

# Post-Ph.D. Job Market and Career Options: Lessons Learned



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# Career Directions

- “After you get a Ph.D., you can do **anything**”



- What we are trained to do *immediately*:
  - Corporate R&D labs
  - Faculty track (directly faculty, postdoc → faculty)
- All else: career change options
  - Software / hardware / systems development, finance, consulting, ...
    - Possible! – but **not immediate**
    - May require substantial and prolonged time investments

# Scope and Disclaimers

- Job market timelines
  - Which I *wish* I had gotten right
- What I did not explore (but will briefly mention):
  - Corporate R&D, engineering, finance, start-ups
- What I explored:
  - Academia
  - Management consulting
  - Data science
- Mixed bag of job market lessons learned
- Disclaimers:
  - A data point of one, with very helpful suggestions from other “data points”
  - A single point in time - in 2-3 years, things are likely to be different

# Important Timeline: 1.5 Years Before Graduation

- Prior to 1.5 years before graduation, focus on your work
  - ❑ No matter where you go next, you will need to demonstrate that you get things done
  - ❑ *“Excellence is transferrable”* © Prof. Gil Zussman
- Start preparing **1.5 years** before graduation
  - ❑ Hiring seasonality
  - ❑ Need to prepare



Decide and start preparing



Apply, interview



Graduate with full confidence in your near-term future<sup>5</sup> 😊

# 1.5 Years Before Graduation: Search Widely! Explore! Dream!



- Search widely → then narrow down the options
- **Searching widely:** its about what **you** want to be doing
  - Do you want to code? Teach? Work with people? Make lots of money? Not have a boss? Create things other people use?
  - What do you want to achieve?
  - *“Be careful about ruling out options”* – Dr. C. Lai
    - Job titles I discovered: “pre-sales engineer”, “product manager”, “data scientist”
- Useful references: [“What Color is your Parachute”](#)
  - The classic
  - Useful frameworks
  - Somewhat dated
  - Many parts not truly relevant for Ph.D.s
- Useful references: [“The Start-up of You”](#) – **very** useful
  - Helps in simultaneously thinking about what you like and what is in demand

# 1.5 Years Before Graduation: Search Widely, Narrow Down Options



- Carefully look at job postings
- Talk to people who are doing what you think you want to be doing
  - I.e., so-called [informational interviewing](#)
  - Be aware of language and point-of-reference differences of people with different backgrounds
    - “Interesting”, “intense”, “hard”, “boring”, “pays well”, “does not pay well”, “analytical”, “quantitative”, “programming abilities”, “communication skills” – all relative terms
- **Narrowing down options:**
  - “Foundation of strategy is deciding what to not do” © Michael Porter
  - “A, B, Z plans” - © The Start-up of You
  - It helps to be realistic

# 1.5 years Before Graduation: Start Preparing



- Preparing:
  - Bearing in mind fall applying and interviewing
  - Hard skills: programming languages, mathematical tools, technology areas
  - Soft skills: team work, communication skills, leadership
  - Other considerations
    - E.g., if you want to be in a particular geographic area, start exploring options in the area
      - Meetups
      - Events at local venues
- With some creativity and flexibility, much of preparation can be combined with research. E.g.:
  - Producing code for public release
  - Applying techniques you are learning in your research
  - Volunteering to help somebody with a paper on the topic you want to learn





Decide and start preparing

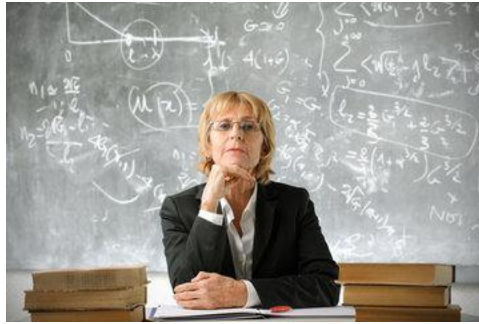


Apply, interview



Graduate and be happy!

# I [mainly] considered



- Academia

- Management Consulting



- Data Science

# I did NOT consider

- Corporate R&D positions
  - Arguably the most straightforward path – do what you know and like
  - Microsoft Research  $\approx$  top *academic* places



- Engineering positions in industry
  - Myriad of options
  - Also a straightforward path, but may require advanced hands-on skills
  - For things that are different from what you do already: “*prepare for 1/3 of your time for one semester*” - Presenter at the Google Scholars Workshop

# I did NOT consider

- Finance
  - Changed a lot since 2008
  - Remains an option for people who like to do this type of work
  - Much like other things, good positions require specific preparation
  - Remains a good option for NYC-based positions



- Creating a start-up

- *“Start solidifying your plans a year before graduation. Talk to people in your school who have done it before” – Dr. K. Yadav*
- NSF SBIR grants
- [Cornell-Technion Innovation Fellowship](#) specifically for Ph.D.s interested in commercializing their research



# Academia: Faculty Track



- Lots of great advice readily available at your school
  - Many faculty members will *readily* offer valuable suggestions

# Academia: Faculty Track



- Pros: unparalleled freedom
  - No boss, no deliverables
  - Choose by yourself what, when, and how to do
- Pros: being an expert in your field, societal respect, nice office, ...
- Caveats: good schools **extraordinarily** competitive
  - Early-year students underestimate the competitiveness
    - But! - upper-year students sometimes underestimate themselves
  - A handful of good departments hires 1-2 people per year **across all disciplines** within electrical engineering/computer science
    - One competes with **everybody on the job market**, across all schools and all specializations
- Those who **really** want it always find ways of making it happen
  - Smaller schools, schools back home or in other countries
  - Postdoc (or “industry postdoc”) → faculty

# Faculty Track: Some Pointers

- Don't dismiss doing a postdoc
  - If you know you want to be faculty, a postdoc is a *great* thing to do
- Application deadlines: in the **Fall** of the academic year you graduate
  - “*Start early!*” – Dr. V. Kostina
- Summer before you graduate:
  - Write your research statement
  - Tell everybody you meet that you are on the job market
  - Start giving pre-job-talks
- Personal advice: write the statement **early** in the summer
  - What if you change your mind about that whole faculty thing?



# Management Consulting





# Management Consulting

- Consulting companies come to campus a lot
  - Elite business occupation
  - Is a **business** occupation → PhDs are secondary hires



- Pros:
  - Interesting work, variety of projects
  - Exposure to different business areas, travel
  - “*Classic option for broadening the range of future opportunities*” – © The Start-up of You
  - Top firms are *fantastic* names to have on your CV
- Cons:
  - Crazy hours, crazy travel
  - Could have little say in choice of projects
- Something to be aware of:
  - Most people do it for a few years before moving on to other things

# Management Consulting: Less Obvious Caveats

- Particular interview format that requires a **lot** of practice
  - Case interviews
- McKinsey, BCG, Bain (“MBB”) **very** competitive
- Many other generalist firms hire Ph.D.s at **undergraduate** levels
  - Level of work, responsibility - ☹️
- Specialized “boutique” management consulting firms?
  - For biotech are related Ph.D.s, many options
  - For EECS Ph.D.s, currently very few
    - With further advent of data science, this may be **rapidly** changing
- All things considered, EECS Ph.D.s need to invest a lot of energy for unclear and highly uncertain payoffs
  - On the other hand, preparing for case interviews is a good preparation for any business career

# The Way to Management Consulting



1. Join your school's graduate consulting club
2. Practice cases regularly
3. Become a member of the consulting club's executive committee
4. Win case competitions
5. Get invited to McKinsey Insight / Bridge to BCG
  - Application deadlines in April



# Data Science



- [“The Sexiest Job of the 21<sup>st</sup> Century”](#) – Harvard Business Review

# Data Science

- Currently very hot market for PhDs who like working with data
  - [Are Big Data Sucking Scientific Talent into Big Business?](#) – Scientific American
- Solving technical or business problems with data
  - A range of different occupations
  - From implementing machine learning algorithms to  $\approx$  management consulting
- Pros:
  - Interesting creative work
  - Hot market – many opportunities
  - Hands-on aspects similar to things many (but not all) Ph.D.s in EECS do on a daily basis
- Pros/cons:
  - New and quickly changing field



# Data Science: Relevant Skillset

- Passion for working with data, including hands-on abilities to handle it:
  - A scripting language (typically Python)
  - An analysis tool (typically R, but MATLAB enough for many positions)
  - SQL
  - Creativity, flexibility
- Statistics
- Machine learning
  - Some hard-core machine learning positions require strong algorithms + data structures knowledge + strong coding abilities
- Big Data experiences and tools
  - Hadoop, MapReduce
  - Algorithms, data structures
- Communication skills
- Useful resource: Coursera class “Introduction to Data Science”
- Useful resource: Coursera class “Machine Learning”



# Applying and Interviewing: Mixed Bag of Lessons Learned



- Female EECS students:
  - Go to [Grace Hopper Conference](#)! (early October)
    - Where an *unbelievable* number of companies go to hire
  - Submit resume to the conference's online database even if not going!
    - Details given online starting from mid-summer, "Like" Grace Hopper on Facebook to stay updated
- Each company moves at its own pace
  - For me, submission to interview: median 7 days, range 0 – 19 days
  - For me, interview to response: median 2 days, range 0 – 9 days
- Best to go on the job market in **fall** or **spring**
- Rejections are **not personal**
  - Setting ego aside is a *great* idea
- A lot of it comes down to luck and lucky timing



# Conclusions

- So many wonderful options!
- After you get a Ph.D., you can do **anything!**
  - ... provided that you make reasonable and timely efforts to decide and prepare
- Much of preparation can be connected to research
  - Its best all-around to allow for that



Decide and start  
preparing



Apply, interview



Graduate  
and be happy!

**Good luck!!**