



PROFESSIONALIZING THE POSTDOCTORAL EXPERIENCE



A FORUM PRESENTED BY

SIGMA XI
THE SCIENTIFIC RESEARCH SOCIETY



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“You learn of the problems postdocs experience in different institutions and, at the same time, you are brainstorming with viable solutions. So you feel empowered to deal with your specific problem at your institution.”

The views expressed in this report are not necessarily those of Sigma Xi, the National Postdoctoral Association or the funding institutions.

SIGMA XI
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Sigma Xi, The Scientific Research Society

Founded in 1886, Sigma Xi has a membership of about 65,000 research scientists and engineers, with more than 500 chapters in North America and overseas. Over the years, more than 200 Sigma Xi members have received the Nobel Prize. Publisher of *American Scientist* magazine, the non-profit society sponsors a variety of programs that advance the health of the research enterprise.

[<http://www.sigmaxi.org>]

National Postdoctoral Association The National Postdoctoral Association (NPA) is a member-driven organization that provides a unique, national voice for postdoctoral scholars. The NPA is also a collaborative organization that seeks to work with all stakeholders to improve the postdoctoral experience in the United States. The mission of the NPA is to advance the U.S. research enterprise by maximizing the effectiveness of the research community and enhancing the quality of the postdoctoral experience for all participants.

[<http://www.nationalpostdoc.org/>]

INTRODUCTION

In January 2006, Sigma Xi and the National Postdoctoral Association (NPA) held a two-day national forum entitled, “Professionalizing the Postdoctoral Experience” in Research Triangle Park, North Carolina, to promote action on findings from the landmark Sigma Xi Postdoc Survey at institutions that employ postdocs.

Funded by the Alfred P. Sloan Foundation, the Sigma Xi Postdoc Survey was designed to improve the training and research environments for postdocs by providing a better understanding of their experiences. Survey results are expected to enable research institutions to benchmark their policies and practices against those at peer institutions.

The survey gathered information from 7,600 postdocs at 46 American research institutions on such issues as pay, working hours, benefits and many other factors. A summary of survey highlights appeared in a special 16-page insert called *Doctors Without Orders* in the May-June 2005 issue of *American Scientist*, the magazine of Sigma Xi. Participating institutions were each sent a summary of responses from their postdocs. A more comprehensive survey report is in preparation.

Among other things, survey data suggest that administrative oversight and structured training can significantly enhance the quality of postdoctoral experiences and may bring about increased research productivity.

The Sigma Xi-NPA Postdoc Forum at the Sigma Xi Center was designed to facilitate the sharing of ideas and materials and to foster networking between postdocs, postdoc office personnel, funders of postdocs and policy makers. At the conference, more than 80 administrators and postdocs from around the country gathered to discuss the main survey findings and then worked together to address them. They came away with a better understanding of

“I think what made this conference better than others I have attended...is that other institutions are now far enough along in establishing postdoc policies that I am learning from their successes and failures.”

survey results at their own institutions and insights on implementing postdoc training and policies. Participants were also inspired by the forum to make plans for establishing new policies and programs, while also considering modifications and refinements to existing procedures and offerings.

Plenary sessions were devoted to case studies, leveraging existing resources and management and leadership training. Case studies focused on developing and implementing effective postdoc-related policies; effective training workshops, materials and ideas; and vulnerable populations, such as underrepresented minorities, women and international citizens.

In small group discussions, participants came to general consensus on some guiding principles for addressing a variety of issues, such as strategies for recruitment and retention of underrepresented minorities and women, individual development plans, regular evaluations, exit surveys, letters of appointment and authorship policies.

What follows is a summary of highlights from the Sigma Xi-NPA Postdoc Forum on Professionalizing the Postdoctoral Experience.

As part of a separate initiative, Sigma Xi is developing an online repository for sharing postdoc policy documents and training materials.

SESSION I: OPENING REMARKS

Managing Scientists, Scientific Management

Geoff Davis
Principal Investigator
Sigma Xi Postdoc Survey

Data from the Sigma Xi Postdoc Survey showed that “best practices” in the training of postdocs are not in fact very common. The goal for the Postdoc Forum is to encourage discussion and foster more widespread implementation of these practices.

At first we thought the reason behind the low reported rates of various postdoc policies was that people needed help crafting such policies for their campuses. The envisioned solution, then, was to help them do so. After talking to a lot of people, however, we discovered we were wrong. The problem, people told us, was not one of not knowing what to do; rather, the obstacle is in figuring out how to do it: how to get buy-in from cost-conscious administrators, reluctant faculty and overcommitted postdocs. Accordingly, the conference was refocused from formulating policies and programs to the next step: on getting these policies and programs implemented.

The issue of *how* to get better postdoc policies implemented begins with a discussion of *why* doing so is a worthwhile endeavor. The way one answers the question of “Why?” has a huge bearing on one’s prospects for success. Consider several possible answers to “Why?”:

- **“Postdocs deserve better.”** Postdocs work hard, so they should be paid more and receive better benefits. A number of essays/reports use this as their initial premise. The trouble is that that can be said of almost every group on a campus. There are many worthy causes competing for constrained resources.
- **“It is the Right Thing to do.”** The trouble with this argument is that it can be made about a lot of different things. In the absence of more substantial arguments, perfectly reasonable people can

have considerable disagreements over just what the right thing to do is. And “Do the Right Thing” is not a particularly compelling motivator.

- **“There is a CRISIS!”** There are several variants of this argument: “The U.S. is falling behind China/India/the EU/ fill-in-the blank,” “Postdocs are all miserable and will revolt (or worse, unionize),” and “The poor state of postdoctoral life will scare smart students into non-science careers.” The trouble with this approach is that in declaring a crisis, one has lots of company. A Google search for documents containing both of the words “crisis” and “education” yields 69 million results. Education appears to be particularly prone to crises: 40% of all documents containing the word “crisis” also contain the word “education.”

These particular crisis scenarios do not necessarily make a strong case for timely action because (1) they are abstract threats that may or may not occur some time in the future, and (2) they do not cause any immediate problems for the people who need convincing. In addition, the use of “crisis” as a justification places postdoc advocates in the awkward position of benefiting from failure (e.g. some reported disappointment that the Sigma Xi survey found that “only” 22% of postdocs were dissatisfied).

The arguments above are not without merit, but they do not make the strongest possible case for change. The biggest problem is that these arguments do not account for the interests of the parties who must be convinced to change. There is merit in utilizing a different approach during the conference, one described in the book, *Getting To Yes* (Fisher, Ury, and Patton: <http://www.amazon.com/gp/product/0140157352>). When advocating changes, think about how proposed changes impact the interests of all parties involved.

For example, look at postdoc productivity, something that all interested parties (postdocs, PIs and administrators) want. Think about the interests of the people involved, look at how proposed changes relate to those interests, anticipate potential obstacles and think about how to work around them.

As an aside, the reason that productivity matters is that small gains can accumulate over time. For example, small gains (< 5% per year) in worker

productivity over the last century have resulted in a roughly sevenfold increase in worker output per hour. That increased productivity has led to huge increases in average wealth, which has enabled, among other things, widespread higher education and government funded scientific research.

To make claims about how various policies will affect productivity, one needs a better understanding of the factors that give rise to productivity in researchers. Peter Drucker's ideas have been influential in this area (<http://www.amazon.com/gp/product/0887309992>).

Drucker emphasized that to be productive, knowledge workers must have both autonomy and a say in what they should be held accountable for. Research/career plans for postdocs provide such a framework of accountability and responsibility, and indeed, Sigma Xi's survey data showed that postdocs with such plans were considerably more productive than those without.

Drucker believed that to gain maximal productivity from knowledge workers, employers should invest in them rather than trying to minimize their costs. Professional development activities represent such an investment, and again, the Sigma Xi survey data showed that postdocs' productivity increased with the amount of professional development they received.

Drucker claimed that external rewards such as salaries are not good motivators of knowledge workers, but that an absence of such rewards causes problems. Sigma Xi survey data found that the relationship between compensation and productivity was weak.

Drucker provided a framework for evaluating management practices: do practices eliminate barriers to postdocs getting their real tasks accomplished? In this light, many procedures make a great deal of sense. Authorship and intellectual policies can prevent time-consuming disputes – it is much better to be conducting research than to be fighting over credit. Orientations and detailed letters of appointment help postdocs get settled into their new jobs faster, leaving more time for research. Professional development opportunities give postdocs the skills to do their jobs more effectively, and better skills can mean higher quality output. Health insurance helps to keep postdocs and their families healthy so they can spend more time in the lab.

As a case in point, at Microsoft Research, employees receive on-campus flu shots, plus free sodas

and coffee, and an office ergonomics consultant set up everyone's office. These practices did not come about just because Microsoft is "nice." Flu shots can reduce sick days considerably; free coffee can eliminate a 20-minute trip to Starbucks and a comfortable office may mean that people are willing to spend more time there.

One must anticipate obstacles so one can be prepared to meet them. One possible objection is that the proposed measures simply won't work. A way to counter this is to acknowledge that success is uncertain, but that whether or not a proposal works is a testable hypothesis. One can propose a small-scale implementation as an experiment.

A second possible objection is that the measures provide only relative advantage of one university over others. What will happen when everyone implements such changes? To this, one might respond that universities are incredibly slow at adopting innovations. A study reported in the *Chronicle of Higher Education* a few years back found that the time between the first university adopting an innovation and half of all universities adopting it was on the order of 25 years. Leaders will gain advantages over their peers for many years.

A third possible objection is that the measures do not solve the "real" problem (too many postdocs, etc). To this, one might reply that the game is not zero-sum. In the short term, better skills training means access to new types of jobs. In the longer term, increased research productivity can lead to increased economic growth, which in turn can make greater resources available for the research enterprise.

In summary, the challenge is to come up with compelling reasons for the things you want to see happen; to consider the interests not just of postdocs, but also of PIs and administrators; and to anticipate obstacles and prepare for them.

SESSION II: CASE STUDIES

Sharon Milgram, University of North Carolina, Chapel Hill

Dr. Milgram provided a detailed account of the evolution of efforts at UNC to proactively address postdoctoral training issues. This included conducting a survey of postdoctoral scholars and widely disseminating the results in the form of a one-page summary. The initial efforts to address

training issues included both graduate students and postdocs. These early efforts resulted in the establishment of an office of postdoctoral affairs, with an annual budget of \$50,000 for programming and one full-time equivalent staff position, which comes from the vice chancellor for research. The justification for creating the office was multi-pronged: postdocs wanted to be a bigger part of the UNC community; postdocs were spending too much time organizing career events, etc. After the first year of operations, the vice chancellor appointed an advisory faculty board to the office, with input from postdocs and faculty on policies. The board disagreed on some issues, compromised on some items and eventually implemented a new set of policies. Future plans include expanding the office to include a second staff person and opening a career center staffed by multiple career counselors.

Dr. Milgram highlighted some of the critical considerations in establishing the office and addressing postdoctoral training issues. She noted that the survey and other mechanisms clearly pointed to the need for improvements relating to compensation and benefits. The office employed a strategy of deferring action on the most controversial issues until the office was firmly established and supported. Buy-in from the faculty was helpful, but financial support from the UNC leadership was critical. It was also important that the office be shielded from controversy, so it can focus on the big picture professional development programs and not policies. Postdocs should be involved in identifying their professional development needs, but organizing programs should not be their main responsibility. Postdocs now have an advisory board to the office, rather than struggling to maintain an independent association. This model seems to be working well so far.

Philip Clifford, Medical College of Wisconsin

Dr. Clifford provided a brief overview of the MCW training population, along with some details about the Office of Postdoctoral Education. The office was established in 2001 and is staffed by the associate dean and an administrative assistant, in consultation with a postdoctoral advisory committee. Dr. Clifford focused on the programmatic efforts of the office to engage and equip postdoctoral scholars for career success. The tools for engagement include: a letter of appointment; orientation materials; a welcome luncheon; a Web site; social/networking events that include families;

poster sessions; and providing food at most events. The programs have been successful in engaging postdocs, but less successful in engaging principal investigators. The tools for equipping postdocs include: the spotlight on science seminar series; skill workshops; travel awards to attend scientific meetings; the purchase and dissemination of career planning resources; and the hiring of a part-time career counselor who works jointly with the postdoc office and graduate school.

MCW has assessed the efficacy of the programs by seeking feedback through evaluation of specific events, soliciting input by e-mail, providing a feedback form on its Web site, holding a yearly town hall meeting and conducting an exit survey. The challenges associated with implementing these programs include: gaining the confidence of postdocs and limited resources in terms of both staff time and financial support. Dr. Clifford outlined opportunities for future success, including broader use of individual development plans, voluntary annual reviews and the provision of ombuds services/grievance procedures.

Debbie Swope, National Institute of Environmental Health Sciences

Dr. Swope provided an overview of the events leading up to the establishment of the Office of Fellows' Career Development in 2003. The evolution began with the founding of the NIEHS Trainees Assembly (NTA) in 1994. For seven years, the NTA provided an annual career fair for fellows and career development opportunities and was the only organization providing career development at the NIEHS. In 2002, the NTA prepared a petition and position description for a fellows' office that would be staffed by a scientist, assume many of the administrative responsibilities for NTA projects and would be the main source of career development training and information. The Office of Fellows' Career Development is housed within the Office of the Director, with one paid staff member and a small annual budget. The office interacts closely with the NTA, PIs and the Assembly of Scientists. The office provides career development seminars, workshops and networking opportunities to fellows at the NIEHS; supports the NTA's mission by providing assistance where needed; and assists with recruiting and orientation to incoming NIEHS fellows. The challenges associated with running the office include the need for: greater buy-in from PIs and fellows; more staff; greater inclusion in NIH training programs; and the ability to enforce postdoctoral training policies.

Moderator's Overview of the Case Studies

Dr. Joan Lakoski noted some common themes that emerged from the three case studies:

- Refrain from asking postdocs to perform the administrative and logistical tasks, but definitely consult with them about content.
- Postdocs learn important skills from leading an association or organizing events: like running a meeting, setting an agenda, team-building, peer review (travel awards)

She observed that the postdoc offices have all developed from the vision of multiple stakeholders to organizations with professional staff support. This continuity is critical as postdocs are transitory. Securing financial support for these offices is also critical. Early success with small-scale programs makes it easier to get resources for programs on a larger scale.

Summary of Group Discussion

A common theme expressed by the speakers was the challenge of engaging postdocs and PIs in the programmatic offerings, but also in complying with various policies. The issue of developing a national or institutional curriculum for postdoctoral training was also discussed as one possible mechanism for increasing the level of engagement. Another suggestion was the use of a competitive application process or other incentives for making participation in the programs feel more valuable and/or prestigious. It was observed by more than one participant that international postdocs are perhaps the most difficult to engage, and solutions for involving them more directly continue to elude us.

The issue of mental health for postdocs emerged as a critical topic that has not been given enough attention. Programs at Vanderbilt and UC Berkeley have sought to address this need more directly by providing counseling for postdocs, peer support and insurance coverage for mental health services. The issue of accountability among various stakeholders was also discussed. The relationship between the postdoc and the PI is not one of mutual accountability because postdocs do not exercise traditional labor/economic marketplace dynamics. Finally, it was noted that institutions that invest in postdoc offices and postdoctoral training receive dividends in the form of increased postdoc productivity.

SESSION III: LEVERAGING EXISTING RESOURCES

*Melanie Sinche, University of
North Carolina, Chapel Hill*

Ms. Sinche provided a brief overview of the services that are provided through the UNC Postdoc Office, including career counseling and professional development programs, maintaining a database of current and former postdocs, conducting surveys and providing information through a Web site, newsletter listserv and other vehicles. The career and professional development programs include workshops, seminars, mini-courses, symposia and other events. In providing these programs and services, the office needs to leverage resources in the following four areas: ideas, expertise, speakers and financial support.

The postdoc office has access to both internal resources at UNC and external resources in the Chapel Hill region. Internal resources include: postdocs, faculty, student services units, support offices, research units and the various schools/colleges. Of particular note were the support offices such as the international office, LBGTQ office, the Center for Teaching and Learning, the office of sponsored research and the office of technology development. External resources available to the postdoc office include: local employers, universities/research institutes, research funding agencies, professional societies and research centers for industry. These external resources can be helpful in organizing regional events, providing speakers, sharing the expenses and perhaps even hiring your postdocs! Former postdocs are an excellent resource: the UNC exit survey is linked to a networking database for people looking for jobs. Former postdocs are also great speakers; and their experiences resonate with current postdocs.

In seeking to leverage existing resources available to the postdoc office, Ms. Sinche offered the following guidance:

- Start small with a core set of programs you can do well
- Consider everyone a potential collaborator
- Share your goals early and often with all constituencies

- Expect to be met with varying levels of enthusiasm
- Check references for and discuss goals with speakers
- Programs need not be expensive to be effective
- But recognize the very real expense of staff time

Lisbeth Hamer, North Carolina State University

The mission of the Professional Science Master's in Microbial Biotechnology (MMB) is to provide state-of-the-art academic and professional training in science and business to meet the increasing need in the biotechnology and pharmaceutical industries for graduates with both competencies. Although the program is not designed for the training of post-doctoral scholars, many of the professional training elements of the program could be applied within the postdoctoral community. The MMB provides academic and professional training in science and business, while making use of "industry cases," internships, mentors and an advisory board. MMB leverages intellectual resources from leaders in local industries and at N.C. State University with an emphasis on academic scholarship, practical working knowledge, productivity, teamwork, entrepreneurship and ethics. Within N.C. State, the MMB leverages existing resources by forging alliances with multiple entities: the College of Management, the College of Agriculture & Life Sciences, the Biotechnology Program and N.C. State's Industry Partners. In seeking out industry alliances, the following steps should be considered:

- Define need
- Research industry inventory
- Contact potential partners
- Market alliance advantage
- Discuss project opportunities
- Show flexibility
- Obtain commitment and resources
- Resolve intellectual property matters
- Specify project plan, deliverables and format
- Execution of plan
- Collect feedback
- Nurture alliance

The "industry case studies" students learn about:

- Action and Context-oriented training
- Science and business knowledge
- Practical working knowledge
- Regulatory knowledge

- Good manufacturing practices
- Leadership
- Mentorship
- Supervisory experience
- Synergistic behavior
- Team building
- Conflict management
- Oral and written presentation skills
- Marketing skills
- Cross-cultural understanding
- Discipline
- Flexibility
- Expectation and ambiguity management

The challenges associated with implementing the MMB within N.C. State included the normal issues associated with establishing a new enterprise in a traditional environment where its value was not immediately appreciated. Other internal challenges included the need to develop tenure guidelines, provide sufficient financial resources and successful navigation of the departmental landscape. The challenges associated with leveraging external resources for the new MMB through industry alliances included the need for patience and flexibility, as industry is a rapidly changing environment and forming alliances can be a time-consuming endeavor.

Rashid Shaikh, New York Academy of Sciences

Dr. Shaikh provided an overview of the academy's history and demographics, focusing in particular on its efforts to provide regional professional development programs for graduate students and postdoctoral scholars. The Science Alliance for Grad Students and Postdocs is a network of 3,500+ young scientists from 19 institutions in the New York metropolitan region. The goals of the alliance are to organize events focused on career and life issues, provide access to the academy's scientific resources (meetings, e-Briefings) and provide networking opportunities across institutions and sectors. To gain access to alliance programs, institutions pay for membership on behalf of their graduate students and postdocs and the NYAS organizes the events and e-Briefings. The advantages of the alliance model are multiple: it supplements and complements programs of area institutions; the planning work is performed by NYAS staff and the programs attract larger audiences than at single institutions; the events facilitate networking across various institutions and sectors; and the NYAS

builds its membership. One particularly successful model has been the use of e-Briefings following various events. The e-Briefings provide an online bulleted summary, professionally prepared reports, searchable transcripts, graphics and sound, while allowing for open questions from page visitors.

The challenges associated with utilizing this model to leverage regional resources include: uneven coverage within institutions; leadership and delegation issues among multiple institutions; cost recovery for the events; and, finally, the collaborative model is not always appreciated.

SESSION IV: MANAGEMENT AND LEADERSHIP TRAINING

Daniel Denecke, Council of Graduate Schools

Dr. Denecke provided an overview of Preparing Future Faculty (PFF), a national professional development program. Although primarily intended for graduate students, the program has been made available to postdoctoral scholars at some campuses. Many of the professional development topics covered within this program are appropriate for postdocs.

The program, conducted in four phases between 1993-2002 at more than 250 institutions/organizations, is premised on the following assumptions:

- Faculty roles and responsibilities are various and demanding in any context
- Ph.D.s pursue academic careers at a variety of types of institutions
- Different types of institutions define “academic practice” differently, and thus require different competencies, skills and sensitivities
- Collaboration and partnership are the best vehicles for change

The topical content of the programming is far ranging, focusing on teaching, academic practices, leadership skills, service, research, publishing, academic culture and politics, and obtaining tenure. The program was structured differently at each institution; some common components included:

- Workshops and Seminars
- Guest Lecture Series

- Credit Courses
- Supervised Internship (multiple mentors)
- Institutional and Departmentally-supported Informal Networking Opportunities (alumni, guest lectures, faculty, peer mentors, etc.)
- Incentives for Partner Faculty
- Graduate Student Administrative Assistance
- New Faculty Line (“Professor of the Practice”)

The challenges associated with implementing this program at the institutional level included gaining faculty buy-in and addressing concerns expressed about lengthening the time-to-degree. The solutions to these challenges were to place greater emphasis on research, to utilize a “Researcher-Champion,” to integrate the program into the institution through the use of certificate or credit courses, to document actual student completion rates and to be flexible regarding scheduling of programs.

The lessons learned from conducting the PFF program, based on external evaluators’ conclusions, were that each institution/organization must include the following essential elements:

- National Leadership and Recognition
- Exposure to Teaching, Service and Enhanced Research
- Formalized “Anticipatory Socialization” to the Profession
- Formal Structure for Interaction

In addition, the following program elements were of significant value:

- Clusters of Partnering Institutions
- Required Courses and Concepts
- Certificates
- Academic Internships
- Multiple (T, S and R) Mentors
- Steering Committees
- Campus Teaching and Learning Center Involvement

Based on evaluators’ comments, it is important to deliver these programs in such a way as to avoid:

- Setting up faculty for “burnout” or endangering “at risk” faculty
- Being labeled as a teaching-only program

