NATIONAL
POSTDOCTORAL
ASSOCIATION

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NPA CORE COMPETENCIES RESOURCES

NATIONAL POSTDOCTORAL ASSOCIATION

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#1. DISCIPLINE-SPECIFIC CONCEPTUAL KNOWLEDGE

Postdoctoral scholars are expected to demonstrate a broad base of established and evolving knowledge within their discipline and detailed knowledge of their specific research area. They should understand the gaps, conflicts, limits, and challenges within their research area such that they can develop testable hypotheses.

- Analytical approach to defining scientific questions
- Design of scientifically testable hypotheses
- Broad based and cross-disciplinary knowledge acquisition
- Detailed knowledge of specific research area

One of the main goals of postdoctoral training is to expand knowledge of your field and develop your niche. To become a subject matter expert:

- Join professional societies.
- Join interest groups at your local university/department.
- Attend journal clubs.
- Attend national and international meetings. A good source for the sciences is the Nature Events Directory; for the humanities, H-Net Academic Announcements; and for the social sciences, the Consortium of Social Sciences Associations. Networking is key to your career success, regardless of your field. Consider the benefits of attending large conferences where you will obtain a broad picture of the state of your field vs. smaller conferences where you will have more personal interactions.

Please note: Much of what postdoctoral researchers need to learn under this topic is discipline-specific. The following resources are examples:

- List of PhD Public Health Competencies for several majors including behavioral sciences, biostatistics, environmental sciences, epidemiology, and health policy
- "Finding Your Niche" from Ten Steps to a Winning R01 Application, NIH National Institute of Allergy and Infectious Diseases (NIAID)
- What's the Right Toolset for Digital Humanities? from Academic PKM: Personal Knowledge Management for Academia & Librarians
- Information Literacy Standards for Anthropology and Sociology Students from the Association of College and Research Libraries

#2. RESEARCH SKILL DEVELOPMENT

Postdoctoral scholars are expected to be able to design sound research protocols, safely perform the techniques necessary to conduct and analyze this research and navigate the grant application and scientific publishing processes.

- Research techniques and laboratory safety
- Experimental design
- Data analysis and interpretation
- Effective search strategies and critical evaluation of the literature
- Grant application and scientific publishing processes

Please note: Much of what postdoctoral researchers need to learn under this topic is discipline-specific (Core Competency #1). The following resources are examples for general research skill development:

- Making the Right Moves: A Practical Guide to Scientific Management for Postdocs and New Faculty from the Burroughs Wellcome Fund
- From Postgraduate to Social Scientist: A Guide to Key Skills by Nigel Gilbert, available from Sage Publications
- Researcher Development Framework from Cloudworks UK
- Getting Started in the Digital Humanities from the Digital Scholarship in the Humanities blog

#3. COMMUNICATION SKILLS

In any professional environment, the ability to communicate one's thoughts in a way that people readily understand is critical. Although postdoctoral scholars learn many communication skills throughout their educational lifespan, these skills take time to master. Communication is more than preparing and sending a message; it is making every effort to be sure that the message is heard and understood by the appropriate audience.

Postdoctoral scholars are expected to demonstrate interpersonal and other communication skills that enable them to communicate effectively with colleagues at all levels. They must also be prepared to communicate with students, media, and society at large. They need to develop writing, speaking, and listening skills.

- Writing
    - Scientific publications
    - Grants/applications
    - Career, including curriculum vitae, resume, cover letters, and teaching statements
    - Research and teaching statements or portfolio
    - Letters of recommendation or collaboration
- Speaking
    - Presenting research to scientific and lay audiences
    - Conference and seminar presentations, including posters and PowerPoint
    - Job interviews and job talks
- Teaching and Mentoring
    - Teaching methods
    - Learning styles
    - Teaching resources
- Interpersonal Communication Skills
    - Style, tone, and non-verbal cues
    - Negotiation, e.g., in difficult economic times, formal conversations with PIs/mentors about continued funding of the postdoc position
    - Performance reviews/feedback
    - Conflict resolution, including difficult conversations/minimizing conflict
- Special Situations
    - Networking
    - Managing the news media

Communication in General

- ScienceCareers and the Chronicle of Higher Education have numerous archived articles on communication skills.
- Open-access, free courses in communication skills are available online, including:
    - Introduction to Public Speaking, Business Communication for Career Readiness, and Communication in the 21st Century Workplace from Coursera
    - Communication Skills for Academics, Communication for Managers, Science Writing and New Media: Elements of Science Writing for the Public, and Argumentation and Communication from MIT Open Courseware

- Toastmasters International helps members improve their public speaking and leadership skills, with 14,650 Toastmasters chapters in 126 countries.
- The AAAS Center for Public Engagement with Science and Technology provides resources on communicating science to the public.
- The NIH Office of Intramural Training & Education provides videocasts on improving communication skills, including Improving Spoken English, Communicating Science, and Using LinkedIn Effectively.

Conflict Resolution

- Articles on conflict resolution from Mediate.com and the Conflict Resolution Network
- Butting Heads: Conflict Resolution for Postdocs from AAAS ScienceCareers
- Difficult Conversations: How To Discuss What Matters Most by Douglas Stone, Bruce Patton, and Sheila Heen, from Penguin Books
- Your Perfect Right: A Guide to Assertive Behavior by Robert Alberti and Michael Emmons from Impact Publishers
- Conflict Resolution Skills from the Conflict Resolution Network

General Writing Resources

- Handouts and videos from the Writing Center at the University of North Carolina at Chapel Hill
- The Elements of Style (1st ed) by William Strunk from Project Gutenberg

Grant Writing

- Grant Proposals (or Give Me the Money!) from the Writing Center at the University of North Carolina at Chapel Hill
- Grant Writing Resources from the College of Arts and Sciences, the University of California at Berkeley
- Proposal Writing Short Course from the Foundation Center
- Guide for Writing a Funding Proposal (social science disciplines)
- Writing a Grant Proposal: Writing Tips and Application Forms and slide presentations on Funding and Grantsmanship for Research and Career Development Activities from the Graduate School of Arts and Sciences at Columbia University Medical Center (scientific/medical disciplines)
- How to Get Funding series from ScienceCareers (scientific/medical disciplines)
- Information specific to National Institutes of Health (NIH) Awards:
    - The K Kiosk: Information about NIH Career Development Awards
    - Tips for New NIH Grant Applicants from the National Institute of General Medical Sciences (NIGMS)
    - Tips on Submitting an NIH NRSA F32 Application from Sarah Bottjer, the University of Southern California
    - Ten Steps to Writing a Winning R01 Application from the National Institute of Allergy and Infectious Diseases (NIAID)

Managing News and Social Media

- An Introduction to Social Media for Scientists by Holly Bik and Miriam Goldstein from PLOS Biology
- SciDevNet Practical Guide topics include "What Journalists Want from Scientists and Why", "How to Record and Produce Audio Slideshows", "How to Report Science in Local Languages", and 'Beyond Press Releases: How to Dig Up Science Stories".
- Sense About Science resources include "Standing Up for Science", 'Standing Up for Science 2: The Nuts and Bolts", and "There Goes the Science Bit".
- Dealing with the Media: Press Tips from the Harvard Innovation Lab
- Science Writing and New Media: Elements of Science Writing for the Public: open-access, free course from Coursera

Negotiating

- Principles and Tactics of Negotiation from the Journal of Oncology Practice, National Center for Biotechnology Information
- What is Negotiation? from the University of Colorado Conflict Information Consortium
- Getting to Yes: Negotiating Agreement Without Giving In by Roger Fisher, William Ury, and Bruce Patton (available from most university libraries)

Professional and Career Development

Scientific/Medical Disciplines:

- Resources on professional development for both academic careers and careers beyond academia (e.g. CVs, resumes, cover letters, research and teaching statements, job interviews, informational interviewing, networking) are available from the Duke Office of Postdoctoral Services and the University of California at San Francisco Office of Career & Professional Development.
- Careers Beyond the Bench - This Science Careers article looks at what different scientists have done outside of academia and have had very successful careers fields ranging from grant administration to venture capital. If you do not see yourself long term in academia and are wondering what to do next, this is a good starting place.
- An Academic Scientist's Toolkit an extensive review of the different aspects that academic scientists are faced with, at different stages of their career progression.
- Advice for a Young Investigator by Santiago Ramon y Cajal
- Charting a Course for a Successful Research Career A guide for early career researchers by Alan M Johnson 2012.
- A Ph.D. Is Not Enough! A Survival Guide in Science by Peter J. Feibelman, Ph.D. 2011.

Humanities/Social Sciences:

- Resources on professional and career development for both academic careers and careers beyond academia are available from the Duke Graduate School, the Modern Language Association, and Anne Mitchell Whisnant's "Resources for an Expansive Job Search: Humanities & Social Sciences."
- Surviving Your Academic Job Hunt: Advice for Humanities PhDs by Kathyrn Hume.

All Disciplines

- The Professor Is In: The Essential Guide to Turning Your PhD Into a Job by Karen Kelsky.
- UPenn Sample Teaching and Writing Statements
- The Academic Job Search Handbook by Julia Miller Vick and Jennifer S. Furlong. This book covers various aspects of the academic job search as well as addresses different issues such as dual careers and handling career breaks. One valuable component of the book are the sample CVs and the included research statements.
- Advice for New Faculty Members by Richard Boice - This is recommended for postdocs whether they are considering a faculty position or other. It has great advice on writing and on career socializing, and on teaching for those who might be doing that.
- What They Didn't Teach You in Graduate School: 199 Helpful Hints for Success in Your Academic Career by Paul Gray, David Drew, Matthew Henry Hall, and Laurie Richlin. This book chronicles everything from graduate school, through the academic job search, teaching, tenure track, academic salaries, diversity, and publishing (to name a few).

Scientific Presentations

- Speaking About Science: A Manual for Creating Clear Presentations by Scott Morgan and Barrett Whitener of Premiere Public Speaking, from Cambridge University Press
- Scientifically Speaking: Tips for Preparing and Delivering Scientific Talks and Using Visual Aids from the Oceanography Society Council
- Designing Conference Posters by Colin Purrington
- Delivering a Dynamic Job and Chalk Talk by Susan McKarns from the American Physiological Society
- How to Give a Great Scientific Presentation from the MacDiarmid Emerging Scientists Association
- How to Convert your Paper into a Presentation, Duke University Writing Studio
- Giving a Conference Talk by Mike Dahlin
- How to Give Effective Lectures-and Job Talks and Conference Presentations by Columbia University Graduate School of Arts & Sciences Teaching Center
- University of North Carolina: The Graduate School (a comprehensive resource for academic poster presentations and general presentation advice)
- Giving an Academic Talk by Jonathan Shewchuk
- How to Give an Academic Talk by Paul N. Edwards
- Talking the Talk: Tips on Giving a Successful Conference Presentation by Abby Adler
- Designing Effective Scientific Presentations Using PowerPoint and Structuring your Talk by Susan K. McConnell, Ph.D.

Scientific Writing

- The Science of Scientific Writing by George Gopen and Judith Swan from American Scientist Magazine
- Scientific Writing Resource (online course) from the Duke University Graduate School
- How to Write Your First Research Paper by Elena Kallestinova, in the Yale Journal of Biology and Medicine, from the National Center for Biotechnology Information

- Series on Effective Writing and Publishing of Scientific Papers by Daniel Kotz, Jochen Cals, Peter Tugwell, and André Knottnerus, from the Journal of Clinical Epidemiology, available from Elsevier ScienceDirect
- How to Write and Publish a Scientific Paper by RA Day. The growth of the Internet, online journals, new software packages, computer networks - these and other facets of science writing can be found in the new edition of Robert A. Day's How to Write and Publish a Scientific Paper.
- Mastering the Art of Scientific Publication - a series of articles and webinars from the American Chemical Society

Teaching

- McKeachie's Teaching Tips: Strategies, Research, and Theory for College and University Teachers by Marilla Svinicki, Wilbert James McKeachie, et al (advice suitable for all academic disciplines; available from most university libraries)
- Teaching Resources for Postdoctoral Scholars from the National Postdoctoral Association (advice suitable for all academic disciplines)
- Ways to Make Your Teaching More Effective from the Center for Teaching and Learning, University of California at Berkeley (advice suitable for all academic disciplines)
- Ideas for Teaching from the Duke Center for Instructional Technology (advice suitable for all academic disciplines)
- The Center for the Integration of Research, Teaching, and Learning (CIRTL) (advice suitable for STEM disciplines)
- What's Your Philosophy on Teaching and Does It Matter? An important article if you're considering a teaching career.
- NYAS online summer course "Scientists Teaching Science" (advice suitable for STEM disciplines)

Public Speaking Tips

- Strike a Pose: How the Way you Stand can make you more successful by Susanne Gargiulo
- Your Body Language Shapes Who You Are by Amy Cuddy
- Five Basics of Public Speaking, Toastmasters International
- The University of Chicago Workshop on Public Speaking
- Ready, Set, Speak by Aisha Langford
- Public Speaking by Eric Jager
- More Effective Public Speaking by K.D. Shives

#4. PROFESSIONALISM

Postdoctoral scholars are expected to adhere to accepted professional standards and practices within their immediate workplace (e.g., laboratory, office), institution, and discipline. They are also expected to reflect and advance the values of their profession in the community at large.

One's professionalism is relevant in different contexts that govern and define the potential interactions the scholar engages with his/her environment. A proper discussion of professionalism should integrate concepts of: *workplace professionalism* (connecting with the immediate working team), *institutional professionalism* (connecting with the research infrastructure), *collegial professionalism* (connecting with the discipline of expertise), and *universal professionalism* (connecting with society in representing an expertise).

- Assess and uphold workplace etiquette, performance standards, and project goals
- Comply with rules, regulations, and institutional norms
- Respect, evaluate, and enhance the intellectual contributions of others
- Advance and promote the discipline by participating in public and professional service activities, such as professional societies, editorial and advisory boards, peer review panels, and institutional committees.
- Advance and promote the discipline by participating in partnerships with government agencies, foundations, and/or nonprofit organizations, such as funding agency grant panels or other advocacy/advisory boards to contribute to the advancement and promotion of the discipline.
- Identify and manage apparent and actual conflicts of interest, ethical violations, and violations of expected professional behavior

Workplace Professionalism (advice suitable for all academic disciplines)

- **Workplace Etiquette** from the Columbia University Center for Career Education
- **Creating and Sustaining an Ethical Workplace Culture** by Charles Kerns
- **Essentials of Business Communication** by Mary Ellen Guffey and Dana Loewy
- **Creating a Positive Professional Image** by Mallory Stark from Harvard Business School Working Knowledge

Diversity Resources

- **Diversity Issues** from AAAS ScienceCareers
- **Resources for Postdoc Women** (National Postdoc Association)
- **MinorityPostdoc.org** resources on the minority postdoc experience

Conflict of Interest

- Conflicts of Interest from the Association of American Universities
- NIH Financial Conflict of Interest Tutorial
- NSF Conflict of Interest Policies

The Scientist as Good Citizen

- Scientists as Citizens: Activism Beyond the Bench by Kathy Barker
- The Scientist as World Citizen by Mary-Claire King from Science Magazine
- Scientists as Citizens by Sir John Conforth from the Vega Science Trust
- Researchers Point to 'Moral Obligation', 'Good Citizens' in Urging Scientists to 'Speak Up' on Policy by Julie Halpert from Yale Climate Connections

#5. LEADERSHIP AND MANAGEMENT SKILLS

Postdoctoral scholars should have the skills and techniques needed to facilitate effective team work, manage day to day operations within their workplace, and pursue leadership opportunities at the local, institutional, regional, and national levels. These skills will also help the person to mentor others more successfully.

- ***Personnel Management***
  - Recruiting, hiring, and terminating personnel
  - Mentoring and retaining personnel
  - Conducting performance reviews and providing feedback
  - Working with individuals of diverse backgrounds
  - Managing conflict/having difficult conversations
- ***Project Management***
  - Establishing priorities
  - Short and long-term planning
  - Time management
  - Establishing/maintaining effective collaborations
  - Developing/managing budgets
  - Tracking use of and ordering supplies and equipment
  - Recordkeeping in print and electronic media; establishing data backup protocols
  - Running a meeting
  - Delegating responsibilities
- ***Leadership Skills***
  - Identifying and clarifying goals
  - Motivating/inspiring others
  - Understanding the long-term strategic vision and helping others to see where their work/roles fit in this picture
  - Understanding how to use appropriate leadership styles in any given situation
  - Serving as a role model

Leadership in General

- Leadership: Theory and Practice by Peter Guy Northouse from Sage Publications (advice suitable for all academic disciplines; available from most university libraries)
- Emotional Intelligence by Daniel Goleman from Bantam Books (advice suitable for all academic disciplines; available from most university libraries)
- What Makes a Leader? by Daniel Goleman from the Harvard Business Review (advice suitable for all academic disciplines)

Leadership in the Laboratory

- At the Helm: A Laboratory Manager by Kathy Barker from Cold Spring Harbor Laboratory Press
- Making the Right Moves: A Practical Guide to Scientific Management for Postdocs and New Faculty from the Burroughs Wellcome Fund
- Leadership in the Clinical Laboratory: Strategies for Change by ML Cameron from Clinical Laboratory Management Review
- Management Strategies for Encouraging Creativity by P Preston from Clinical Laboratory Management Review
- A Herd of Cats: Managing Scientists from Lab Dynamics: Management Skills for Scientists by Carl Cohen and Suzanne Cohen from Cold Spring Harbor Laboratory Press

Time/Stress Management

- Chapter 6: Time Management from Making the Right Moves by the Burroughs Wellcome Fund
- Time Management from New York University Learning Center
- Work Smarter, Not Harder: Time Management for Personal & Professional Productivity, Open access, free online course from Coursera
- How Successful People Stay Calm by Travis Bradberry from Forbes Magazine

#6. RESPONSIBLE CONDUCT OF RESEARCH (RCR)

Postdoctoral scholars should receive training in responsible conduct of research to improve their ability to make ethical and legal choices. This training should provide them with an appreciation for the range of accepted research practices; familiarize them with the relevant regulations, policies, statutes, and guidelines governing the conduct of their research; and make them aware of the resources to which they can turn when ethical questions and concerns arise. Postdoctoral scholars would be expected to[1]:

1. Improve their ability to make ethical and legal choices.
2. Develop appreciation for the range of accepted practices for conducting research.
3. Be familiar with the regulations, policies, statutes, and guidelines that govern the conduct of government-funded research, as appropriate.
4. Be aware of the available tools and resources to which they can turn when ethical questions and concerns arise.

- Data ownership and sharing
    - Sharing of data with collaborators, including industry-specific concerns as appropriate
    - Ownership and access to data, particularly once a postdoc's appointment ends
    - Understanding and respect for intellectual property rights, patents, and copyrights
    - Understanding criteria for authorship and the elements of responsible publication
- Research with human subjects (where applicable)
    - Ethical principles for conducting human subjects research, including informed consent and subject confidentiality
    - Federal, state, and local regulations/guidelines for conducting human subjects research
    - Institutional Review Board (IRB) processes and procedures
    - Requirements for reporting clinical trials
- Research involving animals (where applicable)
    - Ethical principles for conducting research with animals
    - Federal, state, and local regulations/guidelines for use of animals in research

[1] Adapted from the objectives of the *Policy on Instruction in the Responsible Conduct of Research*, Office of Research Integrity (ORI), 2000.

    - Understanding the Three Rs: Replace, reduce and refine animal use in research
    - Institutional Animal Care and Use Committee (IACUC) processes and procedures
- Identifying and mitigating research misconduct
    - Applicable definitions of misconduct (federal, ORI/PHS, NASA, NEH, NSF, etc.)
    - Reporting procedures
    - The role and risks of being a whistleblower
- Conflicts of interest
    - Personal and intellectual conflicts
    - Conflicts of commitment
    - Financial conflicts
    - Confidentiality and bias in peer review
    - Conflicts and potential competition between mentor and trainee

General RCR Resources

- Comprehensive resources on the Responsible Conduct of Research are available from the **Office of Research Integrity**.
- **Columbia University Center for New Media Teaching and Learning RCR Courses**
- **Intuition** by Allegra Goodman - This is a novel about research misconduct. It would be a good discussion point for an RCR class. It is entertaining and thought provoking and reading it will help you understand the consequences of some difficult decisions you will face, such as dating someone in your lab or what to do with your suspicion of someone's misconduct.

The National Postdoctoral Association Core Competencies Committee (2008-2009)*

- Lida Anestidou, D.V.M, Ph.D., Program Officer, The National Academies
- Joan Chesney, M. D., Member, Department of Infectious Diseases, St. Jude Children's Research Hospital
- Emil Chuck, Ph.D., Faculty Member, Student Academic Affairs and Advising, Health Professions Advisor & Term Assistant Professor, George Mason University
- Phil Clifford, Ph.D., Professor of Anesthesiology and Physiology & Associate Dean for Postdoctoral Education, Medical College of Wisconsin
- Lisa Curtis, Ph.D., Instructor of Medicine, Department of Medicine, Division of Nephrology, University of Alabama at Birmingham
- Jennifer Hobin, Ph.D., Senior Science Policy Analyst, Office of Public Affairs, Federation of American Societies for Experimental Biology, joined committee in 2009
- Cathee Johnson Phillips, M.A., Former Executive Director, NPA (2008-2013), joined committee in 2009
- Keith Micoli, Ph.D., Postdoctoral Program Manager, NYU School of Medicine, Sackler Institute of Graduate Biomedical Sciences
- Lucia Mokres, D.V.M., Program Specialist, Hantel Technologies
- Alyson Reed, M.B.A., Former Executive Director, NPA
- Nancy Schwartz, Ph.D., Dean for Graduate and Postdoctoral Affairs, University of Chicago

*Titles and institutions listed here were correct during the members' terms of service on the committee and may have changed since then.