

### Mentoring Guide #1: Understanding Your Role as a Mentor

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*This first Guide in the Series provides a high-level overview of the NRC Adviser's role as a mentor of NRC Research Associates at the postdoctoral level.<sup>1</sup> It offers insight into the types of support Associates want and need and how you can help them achieve success.*

#### I. Introduction

There is no one-size-fits-all formula for excellent mentorship of postdoctoral Research Associates. Each individual Associate has their own set of strengths, motivators, challenges, and dreams. Research Advisers are unique, too, learning and growing over time as researchers and mentors. As such, each mentoring relationship you are involved in will be unique and “the right” approach to each individual that you mentor will be different. It is important to remember that above all, *flexibility and adaptability are key characteristics of successful research mentors.*<sup>2</sup>

Despite the unique aspects of each individual mentoring relationship, there are common elements in postdoctoral Associate-Adviser mentoring relationships. These include common markers of successful postdoctoral research experiences that you and your mentee can work towards. There are also common development needs and challenges for postdoctoral researchers that you can anticipate. By cultivating a handful of mentoring approaches, you can prepare to rise to the different types of mentoring occasions that are most likely to present themselves. In this guide, we review the markers of success and types of advising approaches, then dive more deeply into development themes and challenges, and finally explore how you might help the NRC Associates you mentor prepare for their next career stage.

#### II. Successfully Mentoring Postdoctoral Researchers

The markers of a successful postdoctoral experience include:

- Research Productivity
- Professional Development
- Career Advancement

For NRC Associates, **research productivity** is generally measured by high-impact scientific publications and presentations, sometimes supplemented by other discipline-specific metrics. **Professional development**, in this context, refers to building the competence, confidence, and reputation of postdoctoral Associates to prepare them for their next professional milestone. This typically involves achieving readiness for a principal investigator role and establishing credibility and visibility within their technical community, though details will vary for each individual and career path. **Career advancement** includes preparing for and securing *suitable employment*, ideally in a permanent position. In this case, “suitable” means a position aligned not only with qualifications but also with the Associate’s strengths, interests, and personal and professional

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goals – in short, *a position that excites them*. As an NRC Adviser and mentor, you will play a pivotal role in helping each mentee achieve success in all three areas.

Because achieving success across these categories requires several types of development, effective Advisers must utilize a variety of mentoring approaches and know how to match their approach to different situations. For example, NRC Research Associates need to learn about, and comply with, their agency's policies. This is not an area for negotiation or discussion; knowledge of the policies and expectations of compliance simply need to be communicated. In this case, you would instruct your mentee. For a technical challenge, with data analysis or instrumentation issues for example, your approach might include offering advice, sharing a decision framework, or brainstorming new directions – mentoring techniques that help the Associate learn to resolve these types of issues themselves. More personal topics, such as choosing a career path, call for coaching techniques to help the individual more deeply explore their own interests; positive feedback to highlight their strengths; and Socratic questioning to help them discover how this new self-knowledge might translate into career possibilities. For a complex situation, such as resolving an authorship dispute among collaborators, you might use all of these techniques and more – such as guided observation<sup>3</sup> – to help your mentee learn and grow.

### III. Mentorship for Research Productivity

While the ultimate responsibility for productivity as a researcher falls to the NRC Associate, Advisers can help by *creating the conditions that enable research productivity*. There are several things you can do to help create these conditions, including:

- minimizing roadblocks and distractions
- clarifying expectations
- anticipating challenges and proactively mentoring in these areas

The tenure of an NRC Associate is generally quite short, in many cases two years or less, and it is inherently quite challenging to produce new research results in such a short period of time. One way Advisers can help Associates succeed is by working to **minimize roadblocks and distractions**. For example, there might be a special instrument or a programming technique the NRC Associates in your group need to learn before starting their research project. While it may be possible for the Associate to attend a training class on the subject a few months after they arrive, that certainly is not optimal from a research productivity perspective. Eliminating this roadblock by doing some targeted teaching of the skills yourself might be a better solution. Similarly, you might help your mentee anticipate and manage around planned facility shutdowns, routine equipment maintenance, equipment upgrade cycles, animal and human protocol requirements, and so on, all of which can pose significant challenges for researchers working under constrained timelines.

Administrative processes are another source of potential roadblocks and distractions. Experienced government employees are proficient at a variety of administrative tasks that can be confusing, frustrating, and time-consuming for new lab members. NRC Associates might need to complete some of these tasks – no one should skip safety training, for example. It might be more efficient in other cases, however, to have administrative tasks handled by a permanent employee. Weighing time invested against relevant learning will help you honor your mentee's short timeline and foster their research productivity.

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Because NRC Associates are often setting their own research goals for the first time, it is important to help them paint a realistic picture of success – in essence, to help them understand what “productivity” means for postdoctoral researchers in your organization. In this way, Advisers help foster productivity by **clarifying expectations**. Though each project is unique, you can rely on your experience to provide a general idea of how the research program is likely to play out. You can help your mentee understand how long it usually takes to get up to speed in the lab, when they should be ready to prepare publications, when internal presentation opportunities might arise, and how many publications may result from their work. You might provide a new NRC Associate with a roadmap for their tenure, pointing out key events such as trainings, important conferences, timelines or protocols for accessing specialized facilities or equipment and how their performance will be assessed. Sharing guidelines like these with new Associates can be very reassuring to them.

One particularly important issue to clarify is expectations on secondary projects and collaborations. What percentage, if any, of the NRC Associate’s time may be spent away from their primary research project? If collaborations are encouraged, at what point are these appropriate? It is also important to address upfront the level of alignment a new project idea needs with your agency’s mission in order for it to be supported. Too much, too little, or misaligned effort on secondary projects can be detrimental to research productivity.

A third way Advisers can create the conditions enabling research productivity is by **anticipating common challenges and proactively mentoring in these areas**. The postdoctoral experience typically includes many “firsts” for researchers that create challenges for them. There are research-related “firsts,” such as the first time developing and running a research project relatively independently, the first true taste of intellectual freedom, and the first time having to consider the mission and objectives of the larger organization when making choices about research direction. There are also work environment-related “firsts,” such as the first time working outside of an academic laboratory, or not being co-located with a supportive peer group working on very similar projects. Further, there are self-leadership “firsts,” such as the first time having to finish a project within a clearly defined timeframe and the first time creating professional goals rather than working towards an academically defined goal such as obtaining a PhD. Keeping these “firsts” in mind as you engage with your mentee, as well as the typical professional growth areas described in the next section, will help you recognize situations in which extra time and attention from you may be especially helpful.

#### IV. Mentorship for Professional Development

At the postdoctoral stage, Research Associates are developing into confident, self-directed, independent researchers who contribute to their organizations and their broader technical community. Our recent work with experienced NRC Advisers has identified a set of professional development areas common to many postdoctoral researchers:<sup>2,4,5</sup>

- Expanding Technical Knowledge and Skills
- Planning Scientific Work
- Communicating Scientific Work
- Developing Professional and Collegial Work Behaviors

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- Engaging Effectively in Collaborations
- Understanding the “Business of Science”

Each of these is described in a little more detail below. Giving these topics some advance consideration will help you recognize aspects of research work that could challenge your mentee and anticipate situations in which you might need to engage proactively.

**Expanding technical knowledge and skills** is a central focus of postdoctoral study. Associates may want to deepen their knowledge in an area related to prior work, broaden knowledge within their scientific discipline, or develop new expertise that enables them to change fields. You can help your mentees by sharing your knowledge, facilitating connections with other technical experts, and guiding them towards research opportunities with high learning potential. Facilitate deep learning by challenging thought processes constructively and by helping your mentee apply their knowledge of fundamental principles in the new research areas of interest.

**Planning scientific work** is a large category and one we have already partially explored in the previous section on productivity. It includes thinking through resource needs, identifying key uncertainties and potential project pivot points, anticipating problems, understanding what a “publishable unit” looks like in your specialty’s journals of interest, and maintaining focus. Much of this category falls under the heading of “firsts” for postdoctoral researchers, so they will most likely need your help.

**Communicating scientific work** includes effectively handling different formats (writing, presenting, discussions), successful communication with different types of audiences (scientific peers, multi-disciplinary groups, non-expert groups), and tailoring communication to a specific purpose (e.g., sharing results with peers, generating excitement among collaborators, interviewing for jobs, writing fundable grant proposals, etc.). Exactly what your mentee needs help with will be unique to them. Nevertheless, this is an area where you can expect to invest a fair amount of mentoring time.

You may be surprised to see “**developing professional and collegial work behaviors**” on this list, but many Associates will come to your laboratory having never worked outside of an academic environment. These individuals may need basic guidance and direct feedback about proper workplace behavior as well as an explanation of your organization’s culture and norms.

**Engaging effectively in collaborations** includes initiating collaborations, defining and organizing collaborative projects, and working constructively in collaborative groups. This topic is fertile ground for mentoring effective interpersonal skills, such as aligning competing interests to the satisfaction of all, working through conflicts that inevitably arise, and negotiating author credit and sequence on multi-investigator projects. Though not all agencies or NRC Advisers encourage initiation of new collaborations during the postdoctoral program, almost all projects involve working with other researchers. Allowing NRC Associates the opportunity to build new collaborations or to engage in collaborative projects beyond the primary research project is encouraged, to the extent that it is possible, as it often helps with professional growth and career advancement.

**Understanding the “business of science”** covers developing knowledge about an organization’s research objectives and mission, how an organization supports research, and how internal and

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external research funding is obtained. Understanding funding streams within an organization or community, identifying new funding sources, and learning how to work effectively with funding agencies are all key areas of professional development in the “business of science.” If an Adviser typically writes grants to support their research, involving the Associate in this process can provide valuable experience. NRC Associates may also need help learning to communicate the outcomes of their research within the context of the organization’s mission and research objectives. For example, technical reports are often a product unique to government agencies. The relative importance of developing knowledge and skill in each area will depend on the Associate’s desired career path.

### V. Mentorship for Career Advancement

To a large extent, all of the topics covered in this guide are related to helping postdoctoral researchers advance in their careers. The last two elements we will touch on in this first mentoring guide are: i) preparing for the next stage and ii) finding suitable employment.

#### ***1) Preparing for the Next Stage***

Postdoctoral researchers nearing the end of their tenure will generally have made significant progress in the areas of professional growth discussed above and are turning their thoughts to the next stage in their career. NRC Associates who are preparing to move on generally view themselves as having achieved self-leadership<sup>4</sup> as researchers and aspire to some level of project or team leadership in their next position.<sup>5</sup> When asked to define personal growth objectives for the next phase of their career,<sup>5</sup> Associates commonly cite several of the following:

- Building a network in the technical community
- Gaining influence in scientific group discussions
- Growing in technical breadth
- Establishing collaborations
- Learning to secure research funding
- Developing skills to lead scientific projects
- Developing skills to lead scientific community events
- Developing skills to lead people

**Network building** is viewed as beneficial for establishing an independent identity and gaining visibility within the scientific community, leading to new opportunities for collaboration and/or future employment.

**Influencing scientific group discussions**, either within the organization or at the community level, is related to establishing an independent identity and enhancing visibility. It is attractive to postdoctoral researchers hoping to build credibility and win support for their own research ideas. Gaining confidence is at the heart of this, and you can help with coaching, gentle encouragement, and positive feedback.

**Growing in technical breadth** is of interest primarily for two reasons. First, broadening the technical base is desired for enhancing marketability. Second, many postdoctoral researchers are interested in a variety of topics, excited about learning new things, and wish to pursue career paths that offer exposure to many types of systems, problems, or projects.

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**Establishing collaborations** often arises in the context of growing technical breadth or network, though it is also related to developing leadership skills and establishing an independent research program.

**Securing research funding**, a subset of “business of science,” is an important professional development goal for postdoctoral researchers wishing to establish their own research program. In some cases, it can also help mentees obtain permanent employment.

**Developing leadership skills** can take various forms. Next-stage leadership aspirations of postdoctoral researchers tend to focus on leading multi-investigator projects or organizing events within the scientific community (such as symposia) or leading people. In the latter case, formal mentoring of junior researchers is generally seen as a tangible and attractive first step.

With good intent, generosity, and a bit of creativity, you can find many opportunities to help your postdoctoral mentees grow in the aforementioned areas and launch their professional career. Here are few suggestions:

- Include them in important meetings
- Introduce them to colleagues across your organization and at conferences
- Request they be added to the schedule when you have important visitors
- Offer them the opportunity to observe you in action as you tackle a challenging issue, then debrief and answer questions afterwards
- Have them lead an important project meeting while you stand by as backup, having coached them in advance
- Carve out part of a larger project for them to lead
- Offer them a session chair spot in a conference you are organizing

### **ii) Finding Suitable Employment**

By definition, an NRC Associateship is a temporary assignment and “*what comes next?*” is always a concern. Even if you are not in a position to offer the NRC Associate permanent employment, there are many ways you can help your mentees find a next step that is right for them.

While some researchers come to their postdoctoral positions with a clear plan for what is next, many do not. Creating opportunities for your mentee to talk with colleagues who have chosen a variety of career paths (industry, entrepreneurship, federal laboratories, academia, administrative positions) can help. You can also share your own experiences, lend your network, and encourage NRC Associates to engage in career conversations. Your mentee may also appreciate coaching on how to approach these conversations respectfully and professionally.

Key to choosing the right career path is understanding (and articulating) personal strengths and interests, a struggle for many people. By carefully observing your mentee, you may be able deduce and point out which types of projects or activities excite them most, whether they enjoy working alone or in groups, what modes of communication seem to suit them best, and which elements of their jobs seem to come naturally to them.

One particularly impactful way to help your postdoctoral mentee find suitable post-NRC employment is to work with them on adapting their research plan to their desired career path. For example, since the timelines for academic applications are well-established, you might help someone interested in a faculty position plan their research to increase the probability that a

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tangible contribution from their postdoctoral research will be ready for their interview seminar. You might suggest planning for a lighter lab schedule during the time when applications must be finalized and submitted. You can also make introductions to colleagues who have been successful in securing academic positions and program managers from funding agencies or help your mentee identify opportunities to increase visibility in the broader technical community.

Similarly, though you may not be able to guarantee a permanent position at your agency, you can help an interested Associate increase their chances of securing one. You know how to build a CV that would be attractive to hiring committees in your organization; you can also ensure your mentee is introduced to influential individuals, help plan research so that a solid presentation should be ready when a position becomes available, or lobby to get them a slot in the agency's most prestigious seminar series.

For Associates interested in industrial research, you can help them tie their basic research to practical applications, develop and showcase their breadth, or suggest involvement in industrial partnership projects or industry-supporting activities that your agency may sponsor. Aspiring entrepreneurs may appreciate being connected to your agency's technology transfer team, SBIR office, or other new venture programs.

Regardless of the specific path your mentee chooses to follow, your sponsorship and advocacy are critical. Help your mentee build their CV by being generous in assigning authorship credit and acknowledging their many contributions. You can also create small leadership experiences they can reference, help them find opportunities to contribute to their scientific community, nominate them for awards, and introduce your mentee to colleagues and at conferences with complimentary comments about their work.

When it is time for the actual job search, be encouraging and supportive. Perhaps offer your assistance or make suggestions for where to find help with resume writing, interview preparation, position negotiation and more if you are able. In addition, be prepared to invest your time and effort in writing appropriate letters of recommendation.

### **VI. Summary**

In this first mentoring guide, we covered the basics of what it takes to be a great NRC Research Adviser. Much of the content may be familiar to you from your own experiences as a mentor or mentee. We highlighted three important markers of successful postdoctoral experiences – research productivity, professional growth, and career advancement – as well the Adviser's role in helping Associates achieve success in these areas. We have touched on creating a productive research environment, explored common professional development needs of postdoctoral researchers, and discussed ways to help NRC Associates prepare for their next career step and find a position they are excited about. Mentoring postdoctoral researchers is complex, multi-faceted work that benefits your agency and scientific community as well as your mentees. Your role as an NRC Adviser may also be one of the most personally and professionally rewarding of your career, creating exciting research results, lasting relationships, and many possibilities for fruitful continuing collaboration into the future.

*For those who want a deeper dive into mentoring core skills, techniques or perspectives, please see the companion document "NRC Mentoring Guides: Resources for Self-Study."*

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*Comments and feedback are welcome and may be sent to Nora Beck Tan ([nora@illuminaexecutive.com](mailto:nora@illuminaexecutive.com)).*

### REFERENCES & NOTES

1. Note: Throughout this document, the terms “postdoctoral researcher,” “NRC Associate,” “Research Associate,” “Advisee,” and “Mentee” will be used interchangeably to refer to the NRC Postdoctoral Research Associates. The terms “NRC Adviser,” “Adviser,” and “Mentor” will be used interchangeably to refer to advisers of NRC Postdoctoral Research Associates, who are also expected to be mentors to these individuals.
2. Nora Beck Tan – unpublished research, perspectives of experienced NRC Postdoctoral Advisers.
3. Leonard and Swap, “Deep Smarts,” Harvard Business Review, September 2004, Reprint R0409F.
4. Note: NRC Associates were asked to self-evaluate based on Figure 1 in Younger & Sandholtz, “Helping R&D Professionals Build Successful Careers,” Research Technology Management, Nov/Dec 1997, 40, 6, p. 23.
5. Nora Beck Tan – unpublished work, compilation of themes from career coaching of NRC Research Associates, 2018-2020.

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