

## Postdoctoral Mentoring Plans for NSF Proposals – Requirements and Samples

As of January 2009, all NSF grant applications that include funding support for postdoctoral fellows MUST include a mentoring plan. The specific language of the requirement is:

*NSF*

*Chapter II, Section C.2d(i):*

- **Postdoctoral Researcher Mentoring Plan.** Each proposal<sup>33</sup> that requests funding to support **postdoctoral researchers**<sup>34</sup> must include, as a supplementary document, a description of the mentoring activities that will be provided for such individuals. If a Postdoctoral Researcher Mentoring Plan is required, FastLane will not permit submission of a proposal if the Plan is missing. In no more than one page, the mentoring plan must describe the mentoring that will be provided to all postdoctoral researchers supported by the project, irrespective of whether they reside at the submitting organization, any subawardee organization, or at any organization participating in a simultaneously submitted collaborative project. Proposers are advised that the mentoring plan may not be used to circumvent the 15-page project description limitation. See [GPG Chapter II.D.4](#) for additional information on collaborative proposals. Mentoring activities provided to postdoctoral researchers supported on the project will be evaluated under the Broader Impacts review criterion.

Examples of mentoring activities include, but are not limited to: career counseling; training in preparation of grant proposals, publications and presentations; guidance on ways to improve teaching and mentoring skills; guidance on how to effectively collaborate with researchers from diverse backgrounds and disciplinary areas; and training in responsible professional practices.

### NSF Proposal Guide Reference

[http://www.nsf.gov/pubs/policydocs/pappguide/nsf13001/gpg\\_2.jsp#II.C.2j](http://www.nsf.gov/pubs/policydocs/pappguide/nsf13001/gpg_2.jsp#II.C.2j)

The following guidelines and example mentoring summaries have been adapted from examples found on various university websites. The NSF has recommends against the use of ‘boilerplate’ language and expects PIs to tailor their mentoring plans best suited to their own laboratories and research programs, but generally, it is recommended that you address many or all of the following points:

### General Guidelines

- The goal of the mentoring program is to provide the skills, knowledge, and experience to prepare your postdoctoral associates to become independent researchers and to excel in their chosen career path. Simply put, your mentoring efforts should be directed at enhancing the postdoctoral experience through a program of structured activities.
- Indicate that establishing and implementing an *Individual Development Plan* and an *Annual Performance Review* are integral components of the mentoring process for each of your postdocs.
- You should indicate that you encourage/require your postdocs to attend relevant seminars and workshops offered by the Office of Postdoctoral Studies, the Office of Research (e.g., RCR, ethical and safety issues training, grant writing), or other providers.
- Indicate if you’ve provided forums (e.g., meetings, lab sessions, seminars, conferences) for postdoctoral researchers to give formal or informal presentations of their research.
- Indicate how frequently you meet individually with each postdoc to address the following areas:
  - a. research results
  - b. (weekly, biweekly, monthly) lab meetings, in which postdocs have the opportunity to present and discuss their research with the rest of the laboratory
  - c. the postdoc’s specific career goals
- You should indicate if you’ve provided structured opportunities for your postdoc(s) to acquire both teaching experience and an understanding of faculty roles and responsibilities.
- Indicate if you provide travel support for postdocs to attend local, regional, national, and/or international scientific meetings to facilitate their training and provide networking opportunities.
- You should also indicate that the success of your mentoring plan will be evaluated by tracking postdoctoral associates through their *Individual Development Plans*, conducting periodic interviews to assess associates’ satisfaction with the mentoring program, and tracking progress toward career goals after finishing their postdoctoral training at UNL.

Several different sample mentoring summaries below reflect adaptations of examples provided in 2008 by the Federation of American Societies for Experimental Biology (FASEB). Although the examples are discipline specific, you can readily adapt the content—or include your own specific aspects—to fit your research field. Remember that the overall approach of your plan should clearly illustrate an effective and persuasive mentoring program. Remember that NSF is not looking for “boiler plate” documents, so make sure your plan fits the needs of your students and program.

## **External Resources on Developing Mentoring Plans**

- Federation of American Societies for Experimental Biology (FASEB) [statement](#) on mentoring plans and [sample plans](#)
- [Mentoring plan](#) resources from the National Postdoctoral Association

## Example 1

Postdoctoral scholars working in my laboratory will conduct research on the neuronal processes involved in Pavlovian fear learning. Under my mentorship, they will learn to formulate and test hypotheses related to the acquisition, consolidation, and retrieval of fear memories; develop expertise in behavioral and neurobiological techniques including intracranial drug infusion, single-unit and slice electrophysiology, and immunocytochemical analysis; and acquire expert knowledge of the scientific literature in our research area.

At the start of their training, postdocs will be required to provide the Office of Postdoctoral Studies (OPS) with relevant contact information so they receive announcements of upcoming training seminars and events offered by OPS and the Office of Research; attendance at these professional and career development seminars will serve to supplement the individualized mentoring I provide. Postdocs will also be encouraged to make use of the extensive professional and career development resources on both the OPS ([www.unl.edu/postdoc](http://www.unl.edu/postdoc)) and the National Postdoctoral Association (NPA) websites. UNL is a sustaining member of the NPA.

To foster open and clear communication with my postdocs, I will provide each with the *Compact Between Postdoctoral Appointees and Their Mentors* (attached), which describes the commitments both they and I make to ensure an effective postdoctoral training experience. We will discuss these expectations and the steps we will take to achieve the goals of the *Compact* at the start of the postdoctoral appointment. On an individual basis, we will also collaboratively complete an *Individual Development Plan* (attached) to help postdocs identify both their short- and long-term goals and the skills and abilities needed to achieve them. Used in conjunction with the *Annual Performance Review* (attached), the IDP will serve as an iterative mentoring tool that will help establish an ongoing, productive mentor-mentee partnership characterized by mutual respect and understanding.

Because effective communication of research findings is an essential component of scientific success, I will help my postdocs hone their communication skills by having them write research articles and develop oral and poster presentations for lab meetings, department seminars, and scientific meetings. I will also help them prepare their own research grants and involve them in the development of mine. Finally, I believe that all trainees benefit from the perspectives and guidance of multiple mentors; therefore, while I will serve as my postdocs' primary advisor and mentor, I will encourage them to seek additional mentors within and outside our institution.

## **Example 2**

### ***Scientific and technical skills***

- Postdocs will contribute to research on the role glutamate-dependent neuronal plasticity plays in addiction to psychostimulant drugs such as cocaine and amphetamine.
- They will work under my guidance and with assistance from senior lab members and faculty collaborators to develop the scientific and technical skills necessary to carry out this research program.
- In the course of this research, they will develop expertise in behavioral and biochemical techniques, including drug self-administration, immunocytochemical analysis, BS3 assay, SDS-PAGE, and Western blotting. These skills will have broad applicability to other areas of research and will be an immense benefit to postdocs as they establish their own laboratories.
- Postdocs will add to their scientific knowledge by reading and discussing scientific literature with me and other members of the lab and participating in journal clubs and seminars related to this research.

### ***Career planning and professional development***

- I will work with postdocs to design an individual development plan describing their research, training, and career goals as well as the approaches they will take to achieve those goals. We will review and revisit this plan on a regular basis.
- I will meet weekly with postdocs to discuss their progress on research projects and to identify and resolve any difficulties carrying out their work.
- Postdocs will be encouraged to attend workshops on responsible conduct of research, career opportunities, resume writing, and interview skills.

### ***Communication skills***

- Postdocs will improve their ability to communicate research findings by presenting and obtaining feedback on their research at regularly scheduled lab meetings.
- Postdocs will also have an opportunity to present their research at our weekly departmental colloquium series at which faculty, graduate students, postdocs, and invited speakers present on a rotating basis.
- Postdocs will be encouraged to give poster and oral presentations during the Experimental Biology annual meeting.
- I will help postdocs enhance their writing skills by working with them to develop research reports and review articles.

- Postdocs will be invited to join me in teaching a freshman seminar on our research topic. This will give them experience presenting complex scientific information to an audience of non-experts, and it will provide valuable teaching experience.

#### ***Grants management***

- I will involve postdocs in the preparation of new grant applications and competing renewals.
- I will encourage postdocs to apply for independent research support, such as a National Science Foundation postdoctoral fellowship or a National Institutes of Health Pathway to Independence award. I will provide guidance as they develop these grant applications.

#### ***Laboratory management***

- Postdocs will be required to receive training in lab safety, animal care and use, and responsible conduct of research.
- Postdocs will be involved in day-to-day management of lab operations (e.g., ordering laboratory supplies, overseeing the lab budget, maintaining research equipment and facilities, ensuring compliance with safety standards).
- Postdocs will be involved in training and mentoring undergraduate and graduate students.
- Postdocs will have a role in recruiting and interviewing new students and employees to the lab.

### Example 3

#### Example Postdoctoral Researcher Mentoring Plan for an NSF Proposal

[Note: The following mentoring plan is provided as an **example**; however, the specific mentoring plan a PI develops should fit the project, the school's goals, and the needs of the postdoctoral researcher(s) to be mentored. Adapt references as appropriate to reflect specific recommendations or processes pertinent to your field and students.]

One postdoctoral researcher will be funded on this project. The postdoctoral researcher's development will be enhanced through a program of structured mentoring activities. The **goal** of the mentoring program will be to provide the skills, knowledge and experience to prepare the postdoctoral researcher to excel in his/her career path. To accomplish this goal, the mentoring plan will follow the guidance of the **National Academies of Science and Engineering on how to enhance the postdoctoral experience**, by providing a structured mentoring plan, career planning assistance, and opportunities to learn a number of career skills such as writing grant proposals, teaching students, writing articles for publication and communication skills [1]. Specific elements of the mentoring plan will include:

- Working with the postdoctoral researcher to establish and implement an **Individual Development Plan** based on the process developed by the FASEB [2]
- Seminars, workshops and individual consultations on **how to identify research funding opportunities and write competitive proposals**, offered by the University of California Merced Office of Sponsored Projects
- Participation in seminars and workshops on **teaching and learning**, as well as access to a teaching mentoring program.
- Opportunities to **network with visiting scholars who are leaders in our field** by having lunch or dinner with them when they participate in the school's visiting speaker series
- Participation in a **journal club** for graduate students and postdocs, in which participants meet weekly, along with a faculty facilitator, to discuss and critique recent journal articles in the field and to discuss how to write and submit journal articles
- Travel to at least **two conferences each year** [name conferences here] (travel funds are included in the budget), with the goal that the postdoctoral fellow present a poster or paper at the conference.
- Participation in a monthly brown bag lunch series for postdoctoral fellows and graduate students in our school, in which speakers will be invited to discuss subjects related to **career development** such as how to apply for a faculty position, career paths outside of academia, tips for negotiating salary and start-up funds, how to plan and independent research agenda, etc.
- Participation in the PI's weekly research group meetings, in which members will be expected to present their research regularly, and feedback and coaching will be given to help all members to **develop their communication and presentation skills**.

**Success of this mentoring plan will be assessed** by tracking the progress of the postdoctoral fellow through her/his Individual Development Plan, interviews of the postdoctoral fellow to assess satisfaction with the mentoring program, and tracking of the postdoctoral fellow's progress toward his/her career goals after finishing the postdoc.

[1] National Academy of Science, National Academy of Engineering, Institute of Medicine, "Enhancing the Postdoctoral Experience for Scientists and Engineers: A Guide for Postdoctoral Scholars, Advisers, Institutions, Funding Organizations, and Disciplinary Societies," National Academies Press, 2000.

[2] The Federation of American Societies for Experimental Biology, "Individual Development Plan for Postdoctoral Fellows," <http://www.faseb.org/>

## Example 4

**This Postdoctoral Researcher Mentoring Plan** has been prepared by <organization name>. The Plan establishes guidelines for work to be performed by a Postdoctoral Researcher in support of the NSF <SBIR or STTR> <Phase I or Phase II> Project Awarded to <company name>, entitled “<title of project>”. The Postdoctoral Researcher assigned to the project will work in <name/university> laboratory and will conduct research on <name tasks>.

**1. Orientation** will include in-depth conversations between <company researcher name> and the Postdoctoral Researcher. Mutual expectations will be discussed and agreed upon in advance. Orientation topics will include (a) the amount of independence the Postdoctoral Researcher requires, (b) interaction with coworkers, (c) productivity including the importance of scientific publications, (d) work habits and laboratory safety, and (e) documentation of research methodologies and experimental details so that the work can be continued by other researchers in the future.

**2. Career Counseling** will be directed at providing the Postdoctoral Researcher with the skills, knowledge, and experience needed to excel in his/her chosen career path. In addition to guidance provided by <post doc researcher name>, the Postdoctoral Researcher will be encouraged to discuss career options with researchers and managers at <university name> and with former students and colleagues of <post doc researcher name>.

**3. Experience with Preparation of Grant Proposals** will be gained by direct involvement of the Postdoctoral Researcher in proposals prepared by <company name>. The Postdoctoral Researcher will have an opportunity to learn best practices in proposal preparation including identification of key research questions, definition of objectives, description of approach and rationale, and construction of a work plan, timeline, and budget.

**4. Publications and Presentations** are expected to result from the work supported by the grant. These will be prepared under the direction of <post doc researcher name> and in collaboration with researchers at <company name> as appropriate. The Postdoctoral Researcher will receive guidance and training in the preparation of manuscripts for scientific journals and presentations at conferences.

**5. Teaching and Mentoring Skills** will be developed in the context of regular meetings within <university name> research group during which graduate students and postdoctoral researchers describe their work to colleagues within the group and assist each other with solutions to challenging research problems, often resulting in cross fertilization of ideas.



**6. Instruction in Professional Practices** will be provided on a regular basis in the context of the research work and will include fundamentals of the scientific method, laboratory safety, and other standards of professional practice. In addition, the Postdoctoral Researcher will be encouraged to affiliate with one or more professional societies in his/her chosen field.

**7. Technology Transfer** activities will include regular contact with researchers at <company name>. The Postdoctoral Researcher will be given an opportunity to become familiar with the university-industry relationship including applicable confidentiality requirements and preparation of invention disclosure applications.

**8. Success of the Mentoring Plan** will be assessed by monitoring the personal progress of the Postdoctoral Researcher through a tracking of the Postdoctoral Researcher's progress toward his/her career goals after finishing the postdoctoral program.