Non-research options for your Ph.D. - Career Choices for Bioscientists in Today's World

They're going to hire someone – it might as well be you

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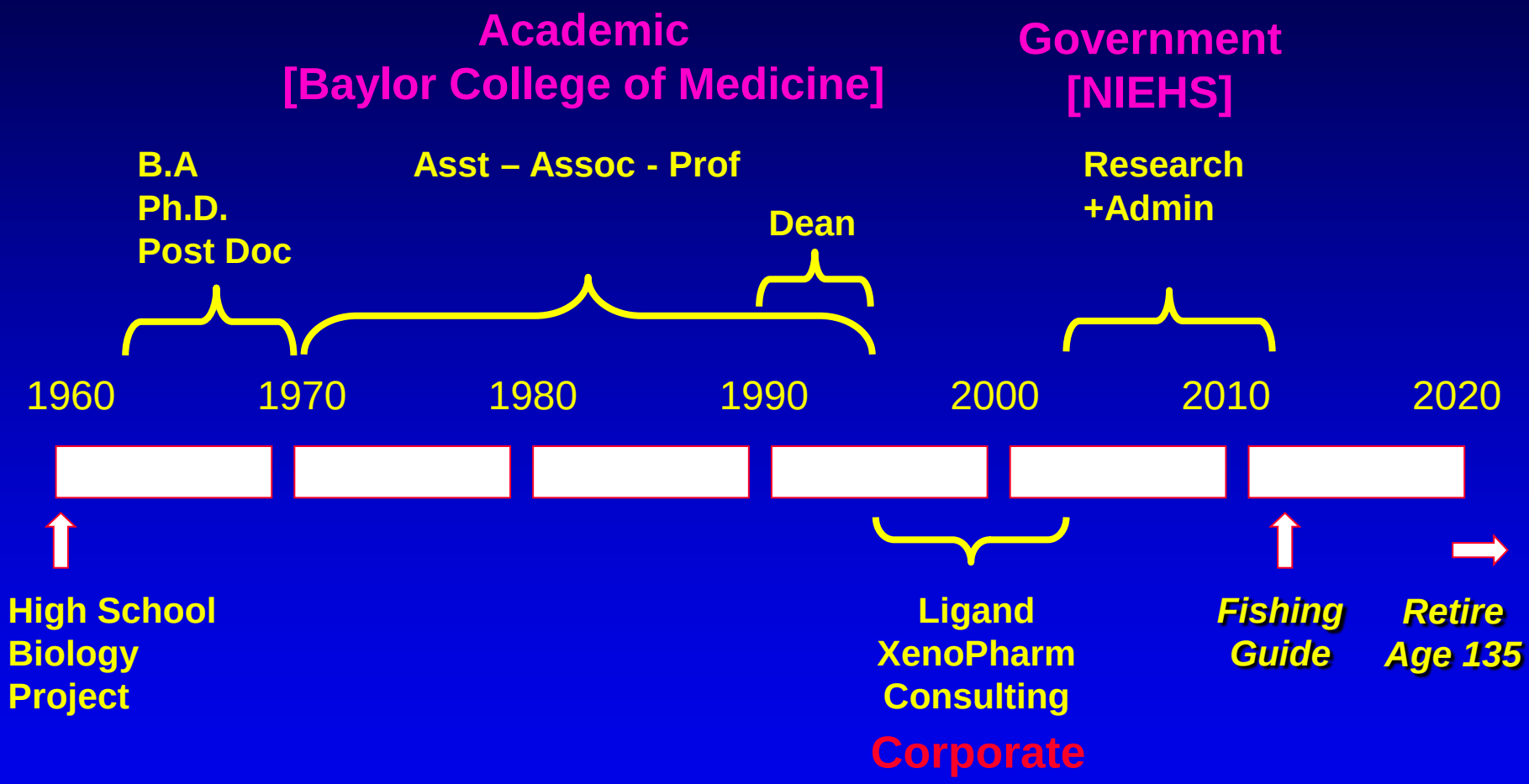
Schrader Career Timeline



"Non-Research" Doesn't Mean "Non-Scientific"

- Non-bench jobs require you to blend science and other skills
- The most lacking assessment is of your own capabilities and needs
  - Strengths and weaknesses
  - What do YOU bring to the table?
- You will probably change directions several times in your life
  - Some by choice
  - Some by chance

The University Search Committee will be asking themselves "Does this person…."

- Know the science in your chosen field
- Anchor a key technology and/or run a core facility
  - Next Gen Sequencing
  - High throughput assays
  - NMR, Xray Crystallography
  - Protein overexpression
  - Gene transfer, knockout mouse, tissue culture
- Teach and get excellent evaluations from students who pay the tuition?
  - Certificate-level accreditations and Master's Courses
- Become a permanent part of the institution and not be seeking ways to leave and pursue more independent roles?

Biological Sciences Career Types

- ***Traditional career paths***
  - ***Academics: instructor/asst. professor***
  - ***Federal or State Government Lab***
  - ***Biotech and big-business staff scientist***
  - ***For-profit analytical laboratory: CRO, diagnostics***

Junior Faculty Job Satisfaction at Colleges & Universities

Nature of work: teaching	
Liberal-arts colleges	**Universities**
Bowdoin	Stanford
Carleton	Brown
Holy Cross	Dartmouth
Davidson	Duke
	Harvard
Nature of work: research	
Liberal-arts colleges	**Universities**
Denison	Dartmouth
Bowdoin	Brown
	Notre Dame
	Illinois
	Stanford
	Duke

Source: Chronicle of Higher Education, December, 2007

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Denison	Dartmouth
Bowdoin	Brown
	Notre Dame
	Illinois
	Stanford
	Duke

Work and family	
Liberal-arts colleges	**Universities**
Hamilton (NY)	Illinois
Carleton	Stanford
Barnard	Duke
	UNC Pembroke

Compensation	
Liberal-arts colleges	**Universities**
Macalester	Stanford
Carleton	Duke
Bowdoin	Dartmouth
	UConn

Source: Chronicle of Higher Education, December, 2007

Junior Faculty Job Satisfaction at Colleges & Universities

Global satisfaction	
Liberal-arts colleges	**Universities**
Trinity (Conn.)	Brown
Kenyon	Appalachian State
	UVa
	Minnesota
	Illinois
	Stanford
	Duke
	Dartmouth
	Cal State San Marcos

Source: Chronicle of Higher Education, December, 2007

Teaching Full-Time

- **Academically excellent colleges & universities**
  (ex.: Mt. Holyoke; Williams; Haverford)
  - **You MUST have had teaching experience before applying**
  - **Little opportunity for cutting-edge research except in non-wet lab disciplines**
  - **Gifted, motivated undergrads who will work for free**
- **Community Colleges**
  - **Part time or one course to gain experience**
  - **Even they don't hire full-time without experience**

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- **The road less-known to academic bioscientists**
  - **Bioinformatics & Computational Biology**
  - **Computing/data management**
  - **Grants management/science administration**
  - **Bio suppliers: Sales, R&D**
  - **Scientific journalism**
  - **Forensics [Esp. with foreign language skills]**
    - … **Microbiology, Virology, toxicology**

Computational Biology and Bioinformatics

- **Upside**
  - **High need for people with Linux command-line abilities**
  - **Huge data sets being generated everywhere; the rate-limiting step is data analysis**
  - **Likely to continue for at least a decade**
- **Downside**
  - **Biologists and physicians pose the questions and set the goals and priorities**
  - **GUI interfaces will be developed, allowing the users to do their own data analysis**

    …**E.g.: Microarray**

Computing/data management

- Upside
  - Maintenance of database integrity becomes a larger problem as surveys and epidemiological studies expand
  - NCBI, NLM – see Clinicaltrials.gov
  - NIEHS “The Sister Study” – 50,000 breast cancer patients and their sisters to be followed for 20 years
- Downside
  - Once a system is launched, it is very expensive to change over to a new one
  - Privacy matters predominate

Grants Management & Science Administration

- **Upside**
  - **NIH, NSF, private non-profits all hire PhD scientists to administer their grants programs**
  - **Direct involvement in determining directions that the research portfolio will take**
- **Downside**
  - **Long time-in-grade to become a “decider”**
  - **Sad news must often be delivered**

Scientific Journalism

- **Upside**
  - **Keeps you tied directly to the science itself**
  - **There are thousands of journals, covering every possible intellectual endeavor**
  - **Corporate technical manuals another source of jobs [e.g., Invitrogen]**
- **Downside**
  - **Editing means handling a lot of really bad papers to find the good ones**

SCIENTIFIC CAREERS IN FOR-PROFIT SETTINGS

Instruments & Reagents
Biotech
Big Pharma
Agribusiness

The Search Committee will be asking themselves "Can this person…."

- **IN ACADEMICS**
  - **Knowledge of science** in your chosen field
  - **Anchor a key technology** and/or run a core facility
  - **Teach a course**, and do it well
  - **Attract students** to your department
  - **Stay there**
- **IN A BUSINESS**
  - **Knowledge of science** in your chosen field
  - **Anchor a key technology** and/or run a core facility
  - **Communicate effectively** by both oral and written means
  - **Get along** in a team environment
  - Plan and **meet timelines**
  - Do work that **makes money** for shareholders

What A Company Hopes to Find

- TEAM PLAYER
- Excellent scientific capabilities
- Smart, keeping abreast in the future
- Reliable – “on time”
- Reliable – ethical, honest, truthful
- Good “people skills”
- Able to accept criticism and make corrections
- Future potential as a leader and manager

Where Do I Find Jobs Like Those?

- **Manufacturer's Rep**
  - **Install, sell, upgrade, troubleshoot instruments**
- **"Contract Science" – run a process or a machine**
  - **Worldwide contractors**
    - **…SAIC**
    - **…RTI**
    - **…Kelly Scientific**
    - **…SRA**
- **Federal**
  - **NCI/Frederick**

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    - … **Microbiology, Virology, toxicology**
- **What your mom always wanted you to do anyway: "Follow the Money"**
  - **M.D. – Clinical directions**
  - **J.D. – Intellectual property law**
  - **M.B.A. (esp. night-time executive MBA)**

Why Get an M.D. after the Ph.D.?

- **Upside:**
  - M.D./Ph.D. holders are the most sought-after for leadership positions
  - Opportunity to attain a leadership position in corporate decisions
  - Potential for actually helping sick people
- **Downside**
  - Long time to the end
  - No advantage unless you complete post-degree training
  - Ph.D. rarely buys you anything regarding entrance
  - Ph.D. training is counter-productive for preclinical success

Why Get a J.D. after the Ph.D.?

- **Upside**
  - **Utilize scientific training combined with excellent writing skills**
  - **Get paid by an Intellectual Property law firm while training to be a "patent clerk"**
  - **Often, companies will pay for law school**
- **Downside**
  - **Long time to completion since courses are in your "spare time"**

Why Get an M.B.A. After The Ph.D.?

- Upside
  - Understanding the financial arena in all its aspects
  - Business development opportunities
  - Future career changes in management
  - Customized biotech-business programs
  - On-line programs exist
- Downside
  - Executive MBA programs take extra years
  - Best MBA programs require company experience
  - High tuition

THE BUSINESS TRACK

What do you get to do with an MBA that you can't do without it?

Scientific/Management Arena

- **Business Development**
  - New technology assessment
  - Licensing & Alliances
- **Operations Management**
  - Stretegic Planning
  - Competitive Marketing Analysis
  - New Product Development
- **Finance**
  - Financial Analysis
  - Venture Capital options
  - Entrepreneurial Endeavors

Patents
[See: Google Patents]

- Steps
  - Invention Report
  - Initial Filing in a year
  - National Phase
  - Patent can take almost a decade
- What a patent does
  - Teaches a concept
  - Shows novelty – must not be “obvious”
  - Claims: What is covered

Distinctions Between the Success Ladder in Academics and Business

- **Academics (Look DOWN)**
  1. How big is your group?
  2. How many papers have you published?
  3. Do you get invited to a lot of meetings?
  4. Do you have lots of grants?

- **Business (Look UP)**
  1. Who do you report to?
  2. Have you increased the stock price?
  3. What is the dollar amount of your signing authority?
  4. Do you sit on committees that make the key decisions?