Next Gen PhDs and Careers

2017 TWD Program Directors’ Meeting
Monday, June 19, 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

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

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

3. Instrument
   - Designed in Qualtrics
   - Demographics, Education, Postdoctoral Training, Employment
Demographics

- 42%
- 56%
- 82%
- 17%
- 10%
- 70%
- 26%
- 2%
- 36%

N=8099
# 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>
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</thead>
<tbody>
<tr>
<td><strong>Current Trainee</strong></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><strong>PhD Training Complete</strong></td>
<td>Postdoc</td>
<td>1469</td>
<td>492</td>
<td>172</td>
<td>143</td>
<td>90</td>
<td>2366</td>
</tr>
<tr>
<td><em>(Employed)</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>No Postdoc (Employed)</strong></td>
<td></td>
<td>711</td>
<td>320</td>
<td>217</td>
<td>170</td>
<td>135</td>
<td>1553</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td>4352</td>
<td>1287</td>
<td>580</td>
<td>550</td>
<td>351</td>
<td>7120</td>
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</table>
Career Goals at Start of PhD and Postdoc

- Faculty Position: 87% (82% acceptance rate)
- Research Position (in industry): 30% (59% acceptance rate)
- Research Position (in government): 17% (27% acceptance rate)
- Other: 7% (15% acceptance rate)
Postdoctoral Training

1 postdoctoral appointment: 68%
2 distinct postdocs: 27%
3 or more postdocs: 4%

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
Skills

% acquired skill during training

95% Discipline-specific knowledge 80%
95% Ability to gather and interpret information 92%
93% Ability to analyze data 83%
83% Ability to make decisions and solve problems 93%
82% Oral communication skills 93%
82% Written communication skills 91%
71% Ability to learn quickly 89%
67% Creativity/innovative thinking 82%
66% Ability to manage a project 87%

% important for success on the job
Why did you accept the job you did?

- Intellectual Challenge: 718
- Flexibility: 707
- Graphic 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

- Education: 49
- Biotech / Pharma: 12
- Government: 12
- Non-profit: 6
- Consulting: 4
- Engineering: 3
- Chemicals: 3
- Energy: 2
- Research services: 2
- Data science: 2
- Hospitals: 2
- Software development: 2
- Other: 1

Education Sector

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

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

Amy Clobes, Ph.D.

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
Biotech/Pharma Sector

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

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

Manisha Sinha, Ph.D.

Degree

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
Kenny Gibbs, Ph.D.

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
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?

...indicated that a PhD was required/preferred for their current position.

78%
indicated that a postdoc was required/preferred for their current position.
## Employment Satisfaction

<table>
<thead>
<tr>
<th></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 Faculty position</td>
<td>2%</td>
<td>6%</td>
<td>10%</td>
<td>40%</td>
<td>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>
Next Gen PhD
A GUIDE TO Career Paths in Science
Melanie V. Sinche
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