Peaceful Job-hunting

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1 Introduction

Landing a job is always challenging. Sometimes more so after staying longer in school. How much longer do I mean? Well, I am talking about "PhD-long". Why so? In graduate school, (unless we do internships) we live within a nice protected space where we discuss ideas over coffee, write code without always paying attention to software engineering artifacts, spend sleepless nights before conference deadlines, understand '*Samoa*' time, attend esoteric seminars, discuss academic gossips (e.g. advisor, tenure tracks, publications, PhD fellowships, drop-outs etc.) and feel protected from the economic downturns in the outside world. In the process, our networks grow within academic circles, priorities change and we grow up as a true academic.

In the recent times, due to drying of both federal and private funds for research and inadequate faculty positions to accommodate the recently minted PhDs, we find increasing number of those graduates joining the 'non-academic' world after their graduate school. (Well, in certain cases they are '*disillusioned*' too.) Right at this moment, at the onset of non-academic job-hunt, a typical graduate student is found to be at a loss. Finding a post-doctoral position is a different ball-game because of the following reason. For a post-doc position, things like publication track-record, reputation of advisor, prior contacts and recommendations come into play. Fortunately, being an academic we know how to deal with them. For finding a non-academic job almost none of them matters except if it is a niche industry that you are targeting (chances are those positions are *very* competitive!).

This document is intended to help advanced degree candidates in their quest for non-academic positions, very much inspired by the popular speech by Peter Fiske. Here, I will share my job-search experiences. Although it will be most helpful to the students of Princeton University, I believe it has an appeal to the broader community of science and engineering advanced degree students also. There are many other resources available online to assist in that process. So, the primary goal will be to bring them together into one common platform and blend it with my own experiences.

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2 My Own Journey

I started applying for jobs in Spring 2012. Preparations started in the last week of January and finally landed multiple job-offers in mid-April. In the process, I interacted with several people which helped me in gaining immense perspective.

My Background: During my graduate school, I interned thrice at different places - (a) **Intel** (semiconductor giant located in Santa Clara, CA), (b) **NEC Laboratories** (a research lab operated by a major Japanese company located in Princeton, NJ) and (c) **Synopsys** (a major player in the electronic design automation (EDA) space located in Hillsboro, OR). In my opinion, these internships exposed me to diverse working environments almost in a "trailer"-like setting before the actual job. Besides, my dissertation research was on debugging multi-threaded programs which is very generic. In my experience, I found that knowledge of parallel programs is definitely considered a precious skill in industry. This enabled me to apply for a diverse set of industries.

My Goal: My goal was to start my career at one of the bigger places that:

1. can add sufficient credibility to my skills as an engineer,
2. (may be) allow me to make a transition into the big data and cloud infrastructure technology, and,
3. capable of taking care of my visa status.

My Applications: I applied to a broad spectrum of companies/organizations e.g. business consultancy, algorithmic trading, electronic design automation, semiconductor manufacturing, web-based and non-web based software product/solution development, online retail services, oil-field services and software engineering research. Keeping my search so broad was not planned. However, in perspective researching for each one of them gave me a very high level understanding of several industries related to software development.

The Outcome: Finally, I had offers from four places: Amazon, Microsoft (both at Seattle, WA), Cadence (San Jose, CA) and a post-doc position at National Institute of Aerospace (NIA) (Hampton, VA) with an opportunity to work with researchers at National Aeronautical and Space Administration (NASA) Langley and Ames laboratories. I opted for *Microsoft*.

3 *No-tension* Job-hunting Guideline

Here I assume that the candidate is graduating following the academic calendar. Fig 1 shows the timeline that I personally followed during my job-hunt. This is just a suggestion. The candidate might need to adjust the phases fitting to their individual needs. Also note that the various phases might be *overlapping*.

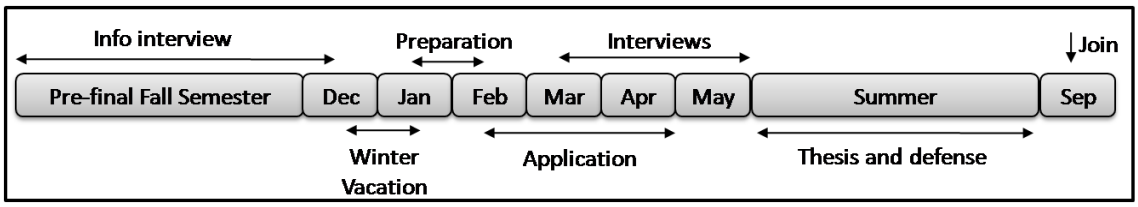

Figure 1: The suggested timeline that I followed

Preparation: In the preparation phase one should brush up the **resume** according to the industry. A research CV is different from an industrial resume. More can be found in [1]. I personally found **web-presence** to be critical for contemporary job-search. Therefore, candidates also need to update their LinkedIn profile and website, if any. Many companies ask for the following besides resume.

1. **Cover Letter** – It might be optional but I felt it helps to make a stronger case why a candidate is a perfect fit given his/her background. It should be tailored according to the role and company. One can highlight how the academic background and skills learned fall in place for the given role.

2. **Job-talk** – Often the companies ask the advanced degree candidates for a presentation of their prior research/project, popularly known as *job-talk*. Job-talk should be prepared for a broad audience. Keep in mind the following three categories of people: (1) manager with insufficient technical background to appreciate the details, (2) engineers expert in different technical domains, and (3) engineers/scholars expert in your own field. More on that later.

The next task is to *collect contacts*. These may come from various different sources, such as advisor's network, prior internships' networks, friends/seniors, acquaintances from career fairs, various events in the campus, school alumni database, previous summer schools etc. Once you have the contacts you can start doing informational interviews with them (more on that later). Researching the company website also reveals a lot of information (management consulting companies like McKinsey and BCG are well-known for this). In fact, it is highly encouraged to do so before an informational interview. Besides, tech-blogs/websites such as `mashable.com`, `techcrunch.com`, `hbr.org` are also widely encouraged to read for updated knowledge of various industries in general and tech industry to be specific. Often this knowledge can helpful to start a conversation.

☐ **Tips** – LinkedIn premium account (about $50/month) can be helpful for two reasons. First it helps you in getting attention from recruiters/head-hunters. Second, you can send '*InMail*' to any profile even if you do not have their email-ids. I got a nice deal where premium membership was offered free for the first month. In my case, two recruiters contacted me right after the profile upgrade. Moreover, LinkedIn groups can also be helpful. I found the advertisement of NASA post-doc position from a LinkedIn group on Formal Methods.

Career fairs are nice opportunities for building rapport with potential employers. You can even put their names in the cover-letter to show your interest. (People actually love to see their names on candidates' cover-letters.) Company info-sessions are good for similar reasons too (and the free food of course!).

For Princeton students, career services can be especially helpful. I attended a six-series workshop on non-academic job-search hosted by Amy Pszczolkowski (thank you Amy!), where we discussed different aspects of the job-search. She pointed us to multiple resources that we have access to as a student of Princeton University. The alumni database can be found in `tigernet.princeton.edu` in 'Alumni Directory Search' and 'Alumni Careers Network'. There are many alumni registered in those databases who have expressed willingness to advise students in career matters and even hosting them temporarily if requested.

There are other resources available to Princeton students such as `versatilephd.com` (mainly for students from humanities background) and WetFeet (very nice packets for preparation for management consulting careers). Get a TigerTracks user-id from Career Services office to access all of these. Again a big thanks to Amy!

Informational Interviews: Informational interview (or info-interview) is a nice way to gather information about a potential employer in order to evaluate whether it will be a good match. The interview can take place between the interested candidate and any current employee of the potential employer either physically or remotely. The pros of an info-interview are following: (a) the candidate controls the interview, (b) (s)he can ask for advices/feedbacks/sticky questions about a particular role or anything about the company, (c) often the person agrees to internally refer the candidate, (d) a relationship is built which can go a long way even if the candidate does not get the job.

One can contact a person through different networks - school-alum, senior, acquaintance of advisor, etc. In my case, I interviewed Mr. X. Mr. X put me in touch with Ms. Y. Then, I interviewed Ms. Y and so on. References work well in practice.
□ **Tips** – Informational interviews can push the candidate in both directions. In my case, I interviewed a manager of a group at a leading chip designing company and decided not to apply there. (I was probably saved the pain!) In another case, I was warned about the stunted career growth in some company I was interested in. In almost all the cases, I have got practical suggestions from current employees to land a job. However, one should never ever ask for a job explicitly in an info-interview. That puts the current employee in pressure which is not the goal of an info-interview. In multiple cases, the current employees have agreed to refer my candidature. Usually in those cases, the turn-around times were much shorter.

Phone screening: Most companies that I interviewed with phone-screened me. Gayle [1] had nicely described the process. General suggestions are keep your resume/webpage in front of you, prefer landline over cell phone for clarity of connection and keep pen and paper to take notes. Typical questions you can expect are introductory ("Tell me about yourself." - try to keep it within 30 seconds, leave markers for inquisitive interviewer e.g. "although generally the problem is intractable, we observed a nice property that works great in 80% of the cases in practice."). Expect puzzles (e.g. Microsoft), tiny case study questions (e.g. consultancy companies like McKinsey), data-structures and solver questions (e.g. EDA companies like Cadence).
□ **Tips** – Be ready to tell the company about your preferences about any partic-

ular products/services that interest you. In companies like Microsoft the phone-interviewer usually forwards your resume to the group(s) (s)he thinks you might fit well. It is good idea to leave cues for him/her. Though not customary, shoot a "thank-you" email.

Online testing: Nowadays companies (e.g. Amazon) have started testing candidates on their coding abilities by putting them through online coding exercises. It is also possible that you might be asked to take a quants test if you are applying for financial companies (they ask a lot of tough time-bound probability questions). In other scenarios, you might be asked to present a talk over skype (e.g. post-doc positions). Each one of them needs different preparation.
☐ **Tips** – For coding test, my suggestion is: prepare a basic infrastructure such as `Makefile` (for the non-coders: `Makefile` is the compilation script file) a priori. You can also keep a small code ready that parses the command-line arguments and does a sanity check on the number of arguments etc.

Campus interview: Campus interviews typically run for 30-45 minutes. Expect to be asked behavioral questions as well as some small coding problem or puzzle or probability question. Campus interviews typically follow an information session in the preceding evening. Attend those sessions and *ask questions*. In my experience, asking questions definitely helps. It tells the interviewer that you are curious and interested. Besides, this is also your chance to know your co-workers before deciding. Again, though not customary, shoot a "thank-you" email to your recruiter.
☐ **Tips** – Honesty is still the best policy. If you happen to know a question, tell that to your interviewer. You will earn honesty points. After all, who wants to work with a *dishonest* co-worker?

Job Talk: Advanced degree candidates are sometimes asked to present their prior work (dissertation research/master's project etc.). This is an excellent opportunity to showcase your communication skills. Remember that there might be managers, engineers, researchers from other domains in audience. So start off with a couple of nice high-level motivation slides. Be prepared to put more time in the beginning and make sure that the majority of the audience is with you. Putting questions/summary text-boxes in slides, repeating figures/examples for explaining concepts, nice animations, not more than three points per slide are the usual characteristics of a nice presentation.
☐ **Tips** – In my case, I was asked to present my work thrice in front of diverse audiences. Practice by presenting the talk to the group-mates. Do not prepare verbose slides. Putting a candidate introduction slide at the beginning of the talk might be a good idea. Industry cares about the coding abilities. So, talk about the experimental setup in more detail, e.g. I mentioned the number of lines of code I had to write in the prototype tool I built or the front-end tool used for instrumentation (nice opportunity to showcase the software engineering skills).

Onsite interviewing: After a successful phone-screen you might be invited for onsite interview. Typically, you fly to the location the night before, interview with

the company for the whole next day, either fly out the same evening or the next morning at most. Refer to Gayle's books [1, 2] for detailed suggestions about the actual interview process. This is an excellent chance to get a feel about the place and company. Moreover, do not forget to ask for feedback at each level of interview and learn in the process. Even if you are not asked to present your work in the form of a job talk, people expect you to discuss your research in the stipulated time they meet you. Be prepared for that.
□ **Tips** – Logistical tip - try to schedule as many interviews as possible over a short span of time for the following reasons. (1) Less travel if you are lucky. I had a multi-city round-trip flight-itinerary (EWR-SJC-SEA-EWR) covering two interviews in the west coast, (2) you probably want all of your potential offers simultaneously (that gives you the negotiating power!), (3) you can leverage on the same interview preparation, and (4) *you need to dry-wash your suit only once after you are done with the interview season!*

Microsoft gave me the option of choosing between a rental car or a cab. I chose the rental car. This allowed me to explore the neighborhood and the interview site on the day before the interview. In my opinion, this is a chance to mentally decide whether or not you like the place for living there. Have a heavy breakfast on the morning of the interview. Reach the site early (you already know the place since you visited the place beforehand). Be positive and show enthusiasm.

Ask questions - both technical and personal. Yes, you can *politely* ask personal questions too (e.g. what is your academic background? how long are you working here? what excites you in this job?). In my experience, people open up much more easily when you ask them these questions. These questions often help to see yourself 10-20 years in future. Ask yourself - do I like this career-path? shall I enjoy working with this person? I am sure the interviewers are also asking similar questions mentally. Wherever I interviewed, I learnt a lot about the recent trends in that particular industry. You probably do not want to land up in an industry where the growth is slow or even worse - stunted. Treat these opportunities as informational interviews. Who knows what industry you might be working for in future? Last but not the least, write down the answers to your questions while you are waiting to board the aircraft after the interview (and your memory is still fresh!). This is useful while deciding between the potential offers later.

A little logistical tip - almost all the companies will ask you to submit your receipts for reimbursements (snail-mail/email/fax). I used to paste them in a white A4 paper during my return-flights. I learnt this trick from one of my co-passengers. The more you delay, the more painful it becomes to separate the receipts for Microsoft from the ones for Amazon.

Offer Evaluation: Congratulations you have offers in your pocket! But wait, the game is not yet over. (I encourage you to read Gayle's book [1] and Peter Fiske's talk on dealing with this phase of the process.) Generally speaking, this is one of the toughest phases of the job-hunt process. The reasons for this are following.

1. Absence/lack of priority metrics - brainstorm the factors of a particular job that potentially make you most happy (if it is just money, you are a lucky chap!)

2. The offers tend to be a mix of salary, bonus, stocks, sign-on bonus and other perks (e.g. gym membership, dental insurance etc). It is often difficult to come up with a single number for the offer.

3. Once the offers start coming up, the clock starts ticking. The companies tend to put pressure to expedite the decision.

My suggestions are: ask yourself about the metrics that you are looking for in the life after graduate school. Talk to people who matter most to you (e.g. parents, spouse, advisor, seniors, good friend etc.). You may also compare the cost of living for different cities here. Talk to people who either work or have worked in the company before. You may also talk to your potential hiring manager about the work.

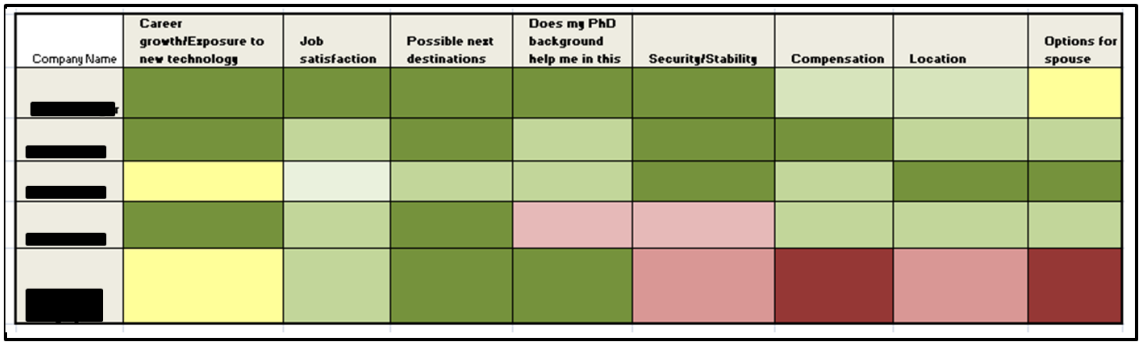

Figure 2: Offer evaluation chart like this represents the big picture and enables holistic decision-making.

☐ **Tips** – My priority metrics were the following: career growth/exposure to new technology, possible next destinations, does my PhD background help me in this job, security/stability, compensation, location, options for spouse. I made an excel sheet with these metrics in the columns and companies in the rows (Figure 2). Each cell is annotated with a description (not shown in Figure 2) and a representative color from the spectrum that depicts 'whether the scenario is favorable' (dark green and dark red represent 'excellent' and 'very poor' scenarios respectively). Next, gather as much information about the companies as possible from your network. Set a deadline for yourself and you can let the companies know about it. This will also put pressure on them to revise their offers as they might fear losing you to other companies. Finally, make a wise and informed decision. Let all the companies know about your decision. Politely, let them know that you will get back to them once priorities change and/or opportunities arise in future.

4 Acknowledgements

For me this whole experience was not just about landing a job but gaining perspectives before starting a non-academic career. I am immensely thankful to a large number of people for their encouragement, advice and recommendations. There

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