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 <u>not</u> 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 ☺

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
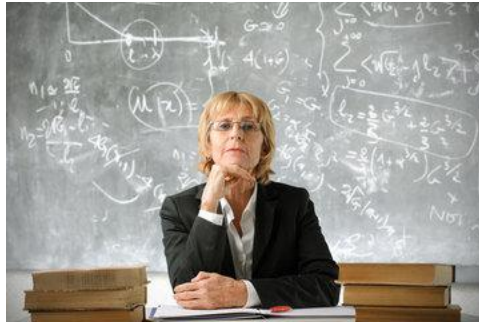
Decide and start
preparing

Apply, interview

Graduate
and be happy!

I [mainly] considered

- Academia

- Management Consulting

- Data Science

I did <u>NOT</u> consider

- Corporate R&D positions
  - ➢ Arguably the most straightforward path – do what you know and like
  - ➢ Microsoft Research ≈ 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 <u>NOT</u> 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 **<u>extraordinarily</u>** 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") <u>**very**</u> 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 21st 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 ≈ 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"

TRUST ME, I'M AN
ENGINEER

HELLO
MY NAME IS
Startup
Founder

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!!