Next Gen PhD:
Where PhDs Land and What the Data Say

National Postdoctoral Association Meeting
Saturday, March 18, 2017
Melanie V. Sinche, NCC
Misconceptions

All PhDs want to work as faculty members.
The only jobs out there for PhDs are faculty jobs.
There are no faculty jobs.
PhDs have no employable skills.
PhDs are not using their research skills in non-faculty jobs.
PhDs outside the tenure-track are not happy in their work.
Assertions

Most PhDs are unsure of what jobs exist for them.

PhDs have many employable skills.

PhDs are using their research skills in most jobs.

PhDs in science are happy in their work.
Research questions

In what sectors are recent science PhD graduates currently employed?

What skills, if any, are developed organically during graduate and postdoctoral training?

Are these same skills required for success in different occupations?

What are the primary activities in which PhDs are engaged at work?

Are PhDs in science satisfied in their work?
Survey methodology

Sample
PhDs who graduated between 2004 and 2014
Doctorate in physical, life, computational, engineering, or social science
Must have worked, studied, or trained in the U.S.

Recruitment
Used LinkedIn, email, articles in Science Careers and NatureJobs
Survey open from April 9 to May 11 2015

Instrument
Designed in Qualtrics
Demographics, Education, Postdoctoral Training, Employment
Demographics

8,099 usable responses

42% men, 56% women

82% U.S. citizen or permanent resident, 17% international

10% underrepresented minorities

70% married, 26% single, 2% divorced/separated

36% have children
## Breakdown by program

<table>
<thead>
<tr>
<th>Status</th>
<th>Training</th>
<th>Life Sciences</th>
<th>Physical Sciences</th>
<th>Social Sciences</th>
<th>Engineering</th>
<th>Computational Sciences</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Trainee</td>
<td>Postdoc</td>
<td>2172</td>
<td>475</td>
<td>191</td>
<td>237</td>
<td>126</td>
<td>3201</td>
</tr>
<tr>
<td>PhD Training Complete</td>
<td>Employed,</td>
<td>1469</td>
<td>492</td>
<td>172</td>
<td>143</td>
<td>90</td>
<td>2366</td>
</tr>
<tr>
<td></td>
<td>Postdoc</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PhD Training Complete</td>
<td>Employed,</td>
<td>711</td>
<td>320</td>
<td>217</td>
<td>170</td>
<td>135</td>
<td>1553</td>
</tr>
<tr>
<td></td>
<td>No Postdoc</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>4352</td>
<td>1287</td>
<td>580</td>
<td>550</td>
<td>351</td>
<td>7120</td>
</tr>
</tbody>
</table>
Career goals at start of PhD

- Faculty position: 87%
- Research position in industry: 30%
- Research position in government: 17%
- Other: 7%
Career goals at start of postdoc

- Faculty position: 82%
- Research position in industry: 59%
- Research position in government: 27%
- Other: 15%
Postdoctoral training

68% have held one postdoctoral appointment

27% have engaged in 2 distinct postdocs

4% have engaged in 3 or more

N=4727
Skills.

- Discipline-specific knowledge
- Ability to gather and interpret information
  - Ability to analyze data
- Ability to manage a project
- Oral communication skills
- Written communication skills
- Ability to work on a team
- Ability to make decisions and solve problems
  - Ability to manage others
- Creativity/innovative thinking
  - Time management
- Ability to set a vision and goals
- Career planning and awareness skills
  - Ability to learn quickly
- Ability to work with people outside the organization
<table>
<thead>
<tr>
<th>% acquired skill during training</th>
<th>Skill</th>
<th>% “important for success on the job”</th>
</tr>
</thead>
<tbody>
<tr>
<td>95%</td>
<td>Discipline-specific knowledge</td>
<td>80%</td>
</tr>
<tr>
<td>95%</td>
<td>Ability to gather and interpret information</td>
<td>92%</td>
</tr>
<tr>
<td>93%</td>
<td>Ability to analyze data</td>
<td>83%</td>
</tr>
<tr>
<td>83%</td>
<td>Ability to make decisions and solve problems</td>
<td>93%</td>
</tr>
<tr>
<td>82%</td>
<td>Oral communication skills</td>
<td>93%</td>
</tr>
<tr>
<td>82%</td>
<td>Written communication skills</td>
<td>91%</td>
</tr>
<tr>
<td>71%</td>
<td>Ability to learn quickly</td>
<td>89%</td>
</tr>
<tr>
<td>67%</td>
<td>Creativity/innovative thinking</td>
<td>82%</td>
</tr>
<tr>
<td>66%</td>
<td>Ability to manage a project</td>
<td>87%</td>
</tr>
</tbody>
</table>
Values.

Why did you accept the job you did?

- Intellectual challenge: 718
- Flexibility: 707
- Geographic location: 534
- Salary/benefits: 350
- Job security: 210
- Leadership opportunity: 189
- Autonomy: 80
- Variety: 58
- Prestige: 57

N=2903
Faculty employment

22% in tenure-track faculty positions

13% in non-tenure-track faculty positions

Most recent NSF data: 7% tenure-track faculty

AAUP data: 68% contingent faculty
Employment of PhDs across sectors

- 49% Education
- 12% Government
- 12% Biotech/Pharma
- 6% Non-Profit
- 3% Research Services
- 3% Engineering
- 4% Consulting
- 2% Chemicals
- 2% Hospitals
- 2% Software Development
- 2% Data Science
- 2% Energy
- 1% Other
Education sector

- Research University: 66%
- Liberal Arts College: 23%
- Community College: 5%
- K-12: 4%
- Comprehensive/Regional University: 1%
- Medical School: 1%

Roles:
- Academic Advisor
- Director, Core Facility
- Biostatistician
- Grants Administrator
- Data Analyst
- Laboratory Manager
- Technology Transfer Specialist
- Associate Dean
- Research Scientist
- Curriculum Developer
- Clinical Trials Coordinator
- Imaging Specialist
- Public Affairs Officer
- Department Chair
- Clinical Psychologist
- Collections Manager
Education sector

- Degree: Ph.D., Biomedical Engineering, University of Virginia
- Job: Director of Professional Development, University of Virginia
- Pathway: Mentored and trained undergraduate students and developed experience for her CV
Government sector

- Degrees:
  - Ph.D., Immunology, Stanford University School of Medicine
  - MPH, Johns Hopkins Bloomberg School of Public Health

- Job: Program Director, National Institute of General Medical Sciences, NIH

- Pathway: Went through AAAS Science & Technology Policy Fellows Program
Biotech/Pharma sector

- Biotechnology: 50%
- Pharmaceuticals: 39%
- Medical Devices and Diagnostics: 11%

Roles:
- Vice President, R&D
- Regulatory Affairs Specialist
- Product Development Scientist
- Medical Writer
- Data Scientist
- Marketing Specialist
- Computational Biologist
- Medical Science Liaison
- Team Leader
- Technical Support Specialist
- Laboratory Manager
- Clinical Applications Manager
- Business Development Analyst
- Patent Attorney
- Principal Investigator
Biotech/Pharma sector

• Degree: Ph.D., Interdisciplinary Graduate Program, Graduate School of Biomedical Sciences, University of Massachusetts Medical School

• Job: Scientist, Drug Development, Biogen Idec

• Pathway: Networked with industry representatives by attending campus workshops, seminars, and networking events with employers
Non-profit sector

- Policy Analyst: 32%
- Editor: 19%
- Senior Scientist: 16%
- Statistician: 14%
- Project Manager: 13%
- Science Writer: 13%
- Engineer: 6%
- Museum Educator: 16%
- Executive Director of Education: 19%
- Director, Postdoctoral Affairs: 14%
- Program Officer: 6%

Institutions:
- Research Foundation: 32%
- Professional Society: 19%
- Intergovernmental / Nongovernmental Organizations: 16%
- Educational Services: 14%
- Non-profit Research Institute: 13%
- Museum/Botanical Garden: 6%
Non-profit sector

- Degree: Ph.D., Chemistry, University of Toronto
- Job: Director, Climate and Urban Systems Partnership (CUSP), The Franklin Institute
- Pathway: Took courses on exhibit development, volunteered at the Museum of Science in Boston, coordinated science festival activities
Pathways PhDs sought to gain experience

Experience/networking: 54%
Self-taught: 50%
Collaborations: 39%
Coursework: 37%
Professional program: 24%
Postdoc in field: 23%
Volunteered: 21%
Interned: 18%
Other: 6%

N=3816
My favorite job titles

Volcanologist
Video Game Designer
Coordinator of Freshwater Turtle and Tortoise Conservation
Director of Institutional Effectiveness
Zoo Nutritionist
Aerospace Physiologist
Nanofossil Biostratigrapher
Principle Behavioral Psychologist
Community Nutrition Education Program Specialist
Geneticist
Virtual Lab Manager
Foreign Affairs Officer
Director, Biofuel Strategy
Coastal Landscape Adaption Coordinator
Health Informatics Innovations Analyst
Primary activities at work

40% engaged in full-time work conduct basic research

36% engaged in teaching

34% conduct applied research
PhD: Required/preferred for non-faculty jobs?

78% indicated that a PhD was required/preferred for their current position
Postdoc: Required/preferred for non-faculty jobs?

28% indicated that a postdoc was required/preferred for their current position.
Finding jobs that are right for YOU

Network, network, network…and then network some more

Check out professional associations

Conduct informational interviews

Volunteer, collaborate, intern, take classes

Give yourself enough time
<table>
<thead>
<tr>
<th>Employment satisfaction</th>
<th>Very dissatisfied</th>
<th>Dissatisfied</th>
<th>Neither dissatisfied nor satisfied</th>
<th>Satisfied</th>
<th>Very satisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tenure-track</td>
<td>2%</td>
<td>6%</td>
<td>8%</td>
<td>47%</td>
<td>38%</td>
</tr>
<tr>
<td>Tenured</td>
<td>3%</td>
<td>7%</td>
<td>7%</td>
<td>46%</td>
<td>38%</td>
</tr>
<tr>
<td>Non-tenure-track</td>
<td>4%</td>
<td>12%</td>
<td>14%</td>
<td>45%</td>
<td>26%</td>
</tr>
<tr>
<td>Not employed in a faculty position</td>
<td>2%</td>
<td>6%</td>
<td>10%</td>
<td>40%</td>
<td>yellow: 41%</td>
</tr>
<tr>
<td>Total</td>
<td>3%</td>
<td>7%</td>
<td>10%</td>
<td>42%</td>
<td>38%</td>
</tr>
</tbody>
</table>

N=3335
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