



## **National Postdoctoral Association Response to OSTP RFI: Building a 21<sup>st</sup> Century Bioeconomy**

On behalf of the National Postdoctoral Association (NPA), we would like to thank the President and the White House Office of Science and Technology Policy (OSTP) for the opportunity to provide information during the development of the National Bioeconomy Blueprint. The NPA is a 501(c)3 nonprofit, professional association that seeks to provide a national voice for postdoctoral scholars (postdocs), to educate the public regarding the contributions that postdocs make to U.S. innovation and discovery, and to facilitate positive change for these new researchers. Since our founding, we have worked collaboratively with all stakeholders to enhance the postdoctoral experience and thereby to maximize the effectiveness of the U.S. research endeavor.

Because of our organization's expertise in and focus on postdoctoral scholars, this response is limited to questions regarding workforce development, namely questions #9 and #11. It should also be noted that this response focuses specifically on the postdoctoral experience, although some of our suggestions are also relevant to other populations such as graduate students.

**(Question 9) The majority of doctorate recipients will accept jobs outside of academia. What modifications should be made to professional training programs to better prepare scientists and engineers for private-sector bioeconomy jobs?**

### *Educate Principal Investigators (PIs)*

*(Please note: the term Principal Investigator (PI) is being used in this response to signify not only PIs but also faculty mentors and supervisors, where they are not one and the same.)*

The NPA's interactions with postdocs suggest that the majority of new biomedical scientists begin their postdocs with high hopes that their Principal Investigators' (PIs') connections and expertise will help them to acquire that elusive tenure-track position, in spite of statistics that suggest that across all disciplines only one in four new Ph.D. recipients will acquire such a position. To compound this situation, PIs more often than not perpetuate the cultural norm that the ultimate goal for an independent researcher is academic tenure. There are several possible reasons for this break with reality on the part of both postdocs and PIs, but the most likely reason, aside from traditional expectations for a successful scientific career, is that neither party truly understands that there are no longer enough tenure-track academic positions to go around, given the continued growth in the number of postdocs. **Institutions need to educate PIs about the economic reality in the life sciences.** At the very least, institutional leaders of career development/training programs need to provide PIs with data

describing the current job market for doctorate recipients in the life sciences. Currently, many postdocs feel like a “failure” as a scientist if they do not acquire a tenure-track academic appointment, and many PIs feel like a “failure” as a mentor if their postdoctoral trainees do not move on to a tenure-track academic appointment. Education about current job market realities is needed to change these cultural misperceptions.

**In addition to providing education about the general economic landscape, training programs also need to educate PIs about (1) the types of jobs in the private sector that are available to postdocs and (2) the skills necessary to succeed in those jobs.** In today’s environment, it would be preferable for PIs to encourage postdocs to consider all of their career options. Yet, in reality, most PIs only understand the academic career track. Institutions and departments need to inform their faculty members about the non-academic career options open to doctorate recipients and the types of skills their trainees need to develop in order to secure those jobs. It would also be helpful for institutions to provide resources or training that would allow PIs to be better informed about the job search process in the private sector and the ways in which it differs from the job search process in academia. Without this type of information, even well-intentioned PIs might be at a loss about how to mentor and prepare postdocs who intend to pursue careers in the private sector. Federal granting agencies could support the efforts of local institutions by developing resources that institutions and departments can use to educate their faculty members.

The importance of the postdoc office cannot be underestimated in terms of providing this information not only to PIs but also to postdocs. Since its establishment, the NPA has encouraged and actively supported the establishment of postdoc offices at research institutions, and the number of postdoc offices known to the NPA has increased from 13 in 2000 to 128 this year. The presence of an office, even if it is just one part-time person at a desk in the graduate dean’s office, results in new or increased development of resources and adoption of institutional policies that support postdocs. Postdocs become more visible to faculty as colleagues and contributors to the institution’s research efforts. **Thus, the establishment of postdoc offices should be at the minimum endorsed by federal agencies.**

### Raise Mentoring Expectations

The PI holds a tremendous amount of power over a postdoctoral researcher. His/her supervision and mentoring (or lack of same) can make the difference between success and failure for the vulnerable postdoc. **Along with providing appropriate education and training for PIs, institutions, departments, and training programs need to raise their mentoring expectations of PIs and enforce those expectations. At a minimum, PIs should encourage postdocs to (1) consider all of their career options; (2) find multiple mentors as needed who can guide them in those options; and (3) pursue professional development opportunities.** PIs should support and consider postdoc offices as a resource, rather than as another layer of bureaucracy. Institutions should communicate these expectations clearly to PIs, and the fulfillment of these expectations should be considered during the tenure process and other evaluations.

Considering the policies of federal funding agencies, however, there is currently little incentive for local institutions to raise expectations of PIs and encourage better mentoring of trainees with an interest in non-academic career paths. **To ensure that mentoring expectations of PIs are raised, it is critical that federal funding agencies make several policy changes to support the efforts of local institutions:**

- 1) **Federal funding agencies should provide stricter guidelines and expectations for the role of the PI in supervising postdocs and the role of the institution in**

- supporting the PI and the postdocs.** At the minimum, all federal funding agencies should require a mentoring plan for all postdocs supported by them, including those on research grants. The NSF recently implemented such a requirement after the passage of the 2007 America Competes Act. Agencies should also include the evaluation of the postdoctoral mentoring plan as part of the peer review process and require reporting on the outcomes of that plan in annual reports. Agencies should also gather data from postdocs themselves about the perceived effectiveness of the mentoring plans.
- 2) **The NIH needs to clarify the definition of “success” for institutional training grants and to make a significant and ongoing effort to educate its reviewers and personnel regarding acceptable outcomes in regard to employment of trainees.** Although the current wording in the solicitation is broad enough to include independent research careers in industry, government, and other fields as well as academia, the workforce culture is such that wording like “productive scientific careers” is interpreted by the reviewers and PIs as “productive [academic] scientific careers.” (The NPA has been given to understand that this interpretation was not intended by the NIH.) The NIH could help to change the culture by including specific wording that clearly states that independent research careers outside of academia are equally acceptable indicators of training “success.”
  - 3) **Furthermore, the NIH and other federal funding agencies should consider broadening the definition of “success” for training grants to include “science-related” positions.** The NPA understands that doing so would enter a gray area of “What is science-related?” but believes that it should be seriously considered, given the lack of independent research positions today. Without these changes to the definition of successful training outcomes in the evaluation of grants, training programs and PIs that do take efforts to mentor and prepare postdocs for a variety of private sector bioeconomy careers will be at a disadvantage during the grant review process.

#### *Utilize Core Competencies to Provide Relevant Self-Assessment and Professional Development*

The variety of career options available today demands a diverse array of skills, such as writing grant proposals and CVs or mastering the principles of effective resource management, that are often neglected during doctoral study and postdoctoral research. The postdoctoral experience will be more relevant to career and professional development if the scholar seeks or is offered opportunities to acquire, maintain, or improve such skills. The NPA has established six broad core competencies meant to serve primarily as: (1) a basis for self-evaluation by postdoctoral scholars and (2) a basis for developing training opportunities that can be evaluated by mentors, institutions, and other advisors ([www.nationalpostdoc.org/competencies](http://www.nationalpostdoc.org/competencies)). **Individual institutions and training programs should adapt the NPA (or other) core competencies and develop discipline-specific core competencies that are used to standardize their training efforts and evaluate the effectiveness of their training programs.**

Federal agencies can encourage these efforts by developing agency-wide core competencies to guide the formal and “informal” training (on research grants) of biomedical postdocs. In some respects, the NIH has already begun to do so in the training program language (e.g., requirements for training in responsible conduct of research). The federal government can also encourage these efforts at institutions by allowing funds from current institutional training grants to be used for the development of core competencies.

Provide Opportunities for Diverse Professional/Career Development and Career Exploration

**Institutions and training programs should develop and provide workshops, seminars, and other programs for postdocs that (1) encourage career exploration and (2) help postdocs develop the skills necessary for success in private-sector jobs.** Postdocs rarely receive training in business concepts and soft skills (e.g., teaching, leadership, and management) that would help them succeed in the private sector. They could benefit greatly from access to business school courses, and institutions without business schools should be encouraged to offer workshops and seminars that offer training in management, interpersonal communication, and basic business concepts. Postdocs from other countries conducting research in the United States would often benefit from English language training to ensure that their language and communication skills are sufficient for the needs of private sector employers. In addition, many postdocs are unaware of the variety of private sector jobs available to them, and postdoctoral training programs could provide opportunities for career exploration that would allow postdocs to determine if they would be a good fit for one or more private sector career paths. Postdoc offices do and could provide coordination and leadership of these efforts.

In addition to providing funding to institutions and training programs for the development of such activities and programs (through institutional training grants and similar funding mechanisms), the federal government could support the efforts of institutions by providing a mechanism for institutions to share information with each other about particularly innovative and effective career development programs and activities. Federal funding agencies could also provide centrally produced career development activities to support local efforts. Funding agencies would not necessarily have to “reinvent the wheel” but could build upon or expand the dissemination of the resources that have been developed by the NIH Office of Intramural Research, the NPA, and other groups. For example, funding agencies could encourage institutions to use mentoring tools such as individual development plans [such as that developed by the Federation of American Societies for Experimental Biology (FASEB)] and the Association of American Medical Colleges (AAMC) Compact between Postdoctoral Appointees and Their Mentors.

Allow Release Time for Professional Development on NIH Research Grants

In order for postdocs to be able to take advantage of any additional career exploration and career development opportunities developed by local institutions and training programs, **it is critical that the NIH require release time for postdocs funded through its non-training grants to take advantage of these career development opportunities.** Currently, many PIs will not allow postdocs to take time to develop soft skills because of the 100%-time-and-effort required by most NIH grant guidelines. Building in from 5% to 20% release time for postdocs to pursue opportunities to build these skills will help to prepare them for diverse careers. Rather than take away from productivity, this time will help them to be more productive and help to ensure their future productivity and success<sup>1</sup>. Without this change in NIH policy, it is likely that any new training resources developed by local institutions and training programs will be poorly utilized.

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<sup>1</sup> “Postdocs reporting the greatest amount of structured oversight and formal training are much more likely to say they are satisfied, to give their advisors high ratings, to experience relatively few conflicts with their advisors and to be more productive in terms of numbers of publications compared with those with the least oversight and training.” Davis, G. (May-June 2005). *Doctors without orders: Highlights of the Sigma Xi postdoc survey*. Special supplement to the *American Scientist*.

### Provide Job Search Guidance and Support

**Institutions and training programs should provide job search guidance and support to postdocs who plan to enter the private sector as well as those seeking academic positions.** In the current apprenticeship model of biomedical training, postdocs who are searching for tenure-track positions within academia generally look to their PIs for job search assistance. PIs are able to help postdocs network, alert them to faculty job openings, assist with the preparation of application materials, and provide guidance during the interview process. Because most PIs have not experienced the job search process in the private sector, they do not have the expertise to provide the same degree of guidance to postdocs undertaking a job search in the private sector. Institutions and training programs must fill in this gap. Institutions and training programs can provide job search guidance by providing seminars on job search skills relevant to all career paths, offering one-on-one counseling with trained career services staff, or working with alumni or private sector companies to provide postdocs with additional mentors in the private sector.

**(Question 11) What role might government, industry, and academia play in encouraging successful entrepreneurship by faculty, graduate students, and postdocs?**

### Provide Training Specific to the Entrepreneur Career Path

As mentioned above, postdocs rarely receive training in general business concepts and soft skills. Such training is crucial if postdocs are to become successful entrepreneurs; they need business training in additional topics such as technology transfer, drug development, developing business models, and basic finance and accounting, as well as soft skills. Government, academia, and the private sector should work together to provide such training. Again, the NIH should allow release time for postdocs funded through its research grants to take advantage of such training. These seminars and courses should also be allowable training for postdocs funded through institutional (T32) and individual (F32) training grants.

### Increase the Opportunities for Independence

While the postdoctoral experience is currently viewed as a training period in preparation for becoming an independent scientist, the current system does not promote exploration of independent ideas because the biomedical postdoc must most often focus on the research for which his/her PI has funding. To encourage entrepreneurship in the postdoc population, postdocs should be encouraged to develop their own independent, innovative ideas. **The NIH and other federal funding agencies should therefore consider a gradual increase in the number of postdocs funded by training or career grants.** This will increase the ratio of postdoctoral scholars funded by training grants to those funded by research grants, encouraging greater independence in postdocs. The NPA recommends increasing the number of postdocs funded by training or career grants from 6,800+ to 8,500+ over the next ten years, changing the ratio from a little of  $\frac{1}{4}$  to approximately  $\frac{1}{3}$ . We have only one caveat to this recommendation: that the entry-level stipend is \$45,000.

### Establish Intellectual Property Rights Conducive to Pursuit of Entrepreneurship

Intellectual property rights are often not available to postdocs. The research that they conduct usually becomes the property of the institution and/or PI. Unfortunately, the assignment of these rights are rarely well articulated to postdocs, who most likely did not negotiate with the PI regarding ownership of

data and publication rights and then are surprised to find that the PI/university controls the postdoc's data and use of that data. **Institutions and funding agencies should clearly articulate the intellectual property rights of postdocs and, as appropriate, allow postdocs the opportunity to participate in entrepreneurial activity based on the postdoc's research, whether initiated by the PI or initiated by the postdoc in collaboration with the PI.**

*Thank you for your consideration.*

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