On Finding the Right Academic Career:
A Conversation between Fran Berman and Sarah Loos

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Sarah Loos is a senior Ph.D. student at Carnegie Mellon University and former Student Trustee of the Anita Borg Institute for Women and Technology. She is finishing her dissertation in formal verification of cyber-physical systems, such as ensuring safety of collision avoidance protocols for aircraft. She is looking ahead to the job market.

Fran and Sarah recently had a conversation at the Grace Hopper Conference in October 2014 to talk about getting a job, setting yourself up for success, and exploring what's next. An excerpt of their conversation is provided here.

SARAH: I've been thinking a lot about next steps after I finish my Ph.D. One option is to apply for a postdoc. A big detractor for applying to postdocs though is their short duration. You have to get acclimated to a new group, new research problems, and a new location, all while trying to publish quickly before applying for jobs again. This combines to make the one to three years of a postdoc look very stressful.

FRAN: It can be, but taking a postdoc can have real advantages as well. First of all, it gives you a couple of years to focus on your research as a professional with few distractions. Second, a postdoc can help you build your resume. So, for example, if you're not from a top 25 school, but you postdoc at a top 25 school, the place you "come from" is now the top 25 school. You can increase your cachet based on the postdoc -- lots of people do this. A postdoc can also give you access to an expert in your field or a related field that you didn't have at your previous institution. So it's a way to fine-tune your own experience and what you have to offer. When people take postdocs, they usually take them in a very focused way.

SARAH: I've noticed a trend in academia for Ph.D. students to take a faculty position and then defer for a year or two while they do a postdoc. Have you seen this trend yourself? Do you think it's generally a good idea?

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FRAN: I've seen this happening too and I think it's interesting. If you can pull it off, it's hard to see what the downside is. If there's a place you want to work as a faculty member and they know that they want you, but you'd like to work with someone at another institution or there's something else you'd like to do to enrich your background, deferring for a postdoc can be a good idea. The timing or logistics may not work out, but knowing that you have a job at the other end certainly makes a postdoc less stressful. Be sure you understand the rules at the institution at which you'll be a faculty member: Does this affect your startup? When does your tenure clock start -- when you're hired or when you arrive to be in residence?, etc. You'll want to be strategic about your choices and be sure to get commitments in writing.

SARAH: There are so many choices for students graduating in computer science – first choosing between industry and academia, and then each university has a different feel with different senior faculty to learn from. You've had a lot of experience on the academic side. What factors should I be looking at to figure out which department is the best fit for me?

FRAN: Apply to any place you think there is an inkling of a chance that you'd consider. Don't waste an institution's time or your time if you think there's no chance you would go there. But if you think, "that would be somewhere on my list", even though it might not be the top, you should apply. Cast your net broadly and explore many options – you really don't know what it will be like until you get there. Once you have interviews lined up, you'll need to assess things carefully so that you can make an informed choice.

Applying for a job is the most straightforward part. When you're invited to interview, you should do your homework before you arrive – find out about the department, the school, the faculty, the environment. This is prep work for you. Don't make assumptions about whether you'll like it though, because the fact is, you won't know if there's chemistry until you get there. Are you energized by the people in the department? Do you have something to talk to them about? Do you like the intangibles – would it be fun to work there? Fun to live there? Is there a lot you could learn there? Is the department or university culture something you think you could thrive in? You can't even start to think about much of this realistically until you've been there. You don't want to cut off your options before you have them. So I think it's pretty important to apply and interview as broadly as possible, and to take each potential institution seriously.

Flash forward to the decision of which of multiple offers to take. If you think a place is interesting, I recommend taking advantage of a second interview to do a deeper analysis of what it might mean to be there.

When you've identified institutions you might be willing to work at, *negotiate*. There are resources that you can get when you're being recruited to a university that you can't get once you've taken their offer. For example, there are pots of money for startup packages that will no longer be available to you once you've signed on as a faculty member. In addition to your salary, there are many things that you can and should negotiate for: funding for students, timing, lab space and equipment, support, etc. You should be really savvy about negotiating these things upfront; it is not an imposition, it doesn't look greedy, and it's what professional people do. Make sure you negotiate for an environment that will give you the best possible chance for success.

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SARAH: One difference between negotiating a job offer in industry vs. in academia is that you're not just negotiating for yourself, but for your future lab and future grad students. Can you give some advice on this aspect of the job search?

FRAN: It's incredibly important to negotiate for these things because they enable you to function once you get to a university. So, when you think about the things you want to negotiate for, visualize exactly the lab you want. For example, you want some number of students, they all require a certain tech set up, storage for data, summer support, travel for conferences, tuition remission, etc. You'll need to ask for this. One approach is to conceptualize the best possible environment for your work. Then assume you're not bringing in any money for it and make sure you negotiate for it in your startup package. This may be reasonable -- it can take you time to get funding, and during that time you will still need the lab space, your own space, computers, maintenance, student salaries, travel money, etc. Depending upon your area and the programs available, it can be very difficult to get grants and you may not get the first grant you apply for. Even if you do get funding quickly, funding from federal agencies is often constrained. For example, you might not be able to buy a computer with it or you might not be able to use it for legitimate but unexpected expenses. This is where your startup package can fill in the gaps.

So imagine what your perfect lab environment is and what you would need from your department if you don't have any external funding. This will go into your wish list when you're negotiating. You might also need course relief or some other course

arrangement to help you get started. You want to make sure you have what you need in the workplace so you can hit the ground running.

Next, extend this visualization to your life. Maybe you need a home loan, for example, if you're moving to an expensive area and trying to buy a house on an assistant professor's salary. Some schools have a program to help you with that (UCSD did when I was recruited there). You'll also need moving expenses. You may need other things. That's what the startup package is supposed to help you with. You shouldn't arrive professionally penniless and homeless and then be expected to do your work without the resources you need.

Don't just assume that the department will be able to provide startup resources for you if you wait to ask for them after you've accepted the job. The pots of money available to you once you're there are different (and hotly contested for). Your best negotiating window is between the time the department has told you it wants you and the time you say yes.

So how does negotiation happen? Typically you're negotiating with department chairs (and they are talking with Deans and others in the university). Sometimes people in the department can help you behind the scenes to negotiate for something that the department needs that they can only get through a new faculty member. This happened to me in one of my jobs very early on. They needed a certain kind of computer resource and they could get it with my startup. This was fine with me; it was great to help the department, and I needed the resources too. You'll find allies for your negotiation in many corners. You won't necessarily get everything on your list, especially if it's an ambitious list. You'll have to figure out where your line in the sand is. It is good to have a sense of what is too small for a startup package and under what circumstances you really couldn't function successfully. And of course, commitments for resources from your potential institution should be in writing.

And of course if you have multiple players in the game -- multiple universities that you're negotiating with -- it can get interesting. Universities are often even more interested in you if other people want to hire you. Universities will sometimes ratchet up their offers if they know that they are competing with another institution.

FRAN: Sarah, what would attract you to a department?

SARAH: I'd like to know a little better what would be expected of me at different places. So, for me, it's been very helpful to talk to people who are full professors in different departments. They can say, "if you come here, these are the things that are most important for getting tenure." Making this comparison is very different from comparing Ph.D. programs where you can just go to their website and see the differences: one university requires certain qualifiers while another requires some different set of courses, everyone requires a thesis. But those things aren't so transparent when applying to tenure-track faculty positions.

For example, some universities expect faculty to advise a higher number of students, while other universities expect faculty to be Principal Investigator for more grants. But this information is anecdotal, so it's challenging to make direct and quantitative comparisons between programs.

FRAN: So, what would be a showstopper for you? What would be something where you would say, "I had no idea this university had characteristic X, I would never go there."

SARAH: I worry that if there is a very high requirement for bringing in a lot of funding it might shift the focus away from finding interesting problems and doing good research and advising, to just figuring out how to satisfy the reviews for grants with whatever students I have. It wouldn't be a showstopper, but in my mind it feels like it would be more constrained. I'd want to know what amount of time is spent on managing and applying for grants, and what kind of support staff are available for helping with this. So, for example, at some universities where a lot of grants are expected to be brought in by each faculty member, there may also be a lot of staff support for applying for and managing those grants and related finances.

FRAN: So, one way of saying that might be that you're looking for some kind of culture of support for whatever the expectations are so that you can meet them.

SARAH: Exactly. I'd also be interested in how much collaboration with industry is expected and supported. If you're doing research with industry, does the department value this as highly as academic publications? If you foster industry connections and send a lot of students into industry, is that as highly valued as sending students into faculty positions? These are the types of questions that I'd be asking.

FRAN: Sarah, I'm interested in knowing from you how you'll decide between university jobs, private sector jobs, and other sectors. Also, have you considered taking a Government job in addition to considering universities and companies?

SARAH: I have been fortunate to have had summer internships in industry and at a national lab, so I've gotten a bit of a feel for those sectors. In deciding where to apply, I primarily considered where I would have the most freedom to work on interesting and challenging problems, plus a supportive atmosphere with lots of experts to learn from. At this point, I have some sense of where I would especially like to end up, but the ultimate decision will depend a lot on the feel of the places where I interview. I changed my top

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choice for graduate school because of the visit weekend, so the same might hold true when going for job interviews.

SARAH: Changing directions a bit to higher-level positions, how have you decided what the next steps in your career would be?

FRAN: Deciding what the next step is going to be is a pretty individual thing. I remember talking to Maria Klawe (currently president of Harvey Mudd College) when I was Director of the San Diego Supercomputer Center about what I might do next. She said, "Well if you want to be a college president, you need to be a higher-level administrator first," and then she laid out a set of steps for becoming a college president. She had a really clear way about thinking about building towards a professional goal.

One of the things I realized in that conversation is that I've taken a different approach. I don't seem to identify a professional point on the horizon and create a strategy to move towards it. Most positions I've had have been real departures from what I was currently doing rather than advancing on a linear path and I've found that really stimulating. For example, I went from professor to supercomputer center director and then to vice president for research at a university. None of these jobs were obvious things to do after the last. I think I've always followed the rule of thumb that I should leave my current environment in better shape than I found it, and that the next job should be at least as interesting as the job I have now, something I'm really passionate about, and potentially even more satisfying (at least in my imagination, because you never really know until you get there).

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So I think the approach you take in getting to the next step should be strategic but *how* you approach it turns out to be personal. The most important thing is to take an approach that will work for you and give you the maximum momentum and enjoyment about what you do.

SARAH: Could you share a bit more about your approach? When and how did you know you wanted to do something new?

FRAN: I've had the good fortune work with great people throughout my career and to enjoy many aspects of the jobs I've had. I've realized along the way that the jobs I like best involve building things and leading things. For the most part, I've always generally liked the "pot" I'm in. After a while in some positions, I've come to feel a little "root bound". When I feel that way, I'm more open to new possibilities and the possibility of "re-potting" myself.

SARAH: What do you mean by "root bound"?

FRAN: What I mean by being root bound is essentially that your potential for professional growth flattens out a bit, that you feel like you're in an environment where you begin to see the same problems again and again (even though you can't solve all of them). For example as a professor, I loved doing research with my students and I loved my lab. We certainly couldn't solve all the research problems we worked on, but at some point, I had a lot of experience being a professor and an advisor. Moving to SDSC [the San Diego Supercomputer Center] to direct an organization with several hundred staff and a multi-million dollar budget was a complete departure and an amazing opportunity. I really believed in SDSC's mission and knew I would learn a lot professionally so I moved to that "pot". It was a great period for professional growth with a whole new set of problems and cast of characters.

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When I first went to SDSC as Director I encountered ten impossible problems a day I didn't know how to address. I wanted to take the organization to a new level. It was exciting and scary. Nine years later, there were still ten impossible problems a day, but I had more experience with addressing them and I'd seen many of them before. We had worked hard at SDSC to stay on top of shifting national, state, local and research community priorities and the organization was in a good place. At some point I felt ready and open for a new set of challenges and perhaps a new "pot".

What I realized through all of this is that I grow and am stimulated professionally by seeing new kinds of problems in new kinds of environments. I am always looking to expand my horizons and that's what happens when I re-pot myself from one position to another.

FRAN: Sarah, what's the analogue of this in your career, i.e. what is your own trigger for transition or change? You are now working hard to figure out the next step. How do you plan on preparing for and thinking about subsequent professional steps?

SARAH: Currently I feel like I am facing more research questions than answers. The questions are coming at me faster than I can address them. This is truly the first time that this has happened for me in research. It used to be that figuring out the right question was my biggest challenge. Now the questions I want to answer are more numerous, more challenging, and have a broader scope. I'm not sure if this is the same thing as being "root bound," but it does feel like a change that has happened toward the end of my Ph.D.

SARAH: This discussion has been a wonderful introduction to how to approach the academic job search process. Thank you for all of your insightful comments. Are there any resources that cover some of the topics we've talked about in more depth?

FRAN: Thank you Sarah for your insights as well! There are many resources for women and computing as well as the academic job search available online from organizations like ACM-W, the Anita Borg Institute, NCWIT, SWE, CRA-W, etc. Some time ago, a number of us compiled information from the CRA-W workshops on getting an academic job and building a research career. This document can be found online (http://www.shengdongzhao.com/wp-content/uploads/2012/07/careerWorkshop.pdf).

Additional Resources:

Join a community to help you prep your job hunt materials:
- CRA-W hosts a PhD Job Hunt list where members discuss materials, when they are submitting, and interview ideas.
  http://cra-w.org/ArticleDetails/tabid/77/ArticleID/66/PhdjobhuntHers.aspx

Plan your job hunt:
- A good list of current jobs: http://cra.org/ads/
- The Communications of the ACM have job listings in the back - most of the jobs are posted in the fall months.
- Many research areas have mailing lists for job postings and conference announcements, which will give pre-filtered job listings.

Learn more about stats from around the country to help with academic negotiations:
- The Taulbee Survey "is the principal source of information on the enrollment, production, and employment of Ph.D.s in computer science and computer engineering (CS & CE) and in providing salary and demographic data for faculty in CS & CE in North America. Statistics given include gender and ethnicity breakdowns." http://cra.org/resources/taulbee/