F30, F32) reviewers on the F12B study section devoted to Psychopathology, Developmental Disabilities, Stress and Aging, we often see applications that conform to the “letter” of the program announcement but which receive suboptimal scores for common, preventable reasons that might be difficult to intuit before submission. Here we have assembled a collection of recommendations from NRSA reviewers that will hopefully address many of these considerations. A second goal is to highlight features of the most successful applications that we review. We have geared our comments specifically for predoctoral applicants applying for the F31 mechanism, but most of what we say also applies to the other NRSA mechanisms. There are, of course exceptions to most of what we have said below, and our points are probably best thought of as general characteristics of successful applications rather than hard and fast rules. Importantly, this is not an official document. It has neither been endorsed nor constructed by NIH representatives, program officers, review officers, or staff.

### Process

#### *Read Up*

Visit the F kiosk,<sup>1</sup> and read the program announcement<sup>2</sup> and the guidelines for how F awards are evaluated.<sup>3</sup> To get a feel for what reviews are like, read the sample F critique.<sup>4</sup>

#### *Write the Application with your Mentor*

It is helpful to write the application with your mentor. It is easy to spot applications into which the mentor had little input, particularly if the applicant does not seem to know the field or the mentor’s work well enough. Make sure the mentor has read the application and has had time to comment on it before it goes out.

#### *Plan Ahead*

Most successful F31 grants are resubmissions. Our timeline for writing a K-award (faculty career award)<sup>5</sup> may be a helpful guide in preparing to write your F31.

### Biosketch

Use your personal statement for a *scientific* (not the rest of your life) biography of where you have been and what your professional aims are. Ideally, it should lead directly to the proposed project and from it.

In your personal statement, differentiate yourself from your sponsor--you should be working toward a career that is not exactly the same as the sponsor’s. It can have similarities, but the reviewers want to know you will not be a clone, and that you are capable of original ideas.

List in-press, submitted, and in-prep publications. Also list your presentations separately. For an F31, you should have at least one published or in-press publication and ideally more than two, with one first authorship to be competitive. If you do not have at least two publications, this is something that should be addressed in your sponsor’s letter, ideally with a plan for increasing publications. For an F32, having at least three papers is useful to be competitive.

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<sup>1</sup> Online at [http://grants1.nih.gov/training/F\\_files\\_nrsa.htm](http://grants1.nih.gov/training/F_files_nrsa.htm)

<sup>2</sup> Online at <http://grants.nih.gov/grants/guide/pa-files/PA-10-109.html>

<sup>3</sup> Online at [http://grants.nih.gov/grants/peer/f\\_awards/f31\\_guide\\_for\\_reviewers.pdf](http://grants.nih.gov/grants/peer/f_awards/f31_guide_for_reviewers.pdf) and <http://grants.nih.gov/grants/peer/critiques/f.htm>

<sup>4</sup> Online at [http://cms.csr.nih.gov/NR/rdonlyres/D8F7989B-2F4F-4C72-8DC0-712EC94EF119/24063/f\\_critique\\_example083010jds.pdf](http://cms.csr.nih.gov/NR/rdonlyres/D8F7989B-2F4F-4C72-8DC0-712EC94EF119/24063/f_critique_example083010jds.pdf)

<sup>5</sup> Online at <http://www.4researchers.org/articles/233>

Listing your grades and GRE scores is important, so do not omit them. Telling the reviewers the percentiles for your scores is helpful. If your grades were terrible early in your undergraduate years, you might want your sponsor to note that your circumstances, motivation, or other factors have improved.

## **Training**

### *Career Development*

Take the career development sections seriously. Your sponsor should describe your career development plan in detail in the beginning and then you should describe it at the end under “goals for fellowship and training.” Both should be multiple pages long and very explicit. The content can be virtually duplicated but from the perspectives of your advisor and you.

### *Training Activities*

Proposed training should be above and beyond that which you would otherwise receive in your graduate program. Otherwise reviewers may think that you do not need the grant to get the proposed training. Think about specific skills that you need to go further in your career, such as advanced statistical expertise to help you with longitudinal or trials data, new ways of analyzing fMRI or psychophysiological data, training in psychopathology, and so on. If you are proposing to use a specific technology, such as fMRI, proposing to take a course or workshop in that technology--to either obtain or hone your skills as a scanning maven--can be very useful.

Ideally the proposed training should not deviate too far beyond the skills used in the research protocol. So, if you are going to associate coursework with the proposal, it is helpful to say how you will use it in your proposed research. It is rare that including much clinical work, teaching, or graduate courses unrelated to the research in a proposal would be perceived as helpful unless such activities clearly enhance the applicant’s ability to complete the proposed research.

The ideal coursework is more than what you would already be gaining in your program, and enough that you can move ahead with your proposed research career. Both of these features should be noted. Proposed training should help you differentiate yourself from your sponsor so that you can have a different research career. So, if you are proposing to work with a clinical population and do not have explicit training and background with clinical populations, you should propose to get training in that clinical area--at least a course in the pathology (or if appropriate, psychopathology), and ideally spending time outside the research protocol with people with the pathology. Individual supervision should supplement your experiences learning about psychopathology. Experience in diagnostic interviewing seems to be particularly important for aspiring psychopathology researchers: Otherwise the committee may suggest you will be unqualified, at the end of the day, to do independent work with clinical populations. Be careful not to overstate what you will be able to do based on your level of training (e.g., if you are not a clinical psychologist, you should likely not be assigning diagnoses of schizophrenia). Unless your primary goal is to be a statistician, if you are proposing only retrospective data analysis for your primary research project it is useful to say that you will also have training experiences interacting with actual people; particularly, doing some relevant data collection, so that when you are done it is clear you can stand on your own.

It is useful to propose skills-building activities in manuscript and grant writing. Consider including an agenda for writing papers, attending conferences, and learning skills for grant writing. Bill Gerin’s (2006) book, *Writing the NIH Grant Proposal: A Step-by-Step Guide* is good reading in this regard.

*Choose your Sponsors and Consultants Carefully*

It is helpful to choose a sponsor who is an expert in the research area of the proposal, has published a bunch and, ideally, has mentored other NRSA or K-awardees. If your sponsor does not have a strong track record of mentorship, it is useful to bring on a co-sponsor who does have a strong track record of mentorship. Reviewers will also expect the sponsor to have funding in the proposed research area. If the sponsor does not have that specific funding, or if the funding will end during your award period, it is worth commenting about how other existing funding (e.g., start-up funds or other mechanisms) can be used to support your work.

It is helpful for the sponsor to be local; ideally at your institution. If your sponsor is not at your institution, showing that you have a track record of working with your sponsor face to face despite location, particularly going regularly back and forth from the sponsor's institution, can be helpful.

It is often helpful to have more consultants than just your sponsor. Ideally there should be consultants capable of advising on every aspect of your proposed work. For each sponsor/mentor/consultant you should say exactly what his or her unique (i.e., non-overlapping) contribution will be, and specify your specific involvement with each of them. For example, if you want to use a technology that your advisor has not used in published work, seek a consultant who will train you in those methods. If your project involves studying a form of psychopathology or comorbidity that your advisor is not expert in, seek a consultant to cover that area. All consultants should be well-published in their areas.

It is often helpful to have a statistician versed in your research area as a consultant. Having the statistician read the application before it goes out, and help with writing your analysis plan gets you lots of extra bonus points.

For applicants proposing to learn neuro-imaging, having a physicist and MR statistician on board as consultants can really help; ideally associated with the center where you are scanning.

*Describe your Interactions with Sponsors and Consultants Explicitly*

Meeting content and frequency with your sponsor, co-sponsor, and other consultants should be spelled out by them and by you--and these numbers should agree. A table of meetings is helpful to convey this information to the reviewer. Ideally, the primary sponsor will be available for weekly individual meetings. If a co-sponsor is at another site, provide a detailed plan not just for visiting, but how training will work during that visit. It is not sufficient to say "co-sponsor will be available by phone and web meetings." Additionally, it is best to specify the types of readings that will be involved. Include specific training toward producing manuscripts and enhancing your grantsmanship. Finally, the sponsor and co-sponsor's comments should be superlative if possible or at least strongly laudatory.

**Research***Hit the Public Health Relevance Hard*

How will the work you are doing help people? In other words, how will your research "translate" into improving public health-related issues? This is one strong feature on which the proposal will be judged. If you cannot answer it, neither can reviewers.

The aims should have a high likelihood of being informative; in other words, something that, if the study comes out as predicted, will lead to clinical understanding, new studies, or at least being cited by people in your field. This is particularly true for longitudinal studies, in which you want to include support for the idea that the changes you are proposing to examine over time have a high likelihood of occurring. For example, proposing a longitudinal study in which you examine how many people who are 12-13 years old develop hemophilia within one year of an

initial assessment may be deemed to have low likelihood of being informative due to the low base rate of hemophilia, and poor choice of a time-window in which the disorder will develop.

If you are examining a particular developmental period (e.g., puberty or old age) make sure to (a) clearly justify that period and (b) include relevant considerations for that developmental period. For example, if you are assessing children, will they be able to sit still for your assessments?

#### *Use Your Training*

The proposed work must represent a good training experience. You should not already have the proposed skills to do all the work you are proposing, and should emphasize what you will be learning from the proposed work.

The award is about you getting the training that will help your career to go in an interesting direction. The project is a chance to use that training. As such, it is useful to make sure that you are incorporating your training into your research plan. For example, if you propose to learn a statistical technique, include that technique in your proposed analyses.

#### *Aims*

It is often helpful to have no more than three specific aims (though applications with more can get a favorable review) and to fit them on one page. Reviewers want to see a simple story. This is not to say that the work will not have its complexities--rather, reviewers want to be able to understand the aims in a quick read. Remember, your application will be one of many they review, possibly at midnight after a long night of other grants. A confused reviewer can turn quickly into a grumpy reviewer, which does not bode well for scores.

The specific aims should not be dependent on each other; if hypotheses for Specific Aim 1 are not confirmed, it should still be useful to examine Specific Aim 2.

The aims should differentiate your work from your sponsor's. In particular, they should not read just like those from a sponsor's existing grant, as the differentiation from the sponsor may be questioned. If the overlap is large, make sure to include a statement that very clearly indicates what is new in your line of work compared to that of your sponsor.

#### *Scope*

Keep it feasible--more feasible than you think you have to. F's are often hit for being "too ambitious." In particular, proposing a reasonably powered RCT (randomized clinical trial) which is not piggy-backed on to a sponsor's work is often considered too ambitious. You may want to consider a non-randomized pilot study instead. If you do propose an RCT it is helpful to have extensive documentation of feasibility and support from your mentors and consultants.

#### *Fundamentals*

Never neglect the fundamentals. Reviewers will evaluate the proposed work with regard to strength of methods, and they will look for signs that you kept the fundamentals of research at the forefront of your thoughts as you confronted the many challenges inherent in designing a feasible study.

If you are choosing measures from the literature, choose strong measures. Document their psychometric properties, including reliability and construct validity. This is particularly important for observational studies, where experimental manipulation may be difficult or impossible, and the soundness of your conclusions depends on the psychometric quality with which a construct is measured. Using a measure "because our lab has used it in the past" or "because my sponsor designed it" is not an acceptable rationale. The standard is currently lower for psychophysiology and imaging (i.e., no one reports psychometrics on these), and this can be

noted. Note--this recommendation should not preclude you from developing measures and tasks, but if you do, it is useful to propose to evaluate their psychometrics.

Address potential confounds. All research studies must grapple with potentially confounding variables, and reviewers know this. Explicitly identify potential confounds in your research, decide how to address them (e.g., randomization, exclusion, statistical covariates, etc.), and make your reasoning transparent.

Know the current and upcoming developments in your area. Most research areas, through cumulative efforts of multiple researchers, have developed state-of-the-science methods. Use them. And propose to get trained in them. A strong goal of the F31 mechanism is to help you to be an independent investigator in your area. If the methods you choose would only have made you a terrific investigator 10 years ago, reviewers may not support the application. Of particular note, for studies of emotion and information processing, it may be useful to include measures in addition to self-report (e.g., psychophysiology, eye-tracking, imaging, etc.).

Take care to not selectively report only the literature consistent with your hypotheses--a reviewer is bound to know of inconsistent studies if they exist--it is better to head these off at the pass than to rely on the ignorance of your reviewers.

#### *Things to Include*

Do include analytic plan and power-analysis sections. This should not be a toy or pilot data collection project--reviewers want to see that it will be publishable at the end of the day. Put in a time-line for what research activities will occur when.

#### **Marketing**

Say why the proposed training and research resources are essential to making you the scientist you want to be. This is above and beyond what you would be able to get or what is typically offered for your graduate program and also above and beyond what you would otherwise do for your dissertation research. One good answer here is that the money will protect your time for research so that you do not have to teach or spend time begging on the streets.

Make sure to say how your work will be funded. This is important because the F31 mechanism does not provide research funding. Particularly if it is fMRI, say where the resources for scanning will come from.

If English is not your first language or writing is not your forte, it is very helpful to have others read through and correct your grammar, spelling, and structure. Making the grant easier to read actually helps to get a positive review.

#### **Responsible Conduct of Research**

Take responsible conduct in research seriously. Training must be ongoing throughout the award, formal, and ideally not just online. Saying that you were trained in the past is not good enough. Providing details on course content as well as individual mentorship that will support ethics training is essential. Be specific about the frequency and duration of the training as these are explicit scoring criteria. Wherever possible, name the faculty members who will mentor you in training for responsible conduct in research, as well as the specific role(s) that they will play. Having the sponsor echo their roles in this regard can be helpful.

#### **Human Subjects**

Be careful in describing procedures you will use for protecting human subjects. Mistakes in following these conventions can be perceived as evidence that you are not being well-trained in the procedures in your field. If it is a clinical trial make sure to have a Data Safety and Monitoring Plan. If it has fMRI and there are women of child-bearing age, make sure to provide for pregnancy tests.

If you are working with a clinical population, discuss limits of confidentiality and referral mechanisms if needed, and consider a certificate of confidentiality if you are asking about illegal behaviors. If you are working with a procedure that has risks or discomforts, be honest about those. If you are gathering data online, be very specific about procedures you will use to protect electronic data.

### **Consultant Letters**

It is useful to have letters from everyone remotely associated with your project. If you have a co-sponsor, it is important to have a letter from the co-sponsor. Not having letters can be interpreted as a lack of knowledge about the project or lack of involvement by the co-sponsor or consultant.

You may be asked to draft letters from your consultants and referees to you as well as your sponsor's statement. Take care as you draft these letters. The letters are a big part of reviewers' determination of your consultants' belief in and commitment to you. Do not be modest--your consultants should know you, be enthusiastic about you and your project, and demonstrate that they are committing the proposed resources to help you.

Some thoughts as you review (or draft) consultant letters:

1. It is common for consultants to reiterate their understanding of their specific contributions to the applicant's research and training plans in their letters of support.

2. If you are using a consultant or sponsor's resources (e.g., their lab) it is useful for them to say they are on board with this use.

3. Chris Martin, Ph.D., has used the following sections in his letters: (a) involvement with mentee, (b) summary of mentee background, (c) mentee's appropriateness for an F31, (d) correspondence of career development plan and research proposal, (e) endorsement of collaborators, (f) commitment of mentor's resources, (g) description of mentor's resources, and (g) support for mentee.

4. The NIMH guidelines for a career award reference letter are also helpful. They state that the letter involves an evaluation of the candidate with special reference to (a) potential for conducting research, (b) evidence of originality, (c) adequacy of scientific background, (d) quality of research endeavors or publications to date, (e) commitment to health-oriented research, and (f) need for further research experience and training.

### **Biosketch Personal Statements for Sponsors, Mentors, and Consultants**

The NIH biosketch requires that sponsors, mentors, and consultants include a personal statement. It is helpful to write a draft of this section for them. Here is a template Siegle has used:

The proposed research involves.... I have expertise in all of these areas, including..., a long history investigating..., experience with..., and formative work in.... My work in this area began in.... I currently direct the...lab which is devoted to these themes. I have successfully administered major grants in this area and currently serve as PI or Co-I on multiple NIH grants using.... I have a strong track record of mentorship and co-mentorship of graduate students including NRSA's. Currently I mentor (number) graduate students and (number) post-doctoral fellows, of whom (number) have NRSA's. My students have regularly transitioned to prestigious post-doctoral and faculty appointments. I have and can provide the necessary resources to support (name)'s training goals.

### **Responding to Pink Sheets**

1. Respond to every item in the review.

2. It is rarely useful to make changes on a revision that were not specifically identified as problems in the first submission, unless they were true design weaknesses.

3. If you get comments saying there is not enough methodological detail, be particularly careful to respond to these. If there are gross methodological lapses, it can be interpreted as a lack of mentor-involvement.

#### **Final thoughts**

This may seem like a lot of advice. Please don't let it dissuade you. The F series is a terrific and flexible award mechanism. The committees who review them are eager to see the next generation of researchers go on to brilliant careers and NIH is committed to using the F mechanism to help them do it. So good luck writing!