life after grad school - heaven or hell?

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abstract

- There is life after grad school! Two alumni offer advice from the world beyond the ivory tower. What useful things did we learn in grad school? What wasn't so useful? What did we not learn that we wish we had? What to look for in a job and a company. How to succeed once you get there. This talk will look at those questions from two different viewpoints - for a job in an industrial research lab, and at an Internet startup. Information for making a decision if you're close, and things to think about if you're not.

disclaimers

- your mileage will vary
- our opinions, our experience
- our opinions, *not* our employers
- no universal truths

industrial lab vs. startup

labs	*startup*
• Research and development for a large company	• research and Development for a small company
• long(er) time scales	• short time scales
• long-term impact	• immediate impact
• (often) hard to see impact	• noticeable impact
• avoid the details	• sweat the details
• steady cash	• large (potential) $ upside
• some risk of boredom	• high risk of failure
	• eventually (??) grows up into a large company

what I can use from grad school

labs	*startup*
• process of research	• process of research
• critical thinking	• critical thinking
• hard work	• hard work
• healthy skepticism	• healthy cynicism
• how to defend your ideas	• how to defend your ideas
• writing and speaking	• coding
• thesis research (maybe)	• (probably not)
• connections	• connections

what I can't use from grad school

labs	*startup*
• excessive broadness	• specialized knowledge in distant fields
• focus on a particular "great idea"	• thesis research

things I should have learned

labs

- funding and proposals
  - sell ideas internally
    - > research community, product divisions
  - how innovation happens
  - trade-offs
    - > Turing awards vs. SKUs
- teamwork
- real world innovation
  - what corners to cut
  - when it's "done"

startup

- "selling" proposals
  - sell ideas internally
    - > technical, business case
  - how marketplace works
  - trade-offs
    - > "faster is better"*
- teamwork
- real world engineering
  - (practical) fault tolerance
  - maintainable code
  - users are a diverse bunch

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what to watch for (finding a job)

labs

- freedom
- funding models
  - central vs. per-project
- division partners
  - to get ideas used
- protection for innovation
  - for wild & crazy ideas
- MTBR
  - mean time btwn reorgs
- company culture
  - flexibility (hours,locations)
  - focus on development
- people, people, people

startup

- can the company succeed
  - me-too idea?
  - unrealistic assumptions
- funding
  - burn rate
- who's running the show
  - engineering, marketing, VCs
- does management seem realistic
  - challenges, trade-offs/risks
- company culture
  - innovation, autonomy
- people, people, people

what to do (to succeed)

labs	*startup*

• take ownership
  – initiative
  – follow-through
• take risks
  – technically novel
  – in "transfer" activities
• politics
• play nicely with others
  – listen
  – talk
• don't over-engineer
  – there's always competition
	• take ownership
	  – initiative
	    > matters to the company
	    > just-do-it
	  – follow-through
	• take risks
	  – push ideas out on the limb
	  – tackle difficult problems
	    > general-purpose soln
	• play nicely with others
	  – listen
	• build code/systems to last

career evolution

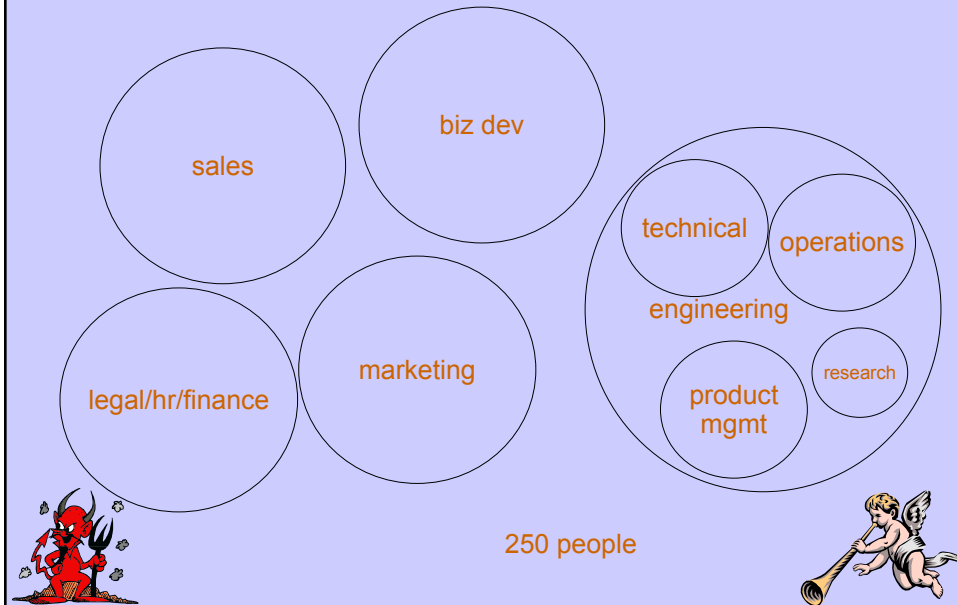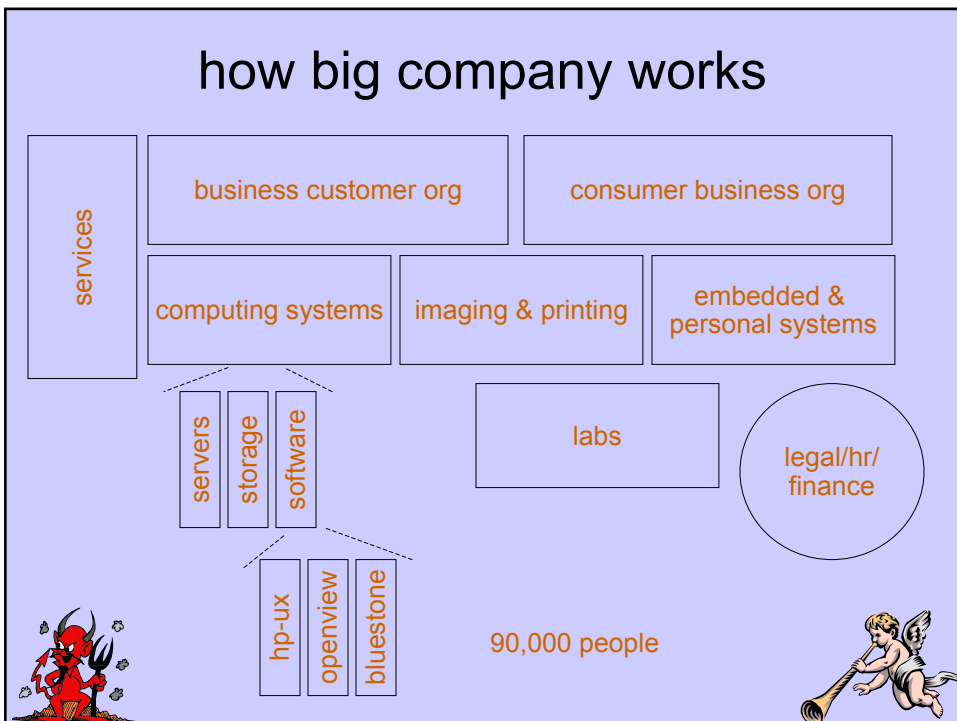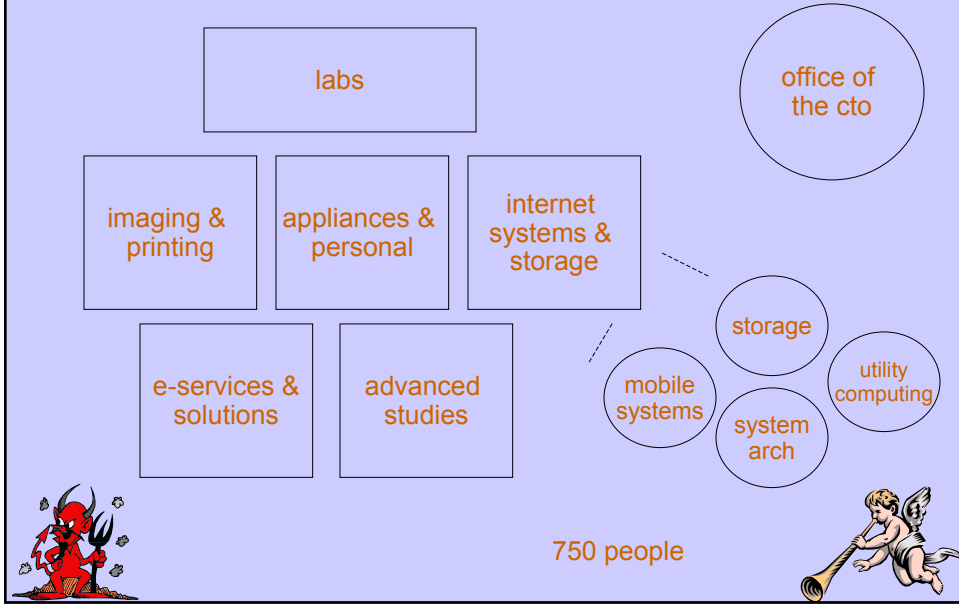| *labs*	*startup*

• researcher
• technical track
  – senior researcher
  – lab scientist
  – company fellow
• management track
  – manager
  – 2nd line manager
  – 3rd line manager
	• engineer
	• project lead
	• product manager
	• group manager
	• fellow
	
	• more fluid movement
	• larger startup -> less fluid
	• similar breadth to large company as it grows

how startup works

- sales
- biz dev
- legal/hr/finance
- marketing

engineering
- technical
- operations
- product mgmt
- research

250 people

how big company works

services

business customer org

consumer business org

computing systems

imaging & printing

embedded & personal systems

- servers
- storage
- software

- hp-ux
- openview
- bluestone

labs

legal/hr/finance

90,000 people

how big research works

labs

imaging & printing

appliances & personal

internet systems & storage

office of the cto

storage

mobile systems

system arch

utility computing

e-services & solutions

advanced studies

750 people

how medium company works

strategy

sales

marketing

engineering

manufacturing

materials/facilities

personal

enterprise

consumer

research lab

legal/hr/ finance

retail

pvr

video

45,000 people
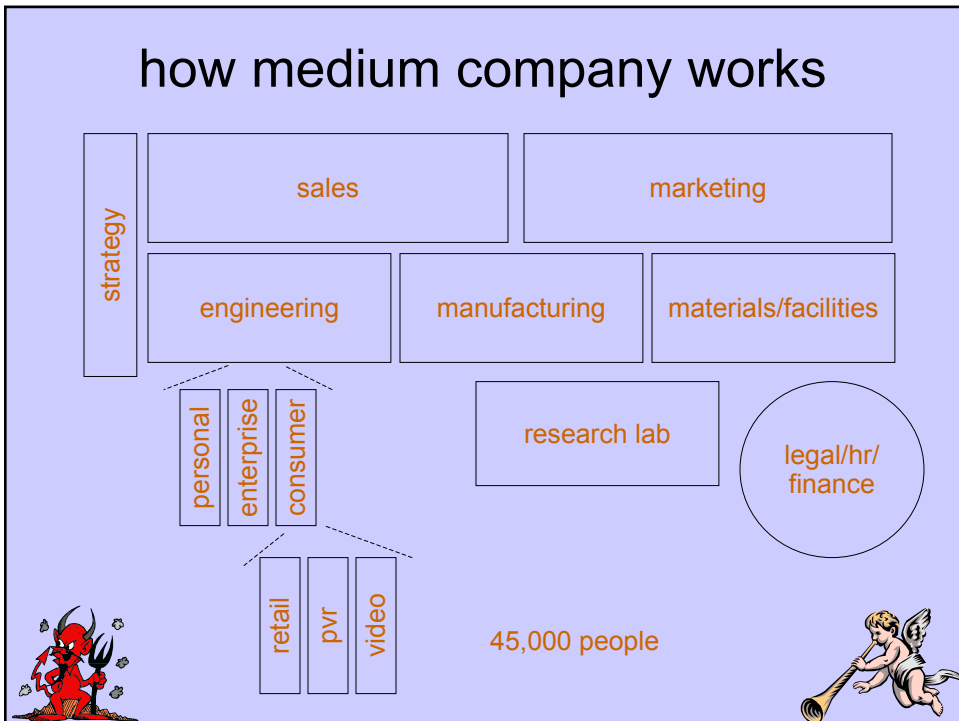
how medium research works

| lab director | the cto |

| heads | media | channels |

| materials | modeling | systems |

120 people

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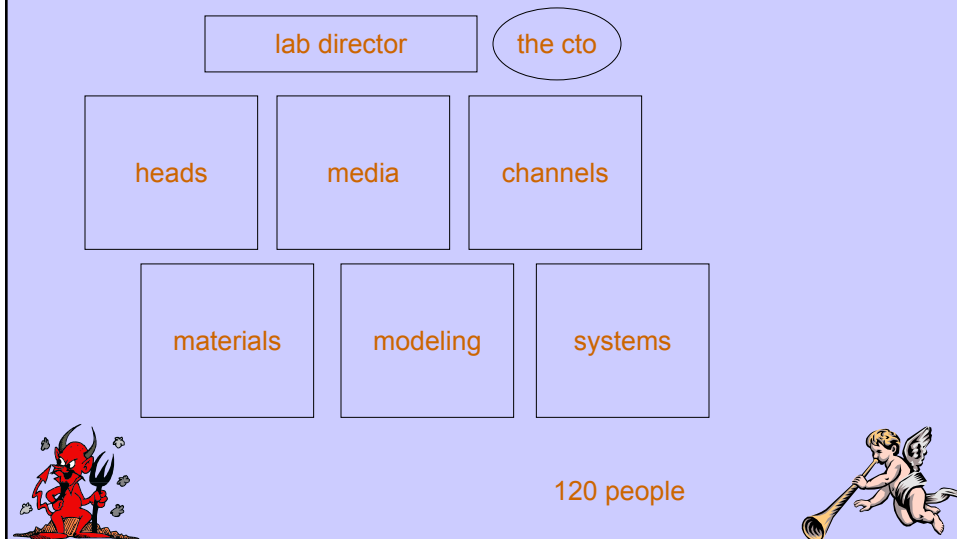
industry vs. academia
(why we didn't stay in academia)

- ability to have a direct impact
- publish or perish
  - tenure pressure gets in the way
- too much work
  - get funding, get students, run university, write papers
- too much politics
- money
- teamwork vs. working (often) for oneself

why go to

labs	*startup*
• sense of the future	• sense of adventure
• contribute to innovation	• do something new
• impact – smaller, indirect	• impact – big, direct
• support for "bigger" things	• financial reward
– more ambitious overall	• work w/ smart and motivated people
• work w/ lots of smart people	• learn about business
• people w/ a broad range of interests	– broader experience
	• do it yourself some day
	• change the world

why not go to

labs	*startup*
• not enough direct impact	• risky
– long-term	• lots of work
– hard to see	• lots of things outside of your control
• not risky enough	• more direct reliance on others
– small innovations	– one missed sale…
• too big, get lost	– one technical snafu…
• more corporate bs	• chaotic
– cost-cutting	• lower salaries
– hierarchies, salary scales	

hiring process

labs

- resume gets you in the door
  - who you know speeds the process
- give talk
- talk to entire group
- recommendations matter
- thorough interviews
  - technical competence
  - vision thing
  - teamwork

startup

- who you know gets you in the door
- phone screens
- rigorous interviews
  - programming
  - problem solving
  - system design

a day in the life

labs

- get on train
- read email
  - corporate memos
  - cost-cutting measures
- think big thoughts
- visitor talks
- research presentations
- review papers
- visits to/from business units
  - occasionally customers

startup

- get on motorcycle
- read email, overnight fires
- code reviews
- informal discussion w/ peers on open problems
- design meetings
- fire fight production systems
- write code, write code
- field questions from business/support staff other engineers

have a life

- work to live *not* live to work
    - work to learn *not* work to earn
- have boundaries/limits
    - burn-out helps nobody
- watch for signs of stress
    - and then *pay attention* to them
- work isn't everything
- socialize with people other than just co-workers
- enjoy the world around you
    - always remember, this *is* life!

things to remember

- take time off
    - don't start a job right away
    - see the world (or at least your family)
- finish writing before you leave Pittsburgh
    - otherwise it'll be another year, or two, or …
- don't take the first job that appears
    - shop around, compare options
    - watch benefits (flextime, vacation, mortage assist)
- you can always change jobs if it doesn't work out
- keep in touch with people
    - contacts, contacts, contacts

companies in the marketplace

labs

- wide range of businesses
  - sometimes some do better than others
- new business takes time
  - has to be "big"
  - overcome inertia
- divisions aren't sitting still
  - not sitting around their offices waiting for cool new ideas from research

startup

- narrow set of businesses
- one smart competitor ruins your whole day
- big industry players can make you sweat
- always another hungry startup on your heels
- ability to redefine yourself
  - move into new businesses quickly

value-added - what makes a good idea?

- expands the market
  - raises all boats, vs. fighting for market share
- creates a new market
- better "enough" to motivate customers to switch
- benefits can be understood by customers
- creates barriers to switching away (lock-in)
- cost-effective for the company
  - high enough margins
  - large enough (potential) customer base
- patentable or publishable
  - contributes to patent/technology portfolio

the verdict

labs   *startup*

life is hell, enjoy grad school while it lasts!

conclusions

- your mileage will vary
  - evaluate options
  - trust your instincts
- the PhD is worth it
  - stay in school
- remember critical thinking
  - not arrogance
- have a life
- contacts, contacts, contacts

recent PhD alums, where (why)

- Erik Riedel, Seagate Research (the growth opportunity)
- Howard Gobioff, Google (adventure)
- Fay Chang, Google (freedom, the people)
- Andrew Tomkins, IBM Almaden (the people)
- Hugo Patterson, Data Domain (founder of startup)
- Sean Slattery, Applied Psychology Rsch (research, location)
- Peter Dinda, Northwestern University (adventure, growth)
    - Khalil Amiri, IBM (cool work, impact)
    - Darrell Kindred, NAI Labs (friendly folks)
    - Arup Mukherjee, Yahoo! (product affects millions)

bibliography

labs

- *you and your research*, by richard hamming (talk)
- *first break all the rules: great managers*, by marcus buckingham and curt coffman
- *the innovator's dilemma*, by clayton christensen
- *six thinking hats*, by edward de bono

startup

- *startup*, by jerry kaplan
- *crossing the chasm*, by geoffrey moore
- *what they don't teach you in graduate school*, by bruce nelson (1997 emigration course)
- *is work hell? life in industrial research*, by john wilkes (1997 emigration course)