

Who Are You?—The Fellowship Applicant

The Fellowship Applicant section is one of the five major criteria the reviewers use to evaluate the Ruth L. Kirschstein training grants. Within this section, there are multiple components that, when considered together, provide the reviewers with an overall impression of the applicant, their goals, and their qualifications. These components include the applicant's previous academic record and scientific productivity, their previous research experience, their goals for the fellowship training and future career, a description of why the applicant selected their sponsor, department and institute, and letters of recommendation. Each of these sections examines a different aspect of the applicant and when taken together presents an overall picture of their attributes and abilities. Further, several of these components provide information that will allow the reviewers to determine whether the training described in the application is truly a departure from previous training experiences. Therefore, to fully sell yourself as an exceptional applicant, regardless of your history and present circumstances, it is important that you understand the function and importance of each component and how each of these components contributes to the overall reviewer evaluation of the applicant.

3.1 THE BIOSKETCH (4 PAGES MAXIMUM)

In the Biosketch, the applicant provides information describing their previous academic record and their scientific productivity. In addition, they provide information, in the form of a Personal Statement, that details how the training described in the application will provide an overall program that is perfect for them as it relates to their individual future career goals and ambitions and their previous training history. The Biosketch is a standard NIH form containing explicit headings detailing the information required, among which are the applicant's name, their eRA Commons name, educational history, previous positions held, and academic and professional honors. However, unlike a Biosketch written for an R-series research grant, which focuses more on the science, the Biosketch for training grants focuses on training

and the qualities of the applicant. Therefore, the NIH Biosketch for a Ruth L. Kirschstein training grant includes a section for the applicant's academic record (i.e., previous grades and test scores). Further, other sections, such as the Personal Statement, are addressed with a focus on the training that will be provided by the overall application instead of describing their qualifications to carry out the proposed research.

3.1.1 Personal Statement

The Personal Statement is the section of the Biosketch in which the applicant provides a description of their goals as a scientist, their previous research experience, and exactly how the plan described in the application will provide them with the best possible training to advance their career. The Personal Statement can be difficult to write, because it is not always entirely clear exactly what information needs to be included. However, it can be viewed, in some respects, as an “abstract” for the entire application. Just as an abstract in a manuscript provides the reader with a summary of research being presented in a paper, the Personal Statement provides a summary of all of the individual components that describe you, the applicant and how the different aspects of the application fit together to form the perfect training environment for the individual. Therefore, it is important to include explicit statements describing the goals for your career, your research training up to this point, how this previous training directed you along your present career trajectory, why you selected the mentor(s) (sponsor and cosponsor) you did, how this sponsor and cosponsor will provide you with the training you need to advance your career, how the present environment will enhance your training, and how the educational program at the institute and department will give you the training that fits your personal needs.

It is usually good to begin the Personal Statement with a solid description of your long-term goals: “My long-term research interests involve investigating molecular pathways that contribute to the development of human disease with the goal of establishing an independent research laboratory at an academic institution.” It is important that this statement be direct and detailed but yet general enough so as not to be viewed as disingenuous. The reviewers like to see that you have knowledge of your general research interests (e.g., molecular pathways that contribute to human disease) without unrealistically limiting the potential for changing interests as you progress through your career.

Follow this statement with a description of how you became interested in research, once again being explicit but not disingenuous or ingratiating. For example, sometimes personal statements will include such statements: “Ever since I was a child and I saw the wonders of nature around me, I knew that I wanted to become a scientist.” Although for some people this statement may be true, reviewers will most likely perceive this statement as saccharine and ingratiating. Instead, if there was a personal experience that motivated your career goals, state it explicitly being sure that it is stated factually, but yet with meaning: “While in graduate school, a friend was diagnosed with and succumbed to leukemia. Upon reading about this disease, I found that many forms of leukemia have a defining genetic characteristic of a chromosomal translocation, which produce oncogenic fusion proteins. From that point on I became interested in cancer biology research, in particular cancers that derive from chromosomal translocations.”

For some applicants, it may not have necessarily been a defining moment in their personal lives that motivated their career decisions but instead their present path is a culmination of an overall educational process. Regardless of whether the present training trajectory derived from a single moment (as described above) or an overall process, provide a brief description of your academic history. Where did you perform your previous training (undergraduate and/or graduate if appropriate) and how did that experience contribute to forming your present career trajectory. If there was a specific class or teacher that made an impact on your decision to pursue academic science or a particular research focus, you should include that information, but in a reserved and factual manner. It is also important to include a statement that describes the factors driving your decision to choose your present training program and mentor. For example, if you are a graduate student that underwent laboratory rotations, state: “As part of the graduate program at X, I underwent a series of laboratory rotations during my first year of graduate school. Through these rotations, Dr. Y impressed me with her hands-on, nurturing mentoring approach. Further, her research sparked my interest as it relates to my long-term goals.” Finally, concisely summarize how the overall training that you will receive is perfect for you: “Taken together, the skills learned from my experience at this institute and completion of the training plan put forth by Dr. Y and the Departmental program, along with ample mentoring opportunities available here, will equip me with the diverse

qualities needed to pursue a career as an independent researcher in an academic environment.”

Sometimes an applicant may have issues in their past or personal situations that may limit or affect the perception reviewers have of the overall quality of the described training plan. These issues may include personal family situations that require an applicant to remain within a region or even an institute to continue their training; personal health issues that caused an applicant to take a hiatus from their training or created a perceived gap in their publication or training history; health or personal issues of a previous mentor that delayed publication of previous work; or even simple immaturity and indecision at an earlier stage of training that resulted in poor academic grades. Regardless of the reason, it is important that these issues be addressed directly, but in a professional manner, in the Personal Statement. Remember, although it may not necessarily seem like it when reading their critiques, the reviewers are human and understand that even though an applicant may have the best intentions, that sometimes life simply gets in the way. Further, it is even more important to remember that reviewers usually read applications very closely and will see inconsistencies (such as a gap in your training) in your past. If no reason is given to explain these inconsistencies, the reviewer will “assume the worst” and your overall score will suffer accordingly.

In general, reviewers will respect honesty and openness, as long as it is not perceived as an excuse for poor past performance. Further, it is important that you provide a description of why this past issue is not an impediment to your present and future excellence. For example: “During my undergraduate career I was not entirely sure of my dedication to academics. Because of this indecision I did not perform as well as could be expected in my classes. However, during my junior year when I took a course in X, I discovered my passion for Y and as a result fully applied myself to this newfound love. Now, I am dedicated to realizing my goals of becoming an independent scientist, as illustrated by my significantly improved grades in my final year of undergraduate and in graduate school.”

Finally, it is very important to remember to write the Personal Statement keeping in mind the type of training grant for which you are applying. For example, a person applying for the F31 predoctoral grant is at the beginning of their career training. Therefore, they are at

the stage in their development in which they are obtaining the broad base in knowledge, skills, and scientific thought they need to develop into a strong scientist. In contrast, the postdoctoral researcher applying for an F32 fellowship has already obtained this knowledge. Therefore, their training needs to focus on the techniques and skills that are essential for them to transition to an independent academic position, keeping in mind that these skills are not only technical but also include mentoring, presentation, and laboratory management. Further, the career goals of the F31 predoctoral applicant (who are training to become academic scientists) are very different from those of the F30 MD/PhD applicant (who are training to become clinicians/scientists) and as such they require a different type of training in order to achieve these goals.

3.1.2 Publications

As with an established investigator on an R-series application, a training applicant's scientific productivity is determined by their list of publications. However, unlike an established investigator who has been working in their field for years or even decades, the applicant for a training grant will not necessarily have an extensive list of peer-reviewed articles. The reviewers understand this fact and recognize that depending on the nature of the grant for which you are applying (i.e., F30/F31 vs. F32) you may or may not have peer-reviewed publications. For example, a second-year postdoctoral fellow applying for an F32 training grant will be expected to have peer-reviewed publications from their graduate work but not necessarily from their present postdoctoral position. Along these same lines, a second- or third-year graduate or MD/PhD student applying for an F31 or F30 will also not necessarily be expected to have any publications from their present graduate training. In both cases, though, having peer-reviewed publications, either from their past work or their present position, will greatly enhance the overall perceived quality of the applicant.

Therefore, it is important to consider several alternative forms in which an applicant can demonstrate their productivity. These alternative forms can include publications that are in revision or have been submitted (listing the journal to which they were submitted) and manuscripts that are in preparation (listing the journal to which you intend to submit). It is important to note, however, that these types of publication listings *do not carry nearly the weight as an accepted or published*

manuscript. The reason they do not carry as much weight is that unless a manuscript has been accepted for publication, it has not endured the rigors of peer review and has not been “validated” by that process. Regardless, these manuscripts in development demonstrate to the reviewers that your work has progressed to a point at which you are able to prepare it for scrutiny by your peers. It is also acceptable to include published abstracts, poster presentations, and invited talks, including all regional, state, national, and/or international venues in which your work was presented. Although not published in a journal, which indicates to the reviewers and to the scientific community in general that your work passes the scrutiny of your peers, these last three categories demonstrate that you have been productive enough to have your work recognized on a larger stage and accepted for dissemination to the scientific community. Finally, regardless of the type of publication, it is highly recommended that you use bold font for your name and indicate with an asterisk if you are a co-first author on a publication. By doing this you highlight where your name falls in the author listing (first author, cofirst author, middle author, etc.), thereby making it easier for the reviewer to determine your contributions to the work included in that publication.

3.1.3 Scholastic Performance

The scholastic performance of the applicant is illustrated by the grades they achieved throughout their education. The Biosketch form that is provided by the NIH for the Ruth L. Kirschstein training grant has a table for entering academic grades. When entering your grades into this table it is important to remember to include ALL of your grades from your undergraduate and graduate institutions and not just your science-related grades. The reviewers want to see the full range of academic capabilities, not simply in the science-related classes. Also, selecting and choosing which grades to present may raise a question to the reviewer that there may not be full disclosure about your academic performance. It is extremely important to clearly delineate which grades come from which institution. Remember, the reviewer may be reading your application under suboptimal conditions (see Chapter 2). Therefore, it is essential to be as clear as possible to avoid potentially annoying a tired reviewer who has to work to figure out your academic history. One good rule of thumb is to place all of the grades from an individual institute into one column with the name of that institute as a heading (Table 3.1).

Table 3.1 The Listing of Academic Grades

The University of Delaware		Johns Hopkins University	
General Chemistry	A	Graduate Biochemistry	B
Organic Chemistry	B	Biophysics	B
Physical Chemistry	C	Molecular Biology	A
Instrumental Analysis	B	Bioorganic Mechanisms	B
German	A	Immunology	A
		Seminar	P
		Anatomy and Physiology	HP

Some courses at Johns Hopkins University are graded on a Pass/Fail basis (P/F). Medical School classes are graded as Honors (H), High Pass (HP), and Pass (P), which correlate to scores of 90–100%, 80–90%, and 70–80%, respectively.

If the list of grades scrolls to a second page retype the name of the institute within the appropriate column on the new page. If you have taken a course that was not graded on an A–B–C scale, identify how the course was graded (Pass/Fail, Honors/High Pass/Pass, etc.) and what criterion was used to derive the different grade rankings. Finally, include your GRE or MCAT scores and if you are an MD/PhD student it may even be helpful to include your Step 1 Certification results.

Remember, the reviewers are looking for the cream of the crop. It will be the applicants with 4.0 GPAs, GRE scores of 650–800 in each section, or MCAT scores well above 30 who are ranked highly in terms of their scholastic performance. If you have an academic history in which you’ve earned a solid mix of As and Bs you will also be considered an exceptional applicant. One C will raise eyebrows and potentially affect your score while more than one C (or even lower) will significantly affect your score. It is important to remember that this is your history. It is finished and there is nothing you can do to change it. However, you must address this issue directly, which can be done in several different ways. First, the focus of these training grants is to assist in the development of an independent researcher, where capabilities and excellence in the lab many times carry more weight than past academic grades. Therefore, have one or more of your references explicitly state that your academic record does not truly reflect your capabilities in the laboratory. Second, many times an applicant had a poor academic performance due to difficult personal issues or simply because they did not know what they wanted to do with their career. If this is the case, concisely and tactfully describe this issue in the

Personal Statement of the Biosketch (see above). The reviewers do not want to know the nitty-gritty details of your personal life. However, if your personal life (e.g., taking care of an ailing family member, working two jobs to pay for school, unexpected health issues) impacted your ability to perform to your optimal capacity, it is essential that the reviewers are aware of this fact. Be certain, too, to point out that those issues are no longer a factor in your life and you have focused on your career goals. Finally, many times an applicant has poor grades in undergraduate but then improves significantly in their graduate work. If this is the case, make an explicit point of this in your Personal Statement. As with the second point, this indicates to the reviewers that you now have your act together and are able to focus your attentions on your present training.

3.2 GOALS FOR FELLOWSHIP TRAINING AND CAREER (1 PAGE MAXIMUM)

For an applicant to be considered truly exceptional, not only must they have a solid academic record and history of productivity, but they must also possess a mature and concrete view of their future career plans and they must be able to clearly communicate how the present training will help them achieve these goals. The section “Goals for Fellowship Training and Career” is the section in which the applicant does just that. When stating your career goals it is important to be specific and to clearly state what your career goals are. For example, some applicants will state “My career goal is to run an independent lab in a high-power institute.” This statement is vague and tells the reviewer nothing about what field of research inspires and interests you. A better statement would be: “My ultimate career goal is to become an independent researcher at an academic institution and to establish a laboratory that studies molecular pathways that contribute to human disease.” While still being somewhat general, it provides a more mature explanation of where you see yourself (an academic institution), what type of research you would like to perform (examining molecular pathways), and what aspect of overall health-related work (human diseases). If possible, it is better to further define the molecular or biological process that interests you and how that process contributes to a more specific health field (e.g., understanding the role of signal transduction pathways in neurodegenerative disease).

Once you have stated your career goals, provide a clear explanation of how the present training and sponsor will help you achieve these goals: “By providing me with extensive training in technical and investigatory aspects related to molecular pathways involved in neurodegenerative disease, this project and sponsor fits perfectly into my future goals of using my research skills to...” Follow this statement by describing the field in which the sponsor works and how that fits your goals, and any explicit technical training that you will receive (e.g., Western blot analysis, DNA isolation, analysis of signal transduction pathways, etc.). It is very important to remember that training does not solely involve the technical aspects of science. Many applications are criticized for not describing the training they will receive in the non-technical aspects of academic research, which include experimental design, results analysis, manuscript/grant preparation, presentation skills, and networking. These are skills that are essential for a student to learn in order to be truly successful as an independent scientist and are usually learned directly from the sponsor. As such, these aspects of training must be explicitly stated. Further, it is important for postdoctoral fellows to describe how the present training and sponsor will help them transition to an independent career and whether they will be allowed to develop a project to take with them to initiate their independent research.

Another aspect that must be discussed in this section is the environment in which the training will take place and how the environment will contribute to you achieving your career goals. The environment will provide access to various different resources that will greatly enhance and enrich a training program, including access to cutting-edge technologies, proximity to other institutes to foster collaborations and networking, and journal clubs and/or seminar series that will expose the applicant to invited speakers. Further, if you are a student, it is essential to describe how the Departmental program will provide essential training to obtain your career goals: “The training program set forth by the Department of Genetics will contribute to my long-term goals by providing me with a strong and diverse base of knowledge through a curriculum that includes...” Remember, you are selling yourself and everything about the training program, which includes the sponsor, the department, the educational program, and the institutional environment. You want to convince the reviewers that as a whole this program is perfect for you to receive an exceptional

education. They want to see a multifaceted program that will give you all of the aspects of training that are required to help you achieve a clearly defined long-term career goal.

As with the Personal Statement, it is important to remember the type of training grant for which you are applying. With the postdoctoral F32, the reviewers will want to see a more discretely defined goal than in the predoctoral and/or MD/PhD training grants, because the postdoctoral years are where an investigator truly hones their skills in their field of interest. Also, the postdoctoral researcher is learning the skills needed for them to transition to an independent faculty position. Therefore, it is essential that a description of how the present training will help them achieve that goal of independence (including laboratory management, mentoring, and having a project for them to take with them to establish their independent laboratory) must be included. For example: “Dr. X is dedicated to preparing me for an independent position by teaching me different aspects of laboratory management. Further, through several discussions, Dr. X has agreed to allow me to develop part of my work into a project for me to take with me to establish an independent lab.” In contrast, reviewers understand that predoctoral students are learning how to think like a scientist and most likely the focus of their doctoral dissertation work will not necessarily be the field in which they work in their independent careers. Therefore, the description of the goals for the present training for predoctoral students should focus more on the training they will receive to think like a scientist and how to develop, analyze, and present their work and be less on the exact field of interest.

3.3 SELECTION OF SPONSOR AND INSTITUTE (1 PAGE MAXIMUM)

The sponsor, or the mentor/advisor, is the person who has the greatest influence on the direct training of an applicant. As such, the reviewers want to see that the applicant has given careful thought into how they chose this person with whom to conduct their training. Further, the department and institute will also contribute to the overall training of an individual. In the “Selection of Sponsor and Institute” section, you will explicitly and clearly describe why you selected the sponsor, department, and institute in which to perform your training. You need to state exactly what it was about each of these three components that

made you feel that this would be the “perfect convergence” of factors to give you the best training for you as an individual. In some ways, this section contains similar information as the “Goals for Fellowship Training and Career” section. In both sections you describe how your training will help you achieve your goals. However, while the focus of the Goals section is to talk about how the overall training, which includes the sponsor, department, and institute, will help you achieve your goals, the “Selection of Sponsor” section focuses on the unique qualities that your advisor, the department, and the institute have that will give you the optimal training you need.

When writing this section, as with all of the parts of the application, you want to be direct and to the point to make it as easy as possible for the reviewer to see the exceptional nature of your choices and that your selections were mature and well informed. “I chose to pursue my PhD (or MD/PhD or postdoctoral research) at institute X because...” Follow this introductory sentence with explicit reasons for why this institute fits your needs: they have an exceptional educational program that provides a solid basis from which to build your training; they provide diverse research opportunities for a student; they have an interdisciplinary program to enhance your research experiences; a strong collaborative environment exists to promote collaborations, etc. Along these same lines, be very explicit about why you chose a particular department; “I chose to undergo my training in Department Y because...” Again follow this statement with distinct and clear reasons (e.g., the type of research going on in the department, the quality of the research, the supportive caring faculty, the departmental educational program, etc.).

Most importantly, describe your reasons for working with the mentor; “I chose to work with Dr. Z for multiple reasons. Among these are...” When describing your reasons, in particular with your sponsor, remember that the training involves more than just the technical aspects of science. Therefore, in addition to describing how the sponsor’s research fits your scientific goals, you must describe how their particular mentoring style is suited for you. Does your sponsor have the ability to be more hands-on, which means there will be more extensive interactions between the two of you? This may be important for the predoctoral and/or MD/PhD student who are beginning their training. Does your sponsor take a more distant approach, which means

you will be left more to your own devices? This style may be more important for the postdoctoral researcher where independence is required. Does your sponsor have a unique teaching style that has proven results? This is evidenced through the level and quality of career placement that the previous trainees obtained after leaving the laboratory. How does the sponsor teach? Do they use more of a “Socratic” method, which leads you to the question versus a more didactic method, which tells you the answer directly? It is also important to talk about the laboratory environment. Is it a large lab, giving you many opportunities to interact and learn from others? Is it a small lab that creates a closer, more nurturing environment? Finally, after you have discussed all of these characteristics it is essential that you swing it back to focus on you, the trainee, and describe exactly why all of these characteristics that are unique to your sponsor and laboratory environment are perfect for you as an individual and your specific training needs.

Finally, some training grants require having a cosponsor or collaborator to supplement the perceived weaknesses of a junior faculty or to provide scientific expertise for a particular aspect of the project (to be discussed in Chapter 4). If you include a cosponsor or collaborator, it is necessary for you to describe why you chose the specific person you did for this role. As with the sponsor description, explicitly state what qualities or expertise the cosponsor will bring. “Because my sponsor is a junior faculty and has limited training experience, I have chosen Dr. X as a cosponsor. Dr. X has a long history of training students and therefore will be able to . . .” However, it is not sufficient to simply pick a cosponsor because of their long training history. It is important that they also have technical or scientific expertise to complement your project. “In addition, Dr. X has worked in the field of Z for 17 years, as evidenced by his publication record, and will . . .” After this statement, describe how the cosponsor will be instrumental in providing you the training you need as it relates to your project and your career goals. It is also beneficial to mention that the cosponsor will serve on your thesis committee (if you are a predoctoral or MD/PhD student) or on your advisory committee (if you are a postdoctoral fellow). Further, describe how the cosponsor will assist you in experimental design, results analysis, manuscript preparation, etc. What is important when describing the cosponsor is that their contributions to your training must seamlessly fit into the overall training plan. The reviewers

want to see that the cosponsor or collaborator will be integral to your training and not simply a tangential figure placed there to “appease” previous critiques or to “pad” your grant application.

3.4 PREVIOUS RESEARCH EXPERIENCE (2 PAGES MAXIMUM)

In addition to a solid academic record and good productivity, the reviewers want to see that you have previous research experience. This previous experience covers all of your previous work, including high school science internships, summer research programs, undergraduate research projects, and graduate school rotation projects. It is also necessary to describe your thesis research up to your present point of education (if you are a predoctoral or MD/PhD student) or your postdoctoral research to the point at which you are writing the application. This description of research experience serves several purposes in the evaluation of the applicant. First, it shows how much research experience you had before entering your present training position. This information is important because the extent of your previous research experience will indicate how much training you will require in your present position and will also provide a measure for the reviewers to use when evaluating your productivity through publications. Again, remember the type of training plan for which you are writing. While definitely a plus to have experience, extensive research exposure is not as essential for predoctoral and MD/PhD students as it is with postdoctoral researchers, who will have completed a thesis project. Part of the assumption with the predoctoral candidates is that they are in the training program to learn how to perform academic research.

In addition to detailing the extent of your previous research experience, this section will also provide information on the scope and variety of your previous experience. The reviewers use this information to determine not only the breadth of your experience but also how much your present training will be a departure from your previous work. There are instances where the applicant has a fairly extensive research history. However, all of their research is in the same field. For example, an applicant performed undergraduate research examining neurodegeneration using cell culture techniques. They then progressed to their predoctoral work where they did a similar type of research in an identical model system but examining a slightly different molecular

mechanism. They then apply for a postdoctoral training grant in which their project is also examining neurodegeneration in a cellular system. While there is nothing wrong with having a very focused knowledge of exactly what type of research interests you, the continuation of a homogenous focus of research throughout your entire training history (i.e., neurodegeneration in a cellular system) will not be perceived as providing any additional training opportunities. In this scenario, it is imperative that you point out in your Personal Statement and Goals sections why you chose to pursue such a focused research interest, which can be perceived as limiting your training potential, and explicitly state how the present training will truly broaden your experience and provide you with novel training opportunities. Further, have your sponsor explicitly state in their training plan (discussed in Chapter 4) how the present program will provide you new training.

The previous scenario is not intended to imply that having a defined research interest is a negative thing. However, it is important to remember that in addition to focusing on the training you will receive, this application also examines the maturity of the applicant. Therefore, having explicit ambitions to work in a specific field requires clearly defined reasons describing why you have this apparent “hyper-focus.” Many times reviewers see it as a positive when an applicant does, in fact, have a very clear picture of their research interests and goals and their research experience supports this focused ambition. However, in general what the reviewers are looking for is that you will, in fact, gain new training experiences with the money provided by the training grant. These new experiences can be obtained by working in the same field but in a completely different model system. For example, an applicant is interested in the role of signaling pathways in the development of cancer. They pursued this interest in their predoctoral work using a cellular model system. They have now progressed on to their postdoctoral work where they are working in the same field, but have now moved to an animal model system. Although the research focus is the same, they will obtain invaluable experience working with animals and learning how to relate results found in the animals to what is known in cells. Another example would be a case where an applicant performed extensive undergraduate research examining the effects of alcohol on regulating gene expression in muscle development using a cellular model. Their present dissertation research is now working on the same question in an identical model system. However, instead of

examining the molecular mechanisms at work (e.g., transcriptional regulation) they are now using genomics and bioinformatics to look at global gene expression differences and affects. Again, the use of significantly different techniques and cutting edge technology will provide invaluable training in different forms of analysis.

When writing about your previous research experience, it is essential to break down your descriptions into distinct, identifiable sections or paragraphs based on the time period in which you did the work (high school internship, undergraduate honors project, dissertation work, etc.) and the mentor for whom you worked at the time. It is best to present these sections in chronological order from earliest to the most recent. Within each section you need to explicitly describe the research focus of the lab where you worked and what you did during this experience: “The research of Dr. X involves. . . During my time in this laboratory my project focused on determining. . .” Tell them how you went about addressing the question of your research and then wrap up the section by explicitly stating the conclusions that you were able to draw from your work; “Through this work I was able to demonstrate that X causes Y, which allowed us to conclude Z.” Also, it is extremely important to state whether this work resulted in a peer-reviewed publication, published abstract, or poster presentation in which you were included as an author. “This work was of a significance that allowed my inclusion as an author on. . .” After you make this statement provide them with a reference, even if that reference is included in your Biosketch. Remember, the reviewer may not want to have to return to your Biosketch to find the reference to which you are referring. In addition to telling the reviewers how much research experience you have and the variety of research training to which you were exposed, this section also demonstrates that you have a history of being able to tackle a project and move it to a logical conclusion at a level that is accepted through peer review or public dissemination.

3.5 LETTERS OF RECOMMENDATION (3 REFERENCES REQUIRED)

Your letters of recommendation will provide the reviewers with an independent evaluation of your capabilities. These letters also provide a description of a history of excellence, suggesting to the reviewers that this history will translate into a solid potential for your future success as

an independent investigator. Therefore, it is essential that you choose the people who will serve as your references carefully. One of the biggest mistakes applicants make is selecting references that all derive from the same institute, if not even the same department, as where the present training is taking place. The department and institute where you are presently working have a vested interest in your success and as such would be expected to write solid letters of support. Therefore, a useful guideline when selecting references is as follows: if you have performed research at another institute (i.e., graduate work, summer internships, undergraduate research, etc.), select your previous mentor to serve as at least one of your references. If you have performed research at several different institutes, then request letters of support from several of these mentors. It is also advisable to select the third reference from within your institute but from a faculty member that is outside of your present department. If possible, make sure that this person serves on your thesis or advisory committee so they are capable of commenting directly on your potential as an independent researcher. It is possible that an applicant, particularly a predoctoral student, may not have performed research as an undergraduate. If this is the case, request a letter of support from a faculty member at the undergraduate institute who is capable of commenting on your potential as an independent researcher. Finally, if you are an MD/PhD student it may be beneficial to get a letter of support from the director of the MD/PhD program. What these guidelines illustrate is the importance of examining your educational and research history and carefully selecting references from each stage of your development to highlight a track record of excellence and a diverse consensus on your abilities as an independent researcher.

When you are deciding on whom to select to serve as references, be sure to select people that you know will write you solid, strong letters of recommendation. This scenario is similar to the adage a defense lawyer takes; never ask a witness a question for which you don't already know the answer. A weak or poorly written letter from a reference will significantly affect how well an applicant will be reviewed. Further, when you contact your references be sure to explicitly ask them to comment on your potential for a successful career as an independent researcher (F31 and F32 applications) or physician scientist (F30 application). If as discussed above you have a poor academic history and this history is not necessarily an indication of your capabilities as a scientist or resulted from external personal issues that were

out of your control, select a reference that can explicitly comment on this fact and specifically ask them to discuss this in their letter. For example, an applicant may have had poor grades during several semesters of their undergraduate work. However, their passion was at the bench, where their true capabilities came through, a fact on which the undergraduate mentor can elaborate. Or, if these poor grades resulted from personal tragedy, illness, or unusual circumstances, it is important that the mentor from the undergraduate work makes these facts abundantly clear and explicitly state that the classroom grades in no way represent the true capability of the applicant. Reviewers usually place more weight on the laboratory and scientific skills of the applicant, particularly when references from all aspects of an applicant's training career independently concur on this fact.

The applicant does not submit the letters of reference and more importantly, the applicant is not allowed to see these letters. Instead the applicant must arrange to have the referees submit their recommendations through eRA Commons at the following web address: (<https://public.era.nih.gov/commons/public/reference/submitReferenceLetter.do?mode=new>). Because the references are being submitted through the eRA Commons and not Grants.gov, the applicant must provide the referees with specific information including their eRA Commons user ID, their last name, and the Funding Opportunity Announcement number. They must also inform the referee that they must use the Fellowship Reference Form, accessible through a link at the above web address. This form includes 12 topics, including Research Ability and Potential, Written and Verbal Communications, Perseverance in Pursuing Goals, Self-Reliance and Independence, Clinical Proficiency (if relevant), Laboratory Skills and Techniques (if relevant), Originality, Accuracy, Scientific Background, Familiarity with Research Literature, and Ability to Organize Scientific Data. The referee rates the applicant on each of these topics on a scale of 1–5 (1 = upper 5%, 2 = upper 6–20%, 3 = upper 21–40%, 4 = middle 41–60%, 5 = lower 40%). A space is then provided for the referee to include their written recommendation. Alternatively, the referee can attach a file containing a letter of recommendation on letterhead, as long as the Fellowship Reference Form is present. Failure to utilize the Fellowship Reference Form may result in the application being returned without review. It is important to note that these references are due by the application receipt deadline.

3.6 RESPECTIVE CONTRIBUTIONS (1 PAGE MAXIMUM)

All reviewers know, and expect, that you did not construct this application in a void independent of your sponsor. Further, they realize that your project did not simply materialize independent of the work ongoing in the laboratory in which you are working. Therefore, this section serves as the place where you tell the reviewers exactly what contributions each individual person made to the development of this application and will make in the future work associated with this grant. Some key phrases that may help in the writing of this section are as follows:

- “The development of the research plan put forth in this proposal was developed as a collaboration between Dr. X and myself.”
- “The specific aims that will be undertaken derived from small facets of ongoing studies within the lab.”
- “This plan was developed from extensive literature research and preliminary data performed by myself.”
- “Frequent one-on-one meetings with Dr. X helped me develop this plan.”
- “I was responsible for writing the initial draft of this proposal, which then underwent multiple revisions, with the assistance of Dr. X.”
- “I will be the primary investigator in accomplishing the work described in this proposal. I will carry out the development of experiments and analysis of results with guidance from Dr. X.”

Although this section is probably one of the least scrutinized when evaluating the applicant, it is extremely important that the same care and meticulousness that was used to write all of the other sections be used to write this section, too.

3.7 ACTIVITIES PLANNED UNDER THIS AWARD

The reviewers want to see that you have a distinct and realistic perspective on the time frame in which your training will progress and that the proposed training will be able to be accomplished within the funding period. In the section “Activities Planned Under This Award” you break down each year of your training into a “percent effort” indicating what percent of your time will be dedicated to different aspects of your training. These different aspects of training include research, professional development, teaching/mentoring, and clinical (if

appropriate). Present the breakdown of the percent efforts in a table with columns for each of the applicable pursuits and a row for each year of your training (Table 3.2). It is important that you critically evaluate the time you will spend in each of these pursuits, remembering that the primary role of your training is research. Further, the percent efforts should change as the training period progresses. For example, a postdoctoral researcher may have 5% effort in professional development in the first 2 years. However, the final year of training will also involve the search for an independent faculty position, which involves the preparation of your application and going on job interviews. Therefore, your professional development will increase slightly in the final year.

The table is followed by a description of what activities you consider to be part of the overall headings. Begin this section with a statement reminding the reviewers that you understand how the training to become an independent investigator involves more than simply the technical aspects of research: “My development into an independent investigator involves undertaking activities not only in the technical aspects of my chosen field but also in the realm of professional development, teaching, and transitioning to independence. Therefore, I will undertake the following activities to achieve my training.” While it is not necessary to break down the research into excruciating detail, it is helpful to indicate how long you predict each independent Specific Aim to take to complete. Keep in mind, the reviewers are all investigators and they understand that this is science and a time prediction is just that... a prediction. “I will focus on Experiments 1–3 of Specific Aim 1 in the first 6 months of my training. During this time I will also begin the breeding of mice to generate the animal model system described in Specific Aim 2.”

When discussing the professional development, be sure to explicitly and clearly define what you consider to be professional development.

Table 3.2 The Delineation of Activities Planned Under the Award for a Postdoctoral Trainee

	Research (%)	Professional Development (%)	Teaching/Mentoring (%)	Clinical (%)
Year 1	90	5	5	0
Year 2	90	5	5	0
Year 3	85	10	5	0

Professional development should encompass the writing of manuscripts and grants, presentation of your work, networking, and attendance at seminars and classes important to your education. For postdoctoral fellows, it is essential that the professional development include the learning of laboratory management and the search for an independent faculty position. Finally, the reviewers are expecting that you will progress on to an academic career. Therefore, most study section members like to see that you will have experience in the mentoring of students and possibly limited teaching of classes.

3.7.1 The Second Time Around—Performing a Second Postdoctoral Training

On occasion an applicant who is performing their second postdoctoral training will submit a Ruth L. Kirschstein training grant. While this is not necessarily a bad thing in terms of a person's career development, this particular type of applicant will have to provide detailed information describing their reasons for undertaking a second postdoctoral position. It is misguided for an applicant to think that the reviewers will not realize that this is their second postdoctoral experience. The basic fact is that reviewers scrutinize applications for fine details and will in fact notice that an applicant is in their second postdoctoral position and will want to know why a second postdoctoral training period was required. If there is no explicit description, the reviewers may think there is something being hidden from them, which will adversely affect the overall score. There are a multitude of reasons why a person would elect to perform a second postdoctoral training: The applicant's research interests developed in a direction that fell outside the realm of expertise in their present laboratory and they needed additional training; personal issues developed between them and their advisor creating an adverse training environment, etc. However, regardless of the reason, these issues must be addressed either directly or tactfully.

The issue of the second postdoctoral position will need to be addressed in almost every component that relates to describing the applicant. In the Biosketch Personal Statement, be forthcoming with the fact that this is your second postdoctoral position. For example: "During my first postdoctoral training period my research unexpectedly introduced me to X field, which I found to be extremely interesting. Therefore, I decided to perform a second postdoctoral training in this new field to gain more in depth exposure and hands-on

experience.” Along these lines, this same point must be discussed and expanded in the Goals for Training and Career section, as this is a distinct, and unexpected, change in your career path. Further, this change will also require that you justify the selection of your new sponsor with explicit discussion in the Selection of Sponsor component and a discussion of the research you undertook in your first postdoctoral position in the Previous Research Experience component. Finally, if you left your first postdoctoral position on good terms it is essential for you to have a letter of recommendation from your first postdoctoral advisor, in which that person reiterates why it was essential for you to obtain further postdoctoral training in another lab. However, if the second scenario discussed above, in which you did not leave the first postdoctoral training lab on good terms, is the case, do not include a letter of recommendation from that advisor (as they can not necessarily be counted on to provide you with a solid recommendation) but provide a tactful explanation for this in the Personal Statement of the Biosketch for why their recommendation is not being included.