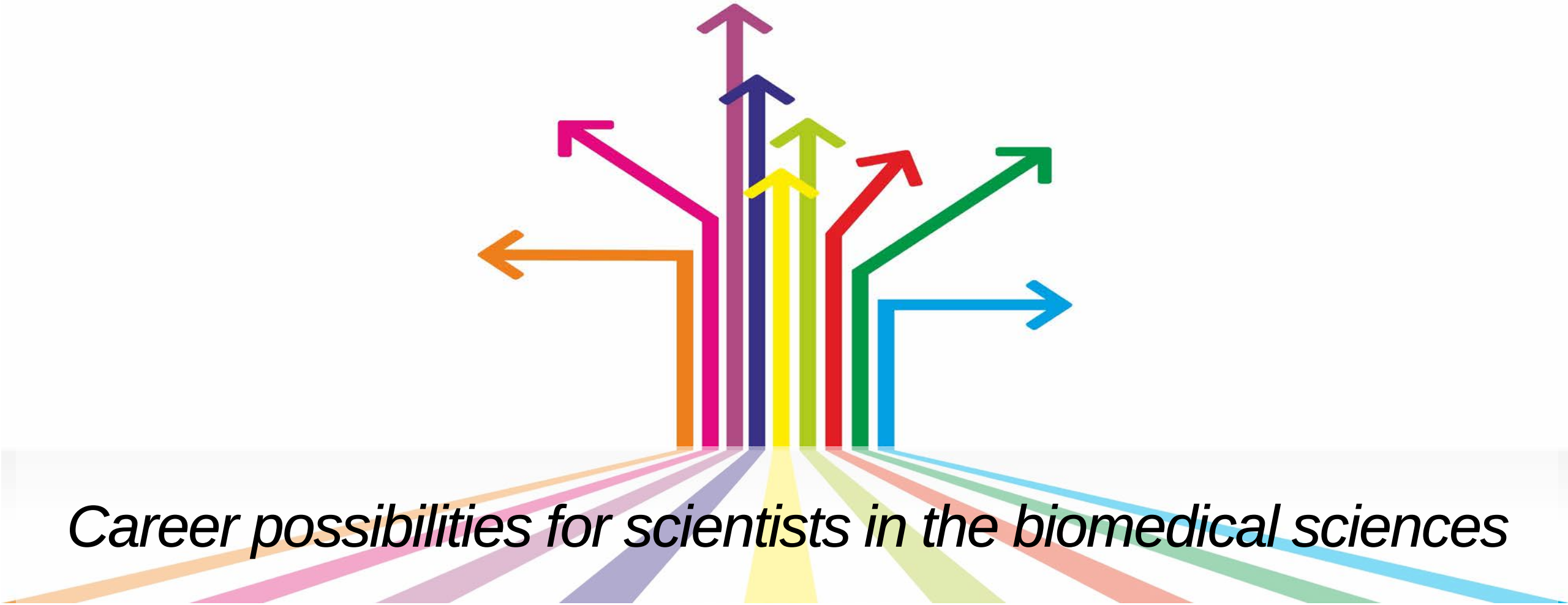
What can you be with a PhD?

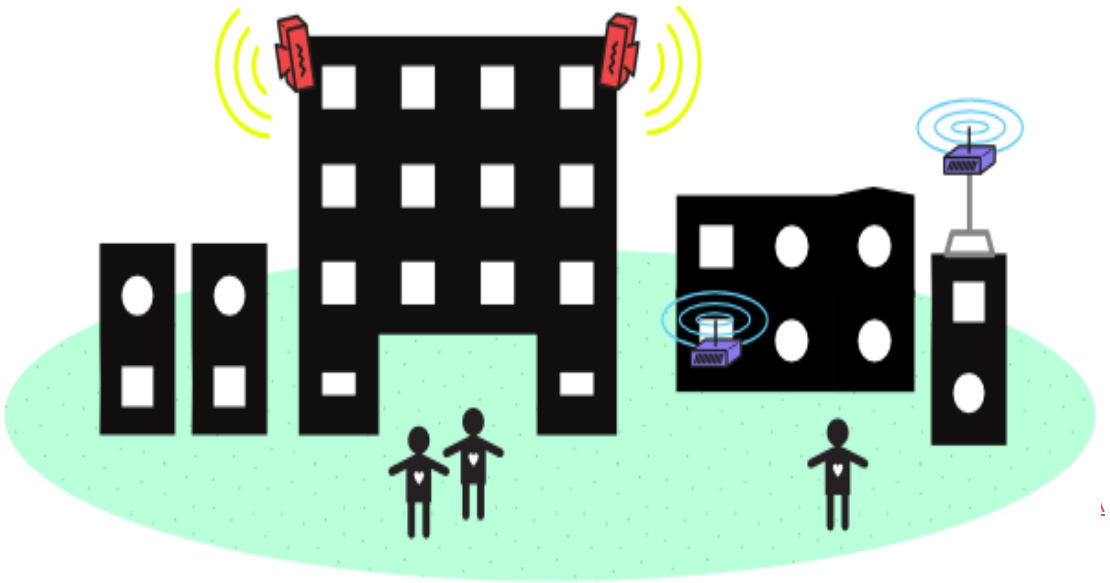


Career possibilities for scientists in the biomedical sciences

Kim Petrie, PhD ● Assistant Dean for Biomedical Career Development ● Biomedical Research Education and Training ● VU School of Medicine

The big picture: what do biomedical scientists do?

WHERE do they work in the workforce?



WHAT TYPES of work do they do?

National Science Foundation Survey of Doctorate Recipients

- Comprehensive employment survey conducted every 2 years by the NSF, a U.S. government agency dedicated to the progress of science
- Sent to a subset of PhD scientists who earned their PhD in the U.S.
- Longitudinal: Follows same people from PhD → age 76
- Excellent source of information about the PhD workforce and trends in employment
- Can slice and dice the data by specific disciplines (like, the life sciences!)
- Most recent survey data from **2021**

Unemployment of bio-sciences PhDs is very low

Bio-sciences PhDs (2021)

1.5%

U.S. economy as a whole (2021)

6.2%

(4.5% among college grads)

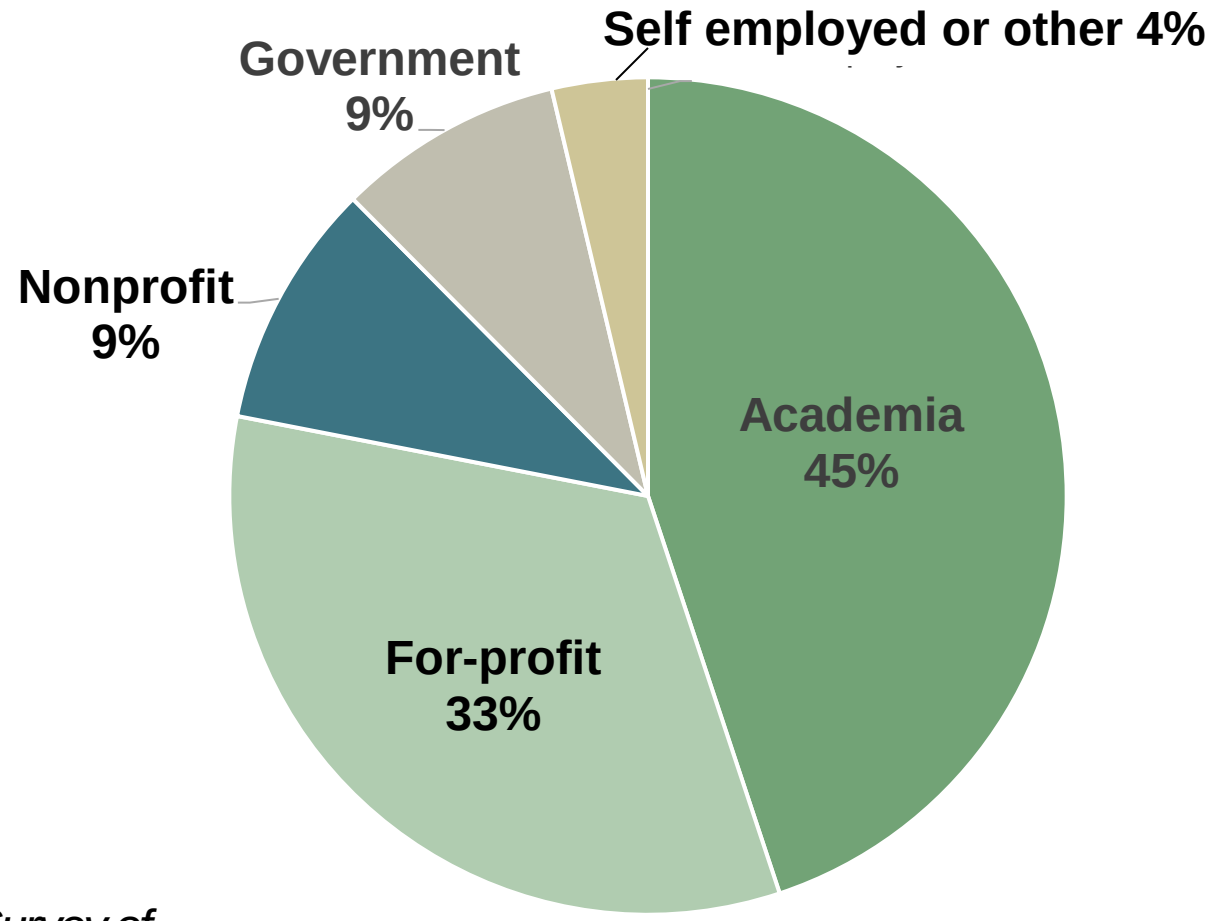
National Science Foundation Survey of Doctorate Recipients, 2021

Employment by sector of employer

Academia	For-profit	Nonprofit	Federal/state government	“Other”
• Universities • Colleges • Community colleges	• Biotech • Pharma • Consumer goods • Consulting firms • Etc.	• Research institutes • Hospitals • Advocacy orgs	• Federal agencies (NIH, CDC, FDA, etc.) • Dept. of health/ed • Labs	• Self-employed • “Other”

Employment of U.S. bio-sciences PhDs by sector, 2021

N=194,440



National Science Foundation Survey of Doctorate Recipients, 2021

Employment by primary type of work activity, 2021

National Science Foundation Survey of Doctorate Recipients, 2021

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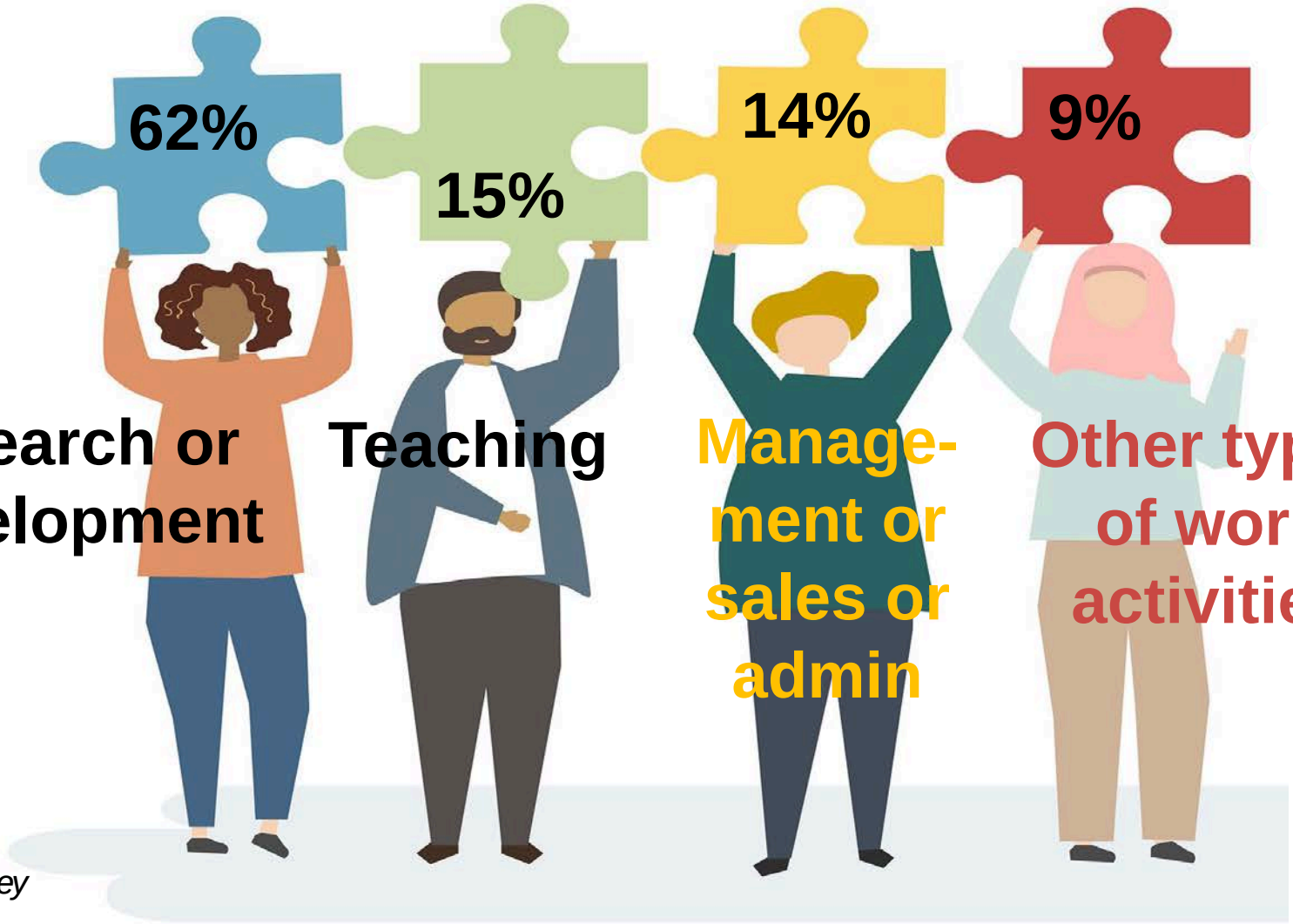

National Science Foundation Survey of Doctorate Recipients, 2021

LET'S DRILL DOWN FURTHER…

What can you be with a PhD?

Two frameworks for understanding career possibilities

By sector of employment

Academia	For-profit	Nonprofit
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Federal/state government	"Other"
• Federal agencies (NIH, CDC, FDA, etc.) • Dept. of health/ed • Federal laboratories	• Self-employed • "Other"

By type of work

All types of work can be found in all sectors of employment

By sector of employment

Academia

- Universities
- Colleges
- Community colleges

For-profit

- Biotech
- Pharma
- Consumer goods
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- Etc.

Nonprofit

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By type of work

Academia is vast: 3939 higher ed institutions, 7 basic types

1. Doctoral universities
2. Master’s colleges and universities
3. Baccalaureate colleges
4. Associate’s colleges (community colleges)
5. Baccalaureate colleges/Associate’s colleges
6. Special-focus institutions (law, art, medicine, etc)
7. Tribal colleges and universities

There are 3939 higher ed institutions, 7 basic types.

More research activity

More teaching activity

1. Doctoral universities
2. Master’s colleges and universities
3. Baccalaureate colleges
4. Associate’s colleges (community colleges)
5. Baccalaureate colleges/Associate’s colleges
6. Special-focus institutions (law, art, medicine, etc)
7. Tribal colleges and universities

Careers for bio-sciences PhDs in academia

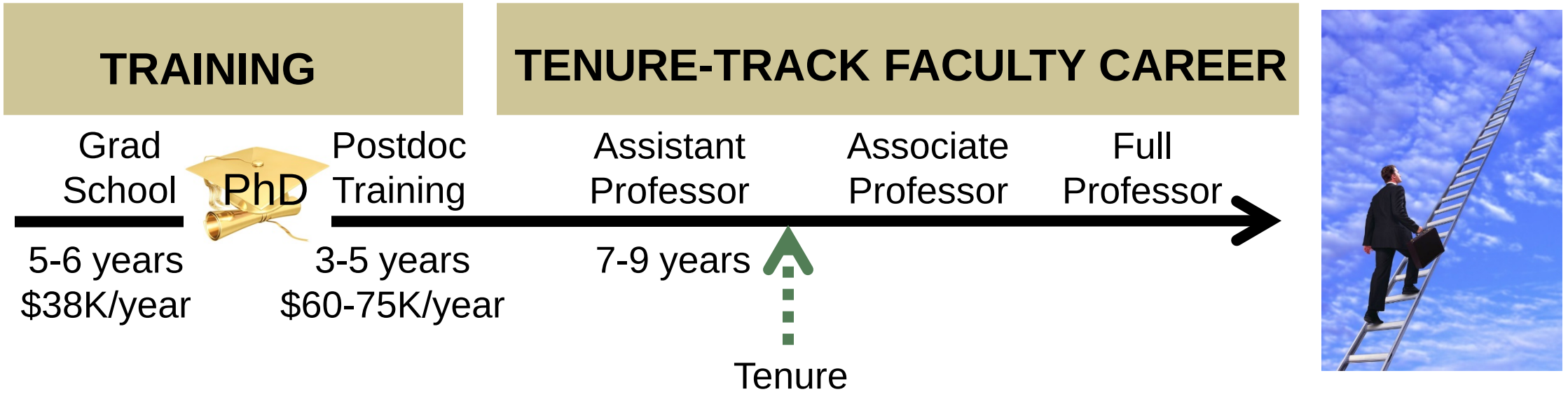
Research and teaching careers

- Faculty/professor
  - Those who have grants and run labs are also called “Principal Investigators” (PI)
  - Two types of faculty: tenure-track and non-tenure track
- Staff scientist
- Laboratory manager
- Core facility manager

Administrative and other careers

- Research development/ grants administration
- Regulatory/ biosafety officers
- Academic/ program administration
- Technology transfer
- Science outreach
- Public affairs/ communication

Academic faculty career path: well defined “ladder”



Careers in for-profit companies

By sector of employment

Academia

- Universities
- Colleges
- Community colleges

For-profit

- Biotech
- Pharma
- Consumer goods
- Consulting firms
- Etc.

Nonprofit

- Research institutes
- Hospitals
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Federal/state government

- Federal agencies (NIH, CDC, FDA, etc.)
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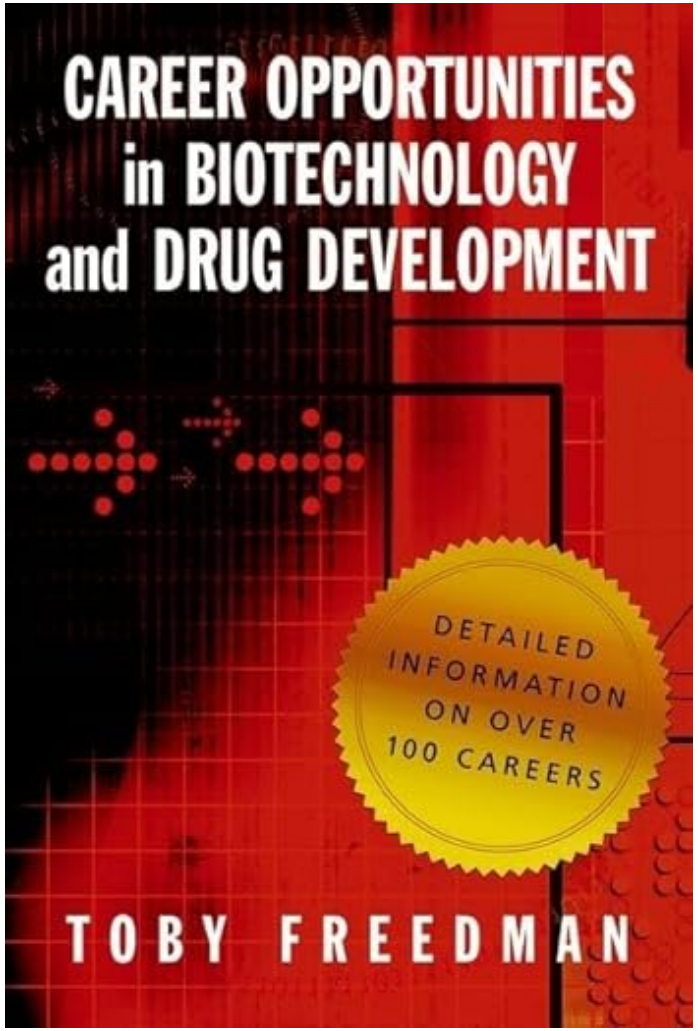
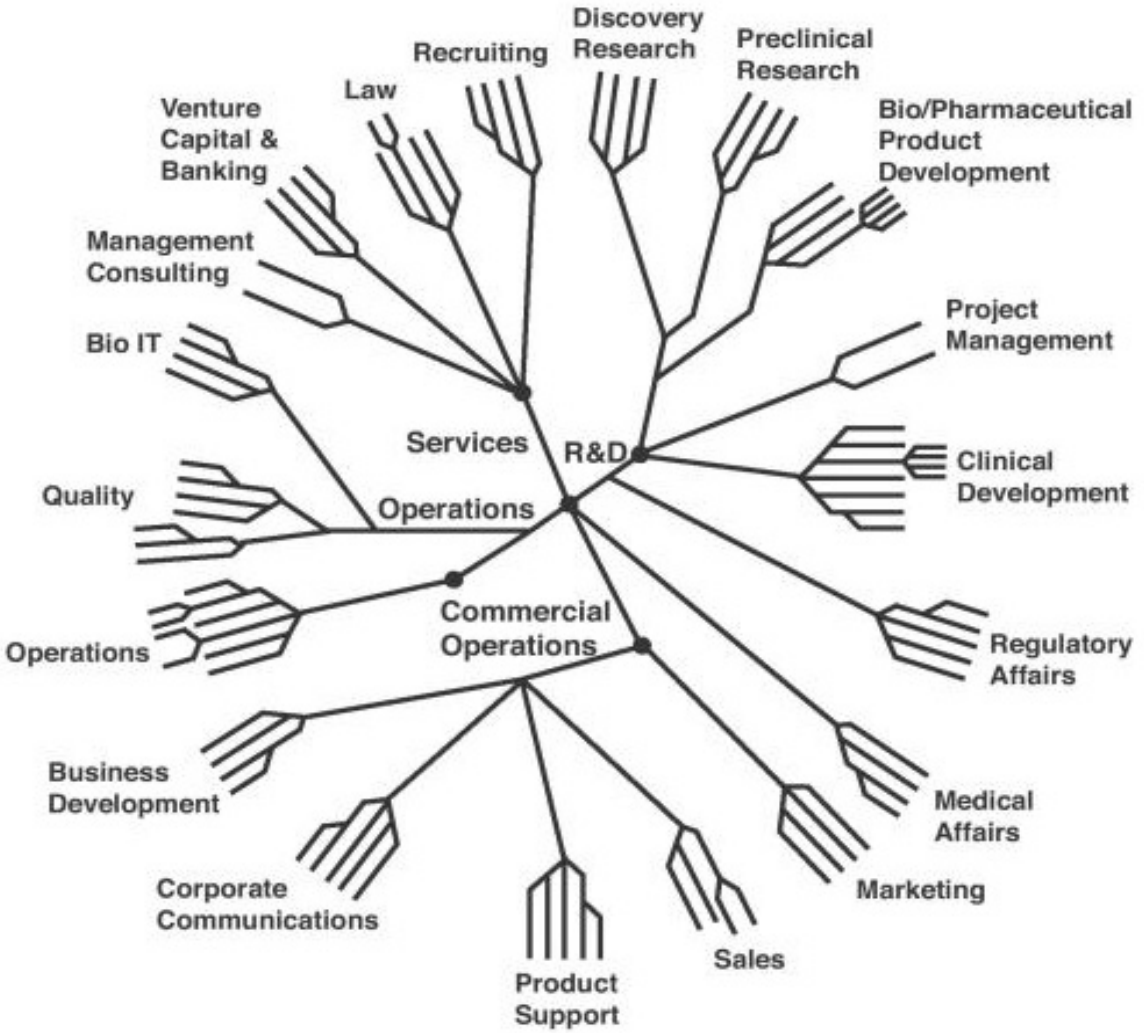
By type of work

Main employer of bio-sciences PhDs: pharma/biotech industry

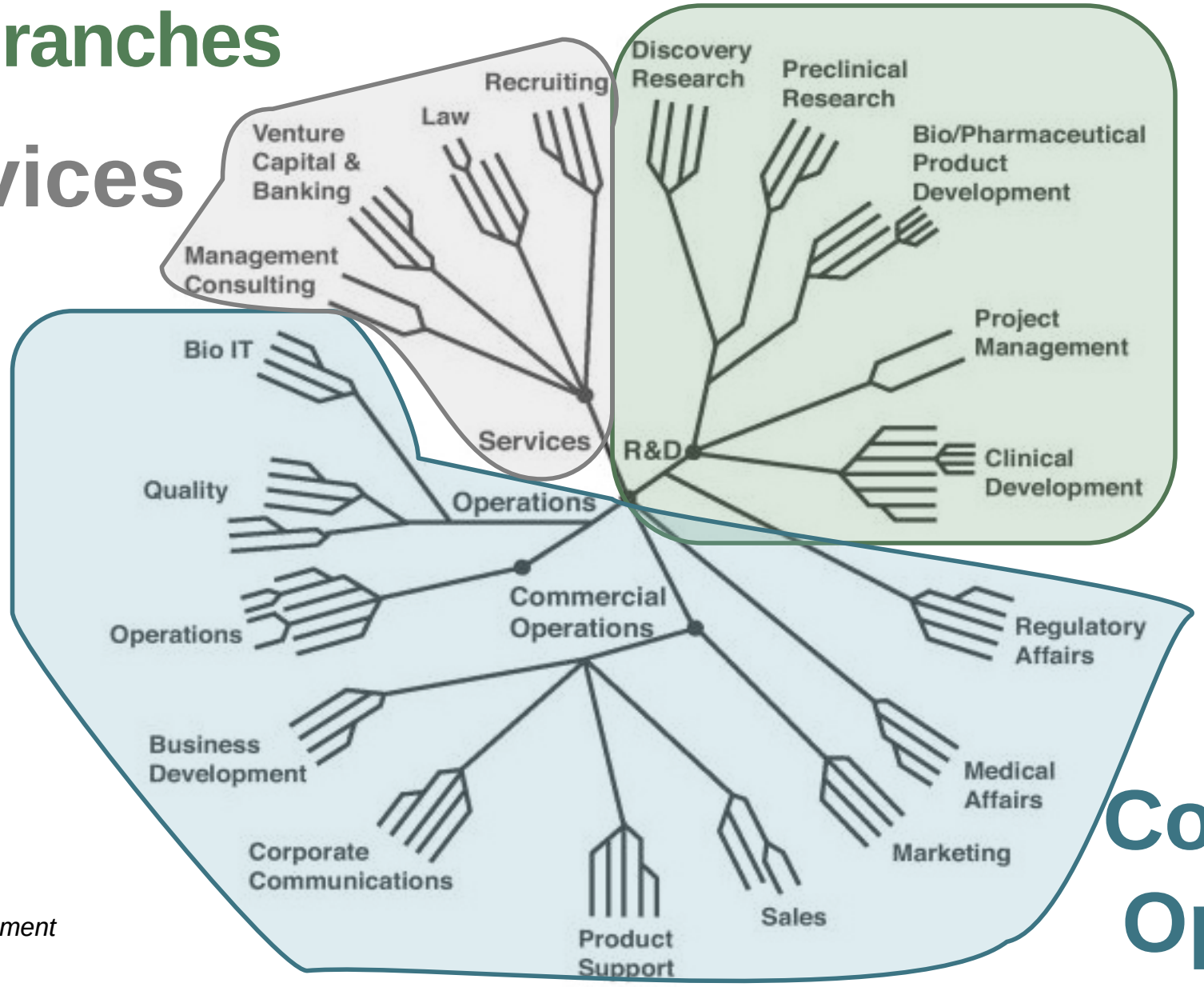




From *Career Opportunities in Biotechnology and Drug Development* (Freedman, 2008)

3 main branches

Services

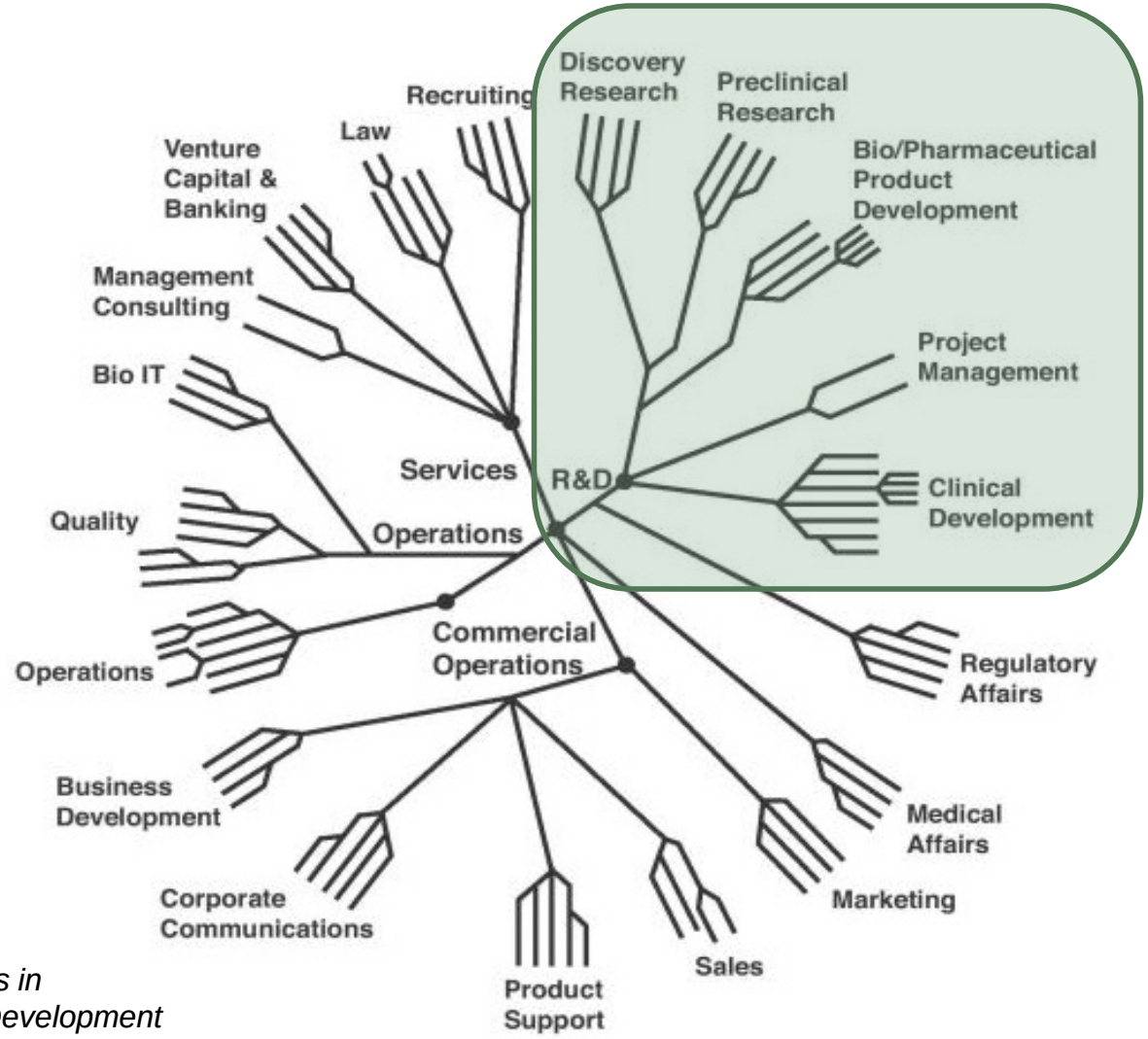


R&D

Commercial Operations

From *Career Opportunities in Biotechnology and Drug Development* (Freedman, 2008)

Most often think of opportunities for PhDs in R&D



From *Career Opportunities in Biotechnology and Drug Development* (Freedman, 2008)

R&D

Senior scientist

Principal scientist

Clinical development scientist

Chief scientific officer

Vandy bio-sciences PhD alumni have jobs in every functional area

Consulting

Patent law

Technical sales

Business development

Venture capital

Clinical research

Data management

Medical communications

industry R & D

Quality assurance

Technical support

Diagnostics

Marketing product manager

Manufacturing

Regulatory affairs

Careers in for-profit companies

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By type of work

Careers for bio-sciences PhDs in nonprofits

Research institutes	Foundations	Professional societies
• PI/research staff • Research/grant administration • Communication • Technology transfer • Education	• Scientific officers and directors • Grant manager • Patient relations	• Government relations/science policy • Communications • Public outreach • Publications • Executive administration

Careers for bio-sciences PhDs in government

By sector of employment

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By type of work

Careers in government

Laboratory research

- NIH, CDC, FDA (HHS)
- EPA, USDA, NASA
- 39 federally funded R&D centers, e.g. Los Alamos, Oak Ridge, Frederick National Lab for Cancer Research
- Military, FBI, CIA
- State department of health, forensic sciences

Research-related

- Science policy
- FDA reviewer
- USPTO patent examiner
- DOD intelligence analyst
- NIH scientist administrator
  - Scientific review officer
  - Program officer
- Project manager
- Communications

Research training during a PhD helps you develop….

- Deep understanding of science and research and the scientific method

The essence of PhD training!

Research training also helps you develop….

- Deep understanding of science and research and the scientific method
- Deep understanding of the “scientific enterprise”
- problem-solving skills
- critical-thinking skills
- creativity
- objectivity
- ethics and integrity
- ability to anticipate/thwart problems (troubleshooting!)
- project management skills
- leadership and teamwork skills
- experience working with people from many different cultures and countries
- ability to operate under ambiguity
- persistence and resilience
- communication skills

All “transferable skills” highly valued by employers!

- Deep understanding of science and research and the scientific method
- Deep understanding of the “scientific enterprise”
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RESEARCH TRAINING IS VERY VERSATILE!

How can I find out more about all these career possibilities??!??

- Podcasts
- Books
- Career events - university, professional societies

Vanderbilt's Beyond the Lab podcast

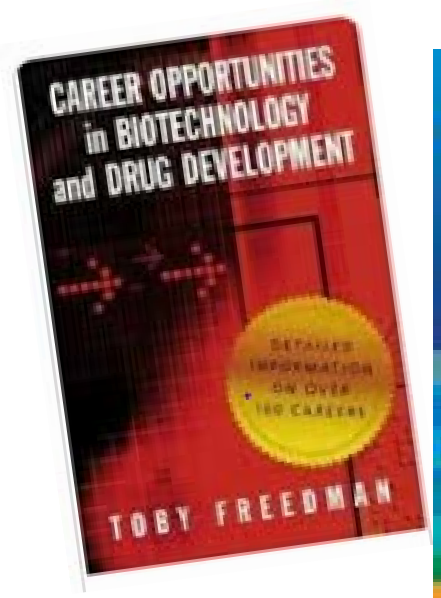
- Interviews with VU PhD alumni about their careers

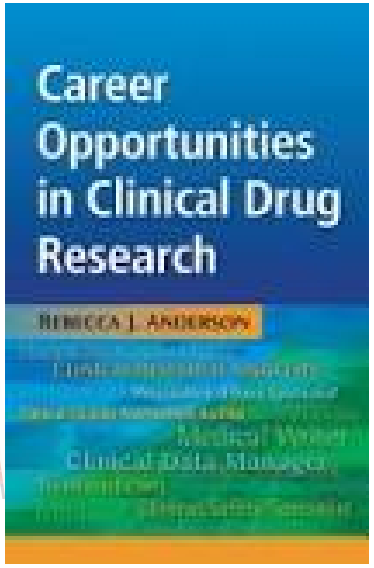
- 100s of episodes!
- Wide range of careers
- New episodes drop weekly
- Available on iTunes, Stitcher, SoundCloud, our website

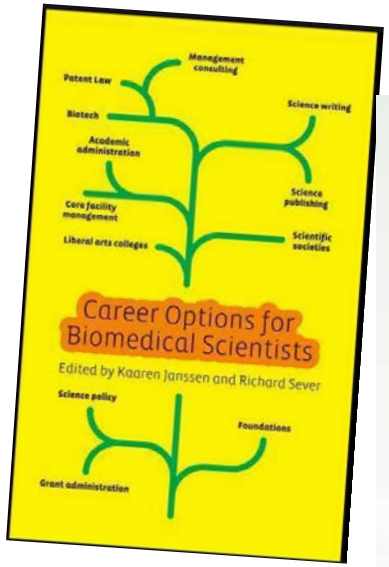
(Some also available as videos on YouTube)

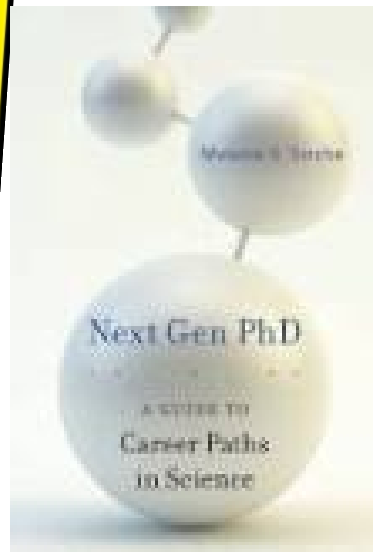
Books

- Career Opportunities in Biotechnology & Drug Development (Freedman)
- Career Opportunities in Clinical Drug Research (Anderson)
- Career Options for Biomedical Scientists (Janssen)
- Next Gen PhD (Sinche)









Questions?

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Assistant Dean for Biomedical Career Development

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