PATHWAYS TO A CAREER IN SCIENCE & ENGINEERING
University Pathway

How many PhDs in life sciences do you think end up with full-time employment on the tenure track at a university?
Changing Climate

Employment of Life Science PhDs Ten Years After Degree

1973-74
(PhD awarded 1963-64)

- University: 61%
- Industry: 12%
- Government: 14%
- Non-Traditional: 13%

1995-96
(PhD awarded 1985-86)

- University: 38%
- Industry: 24%
- Government: 11%
- Non-Traditional: 27%
### Growth in Number of Degrees

<table>
<thead>
<tr>
<th>Year</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1967</td>
<td>13,109</td>
</tr>
<tr>
<td>1977</td>
<td>18,008</td>
</tr>
<tr>
<td>1997</td>
<td>28,847</td>
</tr>
</tbody>
</table>

- Number more than doubled between 1967 and 1997
- Increase in number of degrees is *not* accompanied by corresponding increase in employment opportunities -- particularly opportunities as *independent investigator*

Source: NSF
Some Factors in Changing Climate of Employment

• Growth in federal funding for research is not compensating for increase in PhDs
• Support of research at medical centers is seeing reductions due in part to managed care
• Alternative careers are competitive and some have shrinking job markets
Non-University Pathways

- Government Research Laboratory
- Industry
- Other Related Careers
- PhD in Science or Engineering
- Graduate Student
Related Careers

• “Traditional” employment for person with PhD in life sciences (as defined by National Academy)
  
  Academics, Industry, Government

• Alternative ends (may require second degree)
  
  Business, Law, Consulting, Public policy, Journalism, etc.
Non-Linear Paths

Alternative paths

• Part time
• Time off/re-entry
• Lateral movement from one type of employment to another
Career Plan

Decide:

• What do you want to accomplish?
• Where do you want to work?
• Do you have major responsibilities outside your career or other special considerations?
What Do You Want To Accomplish

What do you want to accomplish in

• Research
• Teaching
• Administration
• Service and other professional activities
Research Considerations

• Research subject areas
  • Basic science
  • Clinical
  • Product based

• Multi-disciplinary studies
• Collaborative investigations
• Availability of continuing research education
Teaching Considerations

- Course instructor
- Occasional lecturer
- Advisor to students
- Train personnel
- No teaching responsibilities
Management and Administration

- Working with people/Team member
- Managing work team
- Leadership
  - Running research operation
  - Leading group in industry
  - Administering academic department
Service to Scientific Community

- Professional societies
- Panels that review proposals
- Journal editorial boards
- Program committees
- Policy committees
- Journal reviews
- Education committees
- Dissemination of scientific information (writing for general audience, giving and attending talks)
Where Do You Want to Work

• University
• 4-year college
• Hospital-based laboratory
• Research institute
• Industrial research department
• Government research facility
• Alternative career locations
Other Responsibilities

Do you have focus outside research?

- Academic science versus entrepreneurial ventures
- Research versus clinical duties
- Work versus family/personal commitments

*Must find way to balance*
Some Special Considerations

- Under-represented minorities
- Persons with disabilities
- Women in science
- Dual careers
Scientists and engineers in the U.S. labor force, by race/ethnicity: 1997

Scientists & Engineers in Work Place, by Sex: 1997

- 77% Men
- 23% Women

Source: NSF
Percentage of full-time ranked doctoral scientists and engineers in 4-year colleges or universities who are full professors, by sex and years since doctorate: 1997

Dual Careers

Survey in *The Scientist*, April 2003
Summary

- Develop career plan
  - What do you want to accomplish
  - Where do you want to work
  - Be open about considerations & responsibilities
- Find out career information in your field
- Relate your career plan to your plan for graduate education & post-graduate training
- Be ready for roadblocks and detours
- Be open to change
Resources

• Career Development Center at Science Magazine
  http://nextwave.sciencemag.org/cdc/index.shtml

• Careers in Science and Engineering
  http://www.nap.edu/readingroom/books/careers/