Facilitating Postdoc Women’s Advancement in the Academic Career Pipeline

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Including Slides Authored by
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National Postdoctoral Association
The mission of the National Postdoctoral Association 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.

The NPA is a non-profit 501(c)3 organization headquartered in Washington, DC.
The NPA played a significant role in:

- The adoption of the **definition of “postdoctoral scholars”** by the National Institutes of Health (NIH) and the National Science Foundation (NSF).

- The **establishment of the NIH Pathways to Independence award** to help postdocs successfully transition to tenure-track faculty positions.

- The Congressional requirement (America COMPETES Act) that the NIH expand data collection efforts regarding postdocs supported on research grants.
Highlights of NPA Accomplishments

The NPA played/plays a significant role in:

• The Congressional requirement (America COMPETES Act) that **NSF require mentoring plans** in all research grant applications that seek funding for a postdoctoral scholar position.

• The **establishment of several Postdoctoral Offices (PDOs) and Associations (PDAs)** at institutions across the country.

• The **development and collection of resources** such as our Annual Meetings; recommended practices for PDOs and PDAs; toolkit on the responsible conduct of research; Survival Guide for international postdocs.
NPA Ongoing Efforts

• To advocate on the institutional, regional, and national levels to enhance the postdoctoral experience.
  • Increasing Compensation to Fair Levels for Both “Domestic” and “International” Postdocs
  • Improving Benefits for All Postdocs
  • Supporting Data Collection
  • Encourage and facilitate diversity within the postdoctoral community.

• Some recent successes
  • NRSA stipend increases
  • Follow-up study to be done by COSEPUP.
NPA ADVANCE is a project to adapt and disseminate promising institutional practices that can help women postdocs successfully transition to faculty careers.

We provide:
- Summary of current data on postdocs and gender
- Online Clearinghouse of promising practices for institutions
- Technical assistance to institutions seeking to implement programs for postdoc women
- Forthcoming resource compendium of best practices

Supported by National Science Foundation’s ADVANCE program

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The Leaky Pipeline of Scientist Women

Ph.D. Receipt → First Tenure-Track Position → Tenure

Women Ph.D. Water Level

Figure adapted from Mary Ann Mason, based on study from Goulden, Mason & Frasch 2009, "Staying Competitive Patching America's Leaky Pipeline in the Sciences."
“…at every academic career milestone the proportion of women in science and engineering declines. … In examining the transition into academic positions…, the declines are greatest in fields requiring a period of postdoctoral study”

Overview of the Postdoctoral Community
Postdoctoral Scholars Today

• 89,000 in U.S.* (estimate)
• 60% international* (estimate)
• $38,000 median annual income**
• 51 hours, average work week**
• Early 30s and in a relationship; 1/3 have children**
• 42% women; 58% men**

Sources:
**Sigma Xi 2004-2005 Postdoc Survey

National Postdoctoral Association
Who employs S&E doctorate holders?

- For-profit firms: 28%
- Self-employed: 17%
- Education: 42%
- Other: 13%

Figure 3-45
Field of doctorate of U.S.-educated S&E doctorate recipients in postdoc positions: Fall 2005

- Biological sciences 46.3%
- Other life sciences 2.8%
- Physics 7.2%
- Geosciences 2.9%
- Mathematics 3.5%
- Computer sciences 0.6%
- Chemistry 8.5%
- Other social sciences 4.2%
- Electrical engineering 2.3%
- Mechanical engineering 2.1%
- Chemical engineering 2.1%
- Other engineering 6.2%

NOTE: Percentages do not add to 100% because of rounding.


Science and Engineering Indicators 2010
Recent National Trends
Recent National Trends

Science & Engineering Ph.D. holders reporting that they had a postdoc:

Before 1972 31%
2002-2005 46%

(Highest in life sciences)


National Postdoctoral Association
Recent National Trends

Recent doctorate holders hired into full-time tenured or tenure-track faculty positions:

Before 1972 42%

2002-2006 26%


National Postdoctoral Association
Science & Engineering postdocs with temporary visas at U.S. universities

1985  8,900
2005  27,000

Recent National Trends

Minorities in postdoc positions, 1973-2006

<table>
<thead>
<tr>
<th>Year</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>1973</td>
<td>2.4%</td>
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<tr>
<td>1983</td>
<td>4.8%</td>
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<tr>
<td>1993</td>
<td>4.5%</td>
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<tr>
<td>2006</td>
<td>7.5%</td>
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</tbody>
</table>


National Postdoctoral Association
Recent National Trends

Figure 5-14
Women as percentage of S&E doctorate holders employed in academia with research as a primary or secondary work activity, by position: Selected years, 1973–2006

Percent

NOTES: Academic employment limited to U.S. doctorate holders employed at 2- or 4-year colleges or universities. Senior faculty includes full and associate professors; junior faculty includes assistant professors and instructors. Full-time nonfaculty includes positions such as research associates, adjunct appointments, lecturers, and administrative positions. Part-time positions exclude those employed part time because they are students or retired. Research includes basic or applied research, development, and design.

SOURCE: National Science Foundation, Division of Science Resources Statistics, Survey of Doctorate Recipients, special tabulations.

Science and Engineering Indicators 2010

National Postdoctoral Association
Figure 5-15
Women as percentage of full-time S&E research faculty, by field: Selected years, 1973–2006

Percent


All fields  Physical sciences  Mathematics  Computer sciences  Life sciences  Psychology  Social sciences  Engineering

NOTES: Academic employment limited to U.S. doctorate holders employed at 2- or 4-year colleges or universities and excludes those employed part time because they are students or retired. Faculty includes full, associate, and assistant professors and instructors. Physical sciences include earth, atmospheric, and ocean sciences. Research includes basic or applied research, development, and design.

SOURCE: National Science Foundation, Division of Science Resources Statistics, Survey of Doctorate Recipients, special tabulations.

Science and Engineering Indicators 2010
Summary: National Trends

- Doctorate-holders in postdoc positions
- International postdoctoral scholars
- Women Ph.D. recipients employed in academia
- Ph.D. recipients from underrepresented groups

Employment of postdocs in full-time faculty positions

69% of postdocs are supported by or receive federal funding

Challenge: increase diversity of faculty
Postdoc Expectations
Type of Position Expected vs. Actually Obtained (Former Postdocs)

- Tenure-track academic position
  - Expected: 61%
  - Actual: 37%
- Nontenure-track research scientist
  - Expected: 15%
  - Actual: 16%
- Government
  - Expected: 6%
  - Actual: 12%
- Nonprofit research
  - Expected: 3%
  - Actual: 5%
- Industry
  - Expected: 11%
  - Actual: 16%
- Self-employment
  - Expected: 1%
  - Actual: 4%
- Other
  - Expected: 3%
  - Actual: 10%

### Postdocs Rate Factors That Contribute to a Successful Postdoc Experience, Plus Rankings Compared to 2009 PI Survey

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Very Important</th>
<th>Important</th>
<th>Postdoc Rankings 2010</th>
<th>PI Rankings 2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Funding/Grants</td>
<td>65%</td>
<td>27%</td>
<td>1 (tie)</td>
<td>6</td>
</tr>
<tr>
<td>Networking</td>
<td>61%</td>
<td>31%</td>
<td>1 (tie)</td>
<td>7</td>
</tr>
<tr>
<td>Advancement/Career Options</td>
<td>57%</td>
<td>33%</td>
<td>3 (tie)</td>
<td>10</td>
</tr>
<tr>
<td>Direction and Vision</td>
<td>56%</td>
<td>34%</td>
<td>3 (tie)</td>
<td>2</td>
</tr>
<tr>
<td>Mentoring</td>
<td>55%</td>
<td>35%</td>
<td>3 (tie)</td>
<td>3</td>
</tr>
<tr>
<td>Employer/Situation</td>
<td>57%</td>
<td>31%</td>
<td>6 (tie)</td>
<td>8</td>
</tr>
<tr>
<td>Communication</td>
<td>45%</td>
<td>43%</td>
<td>6 (tie)</td>
<td>1</td>
</tr>
<tr>
<td>Spouses, Partners, Family</td>
<td>60%</td>
<td>26%</td>
<td>8</td>
<td>12</td>
</tr>
<tr>
<td>Training</td>
<td>45%</td>
<td>40%</td>
<td>9</td>
<td>4</td>
</tr>
<tr>
<td>Compensation and Benefits</td>
<td>34%</td>
<td>39%</td>
<td>10</td>
<td>11</td>
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</table>

“I thought my academic career was basically dead. And so I kept kind of downshifting as I moved through, you know, different career paths.”
“at every academic career milestone the proportion of women in science and engineering declines. … In examining the transition into academic positions…, the declines are greatest in fields requiring a period of postdoctoral study” Beyond Bias and Barriers: Fulfilling the Potential of Women in Academic Science and Engineering (2007)

National Postdoctoral Association
Why do postdoc women leave academia?

- Leading reasons cited appear to be:
  - Challenges related to family formation
    - “Biological clock” vs. “postdoc clock”
    - Family leave
    - Dual-career partners
    - Childcare
  - Disenfranchisement
    - Feelings of isolation and alienation
    - Lack of encouragement and confidence
    - Perceived lack of status
The Leaky Pipeline of Scientist Women

Getting First Tenure-Track Job:

- Married women with children 37% less likely than married men with children
- Married women with children 33% less likely than single women without children

Figure & data adapted from Mary Ann Mason, based on study from Goulden, Mason & Frasch 2009, “Staying Competitive Patching America’s Leaky Pipeline in the Sciences.”

National Postdoctoral Association
#1 Reason: Family Formation

- Leading reason for career goal change: Issues related to children\(^1\)
  - For men: career advancement & compensation
  - Postdoc women with new children during postdoc twice as likely to change goal as:
    - postdoc men with new children, and
    - postdoc women with no kids/no plans for kids

- Dual-career concerns
  - More likely than men to make career concessions for partner\(^2\)

DATA SOURCES:

www.nationalpostdoc.org/advance
#2: Lack of Confidence & Isolation

- Lack of Confidence
  - Less confident they will obtain PI position and tenure, despite feeling their preparation is adequate\(^1\)
  - Lack of encouragement, mentoring and role models\(^2,3\)
  - Lack of status

- Feelings of isolation/alienation\(^2\)

DATA SOURCES:
Lingering Structural Problems

- Limited family-friendly benefits for trainees
  - Lack of maternity guidelines
    - Leave often negotiated case-by-case
    - Few institutions offer paid leave to trainees
    - Lack of awareness of unpaid leave protections
      - e.g. Title IX covers pregnancy discrimination
  - No “dual-career” assistance
    - Few incentives to “keep” contingent researchers
Lingering Structural Problems

• “Postdoc clock” vs. “Biological clock”
  • “Short enough, but long enough”
    • Family needs can cause delays
  • Delays can impact:
    • Funding durations
    • Fellowship & grant eligibility
    • CV evaluation/Job search
    • Both postdoc and PI
Lingering Structural Problems

- “Work, work, work” ethic often precludes professional development
  - Including mentoring
- Low salaries
  - Secondary issue for postdocs
  - Finances linked to: Childcare, mortgages, immigration, dual-career decision-making
Other Considerations

- Lack of grant funding
  - Women received only 25% and 23% of competitive faculty grants in 2007—but 63% and 54% of pre-doctoral awards. (Goulden, Mason & Frasch 2009)
  - Rand Report: Women are less likely to apply for a grant again within two years (NIH and NSF).
Other Considerations

- On average, postdoc women may have fewer publications and have attended fewer conferences than postdoc men.
- Letters of recommendation may not be as strong as those for men due to unconscious bias.
International Postdocs

- Geographic (i.e., distance from family)
- Visa concerns
- Cultural differences
- Language barriers
- Additional Needs for Career Guidance
  - May have limited networks in the U.S.
  - Less familiarity with U.S.-based funding procedures; fewer opportunities
How can we start to patch the leaky pipeline for postdocs?
What Can Institutions Do?

• MENTORING
  • Reward mentoring as “core” activity
  • Offer structured programs to encourage multiple mentors
    • Include mentoring training

• PROFESSIONAL & CAREER DEVELOPMENT
  • Negotiating, Networking, Grant Writing, Research & Career Planning, etc.
What Can Institutions Do?

- FAMILY-FRIENDLY POLICIES & BENEFITS
  - Clear guidance on:
    - Maternity/parental leave guidelines
      - Including paid and unpaid options
    - Flexible work arrangements
  - Provide assistance where possible:
    - Childcare services & subsidies
    - Provide postdocs access to dual-career assistance
What Can Institutions Do?

• FAMILY-FRIENDLY POLICIES & BENEFITS
  • Consider “permanently” hiring your own postdocs, which can help “dual-career” geographical constraints.
  • Include postdocs in any institution-wide assessment of climate for women
What Can Funding Agencies Do?

- **CAREER FUNDING**
  - Transition & re-entry support for postdocs
  - Flexibility in defining “early career”
  - Reasonable postdoc salaries

- **FAMILY-FRIENDLY POLICIES & BENEFITS**
  - Continue to clarify how federal funds can be used to support family-friendly issues, e.g.:
    - Supplements for technical assistance during leave
    - Paid maternity leave
    - Support childcare at sponsored conferences
NIH Efforts

- NIH Working Group on Women in Biomedical Careers (WG) (Dr. Collins/Dr. Vivian Pinn co-chairs)
- NRSA Trainees: Doubled allowed paid parental leave to 60 days
- NIH Reentry Supplement Program expanded to include postdoctoral researchers ([http://grants.nih.gov/grants/guide/pa-files/PA-08-191.html](http://grants.nih.gov/grants/guide/pa-files/PA-08-191.html)).
- Change in Biosketch: to explain how personal circumstances may have delayed their transition to an independent career or reduced their scientific productivity
NIH Efforts

• Supplements to support a technical replacement for a postdoctoral research associate because of illness, disability or family care responsibilities (NIAID)

• Costs of replacement technical support can be charged to any NIH research grant, as can dependent child care expenses and leave for birth/adoption

• Grants may be extended or percent effort reduced for leave of absence for care-giving

• NIH Conference Grants: Require plans to identify sources for child care/family care.
NSF Efforts

• NSF-ADVANCE

• Fellows may request no-cost extension for parental leave.

• Up to 2 months of stipends may be used for parental leave.
What Can Postdocs Do?

• What should you do to get that next job?
  • Do great research
  • Publish great papers
  • Attend great conferences

• What else can you do?
The Job Search Pyramid

Know Yourself (and your options)

Credentials

Network

CVs

Created by Lori Conlan, Ph.D.

www.nationalpostdoc.org/advance
Know Yourself & Your Options

Passions/Personality

Career Goals

KSAs

Options
Know Yourself: NPA Core Competencies

Competencies Needed for Career Success in the 21st Century

- Scientific Knowledge
- Professionalism
- Responsible Conduct of Research
- Management and Leadership Skills
- Research Skill Development
- Communication Skills

www.nationalpostdoc.org/advance
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<th>1</th>
<th>Discipline-Specific Conceptual Knowledge</th>
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<tbody>
<tr>
<td></td>
<td>Analytical Approach to Defining Scientific Questions</td>
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<td>Design of Scientifically Testable Hypotheses</td>
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<td>Broad-Based Knowledge Acquisition</td>
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<td>Interpretation and Analysis of Data</td>
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<th>Professional/Research Skill Development</th>
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<td>Literature Search Strategies and Effective Interpretation</td>
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<td>Experimental Design</td>
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<td>Laboratory Techniques and Safety</td>
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<td>Principles of the Peer Review Process</td>
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<th>Communication Skills</th>
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<td>Interpersonal</td>
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<td>Special Situations</td>
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<th>Professionalism</th>
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<td>Collegial</td>
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<td>Universal</td>
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<th>Leadership &amp; Management Skills</th>
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<td>Leadership-Strategic Vision</td>
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<td>Leadership-Motivating and Inspiring Others</td>
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<td>Management-Project Management</td>
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<td>Management-Data and Resource Management</td>
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<td>Management-Research Staff Management</td>
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<th>Responsible Conduct of Research</th>
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<td>Conflicts of Interest</td>
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<td>Data Ownership and Sharing</td>
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<td>Publication Practices and Responsible Authorship</td>
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<td>Identifying and Mitigating Research Misconduct</td>
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<td>Research with Human Subjects (when applicable)</td>
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<td>Research Involving Animals (when applicable)</td>
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Be Proactive

- Make a career plan
  - Include back up plans
  - Think long-term, esp. if visa involved
  - IDP can help with this!
    - Consult your Virtual Career Center!

- Do your homework
  - Choose the best-fitting institution
  - Policies & benefits?
  - Strategies?
Be Proactive

- Find multiple mentors
  - *Doesn’t need to be your PI/boss*
- Enhance your network
  - You’ll hear much more about this later today!
Dual-Career Concerns?

- Talk with partner *before* applying
  - Willing to commute? Live apart?
  - Discuss possible compromises
- Do your homework about job scenarios
  - Nearby institutions?
  - Shared positions?
  - Soft money or postdoc?
    - Odds of becoming permanent?
- Brush up on your negotiating
  - Partner assistance available?
  - Prepare for when to bring up partner
  - *Negotiate up front*
Taking Maternity Leave?

- Make a maternity research plan
  - Willing to work from home?
  - Hire someone to fill in for you?
- Make a maternity salary plan
  - Paid leave options?
    - Short-term disability? Sick leave? Vacation leave?
    - Many grants allow for paid maternity leave...
  - Unpaid options?
    - This should be an option for you under Title IX
- Discuss in advance with supervisor
- Keep in mind - it’s OK not to work during leave!
• Research universities receiving federal funds are required to:
  ▪ Treat pregnancy as a temporary disability for purposes of calculating job-related benefits, including any employer-provided leave, and
  ▪ Provide unpaid, job-protected leave for “a reasonable period of time” if the institution does not maintain a leave policy for employees.
For More Information

- Federal Funding Guidance
For More Information

• NPA ADVANCE:  
  www.nationalpostdoc.org/advance
  • Clearinghouse of institutional practices
  • Forthcoming resources:
    • Resource book for institutions on postdoc women
    • How to take maternity leave as a postdoc
    • Managing your research while on maternity leave
    • Postdocs and Dual-Career Job Searches