

Course Name- Complete guide for campus interviews: Step by step preparation for Internships and Full-time jobs

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PhD & jobs in academia

Hello folks, today we'll discuss a little bit more about PhD, jobs in academia and delve a little bit deeper into what these mean for students and as they decide to plan their career. Today we'll specifically look at a couple of things. We'll look at what are the kind of jobs that are available after a PhD. We'll talk about what is academic hierarchy and what that means to navigate through hierarchy. It's slightly different from industry. We look at what that means for a future of jobs as you look for a PhD.

We look for examples of what are some of the pros and cons of what you want to do in your academic path and why you would want to think or not think about these options as we discuss them. If you look at the chart, there are a couple of things that is worth calling out. So it's an axis here purely based on salary and let's say another dimension of freedom. And freedom means a freedom to explore things that are important for you, freedom to maybe have the creativity that you need for your field, right? So that's the axis of freedom.

On the Y axis is salary, of course, it's pretty, what's your takeaway, right? Take home salary, your growth salary, however you want to define it. If you look at the axis, you'd see that private sector is among the top in terms of salary. So if you are, and private sector means whether you're an entrepreneur, you're trying to do something on your own, or you're working in the industry, leveraging some of the skills that you have post PhD. Being in the private sector, of course, pays a lot. Consequently, of course, the freedom for you to explore what you want is limited.

So you might want to think about that balance if you're saying, hey, what is important for me? Is it the creative freedom, ability to explore? Is that the most important thing for me? Or is salary the most important thing? So if salary is a single point drive for a folk, then it makes sense to look at private industry. Entrepreneurs are, again, going to be in the same range. The freedom for entrepreneurship is pretty free in the beginning part of the work. So that's why I marked that as a box towards the right. But really, over a period of time, your work is narrowly defined within the sector and you're trying to bring products to market.

So entrepreneurs, you're going to be focused upon trying to make business value out of it. So freedom will shift towards the left. the kind of salary you get initially will be low. So you actually start off low. But if you really are successful, if you keep trying for a long period of time, it becomes comparable to what it is in the private sector, right? So private sector and entrepreneurship, pretty similar in how it happens.

Only thing is the entrepreneurship journey moves from, I would say, the bottom right to the top left. It's a gradual movement over there, right? There is clearly a box called the university jobs. You hope to become a professor, be someone in the research labs, try to do some work. So, you would have tremendous amount of freedom. In fact, the most creative people looking at the

forefront of the work that is done in research are going to be people working within top universities or in fact any university.

So freedom on the axis of freedom is going to be really high. In terms of salary, it's not going to be the same as private sector because the risk is lower. The jobs are by the nature a lot more stable and you have a lot more value from the credibility you have as a professor rather than the value that you get purely from salary. So salary will tend to be a little low. Finally, there are a certain sector of jobs called the public sector jobs.

And these are related to things like, for example, working with defense, working with health and other departments. And then you are specifically someone, a specialist working in that space. So you may be running some as a director, you may be running certain programs within that specific industry or that vertical. And you will notice that the public sector generally tends to pay significantly lower compared to all the other sectors that we discussed. The freedom also is maybe a little bit more than private sector, where you are not confined to only do certain things.

But in terms of the freedom that you have to explore new boundaries in universities, definitely slower. So that's the space. This is definitely something that as an internal reflection, people need to do on where would they want to fit in? Where would they like to see their career? What is their nature? And how is their nature going to fit in with what the job market is going to offer? And consequently, make an informed decision on where they want to focus their life on. Let's take up universities and focus about what the career progression is. I want to call, firstly, this slide is a little focused upon maybe the market out of India.

We're talking about, say, some of the top universities, say, in the US. This could be a classic example. But we will also map this into what that means for Indian universities. faculty right if you are in a faculty in indian universities what that means for you so normally doing a phd is not enough so once you do a phd it's expected that you do a postdoc so if you are in say u.s trying to crack into some of the professorial jobs the jobs are really really limited and what you will do is and this is a common practice we have seen thousands of people do this in which they become a postdoc waiting three to five years sometimes even 10 years hoping that they would get an opportunity to crack into the professorial system So that's almost you can think of it like a training period or a wait period.

So this is over and above your PhD period that you have spent on to the PhD program. Consequently after that you have a chance to actually get into being a research scientist at a lab or I would rather say you start being an assistant professor. You are hired as an assistant professor. So when you are hired in assistant professor, you might end up with a teaching professor, you have to prove yourself, but really most universities would actually give something called a tenure, which is a guarantee to actually continue for life in that university without worrying about being like looking for another job. Only if you clear something called a 10-year process.

So there is an evaluation period. You're supposed to work over six years and then come out with, hey, these are the work that I have done. Am I fit to be a professor? So other professors within the field, within that university, would grade you or rate you and say, OK, you're good. You're not good.

You can stay. And largely, it's going to do with your research outcome. So irrespective of how you enter in, you join as a teaching assistant professor, your teaching professor, or you just start as a research scientist within the university. Ultimately, to get that tenureship, you need to show research outcome and research outcome as a research assistant professor. So that's the next logical step. Once you are there, when your tenure is done, you become a complete tenure assistant professor.

You would never work through the hierarchy. You stay there. You publish papers. You teach the course. Over a period of time, you would actually grow to be associate professor.

And then again, if you hang around long enough, do the work that you're supposed to do, you will ultimately become a full research professor. Within once you become a professor, the work expectation is that you can grow consequently to be like, say, a department head or take up some things like the directorial roles or dean's roles within the university. That's typically the progression within US. In India, it's slightly different. You don't have that postdoc waiting period in most cases.

People do do that. It's more out of, hey, my PhD was not complete. I did not learn enough. I may want to do a postdoc. But normally, if you have had a very good research work during your PhDs, In India, people interview for PhD faculty positions, right? After PhD, they interview for faculty positions and there are lot of universities looking for good talent. So, the wait period to get into the professorial roles is kind of eliminated.

You join as assistant professor in one of the universities. The key, of course, is that you are able to show research potential. That is, you are able to convince the faculty who are interviewing you that you actually have that required work to be an assistant professor. So if you meet the requirements, you don't have to have that elaborate process like in, say, US. But once you join the program, you join as assistant professor.

And then the tenureship can happen pretty fast too. So once you are into the program, you start teaching, you are confirmed as a tenured faculty within a couple of years. So again, there is not a large wait period. And it happens through not just research work, but your contribution towards teaching, your recognition that you do during your work. Beyond that, the growth is very similar.

You grow as an associate professor and then look at a dean or a director position or become the head of a department of some of these departments that you may be leading. So slightly different trajectories, but end of the day, the career growth is pretty similar. Looking at from the industry's perspective, there is going to be two paths. One is the path that will lead you to be managing people, managing business, managing people. And another is a path that looks at what are the contributions you do separately as an individual contributor, not working with people.

Of course, providing value for business, but looking at almost from a scientist perspective, bringing in value purely from the technical realm. So that's the path where you work with business is a path on the left, which starts from research engineer all the way ends with a VP. And then if you're lucky, it goes into EVP and being the head of a company like CEO. On the right, it's a path that goes from being a research scientist all the way to being a distinguished fellow and so on. So you can read through the career paths.

It means very different things. The path on the right is very, very limited. So most companies might have maybe one fellow. um or one distinguished fellow maybe a couple handful of fellows right um when it by the time it comes to an architect you can think of it like there are way more like i would say 10 times or even 20 times more director openings compared to say an architect right there are way more engineers than like maybe maybe a 50 is to one or 100 is to one compared to a research scientist so it's a lot more difficult to progress on the path towards the right lot of people end up having to like maybe once you reach a senior research scientist having to switch tracks and get into the business and people growth mainly because there are no further opportunities along the technical side but only growth along the people and business side so Think about it. If you're thinking about industry growth within an industry, think about where your skills will actually add value. And invariably, it is not just going to be your technical skills, but also your people and business skills.

If you really want to be successful and grow within the industry. That is for most people, right? If you're most people, that's going to be the standard path. Let us delve a little. I think we talked, but we will delve a little bit more deeper into the hierarchy.

So, this is typically the time frames. So, like I said, postdoc can take maybe up to 5 years. I have seen it happen in extreme cases to 10 years, but largely not the rule, but it can happen. A tenure is for the six year period. People might not get tenure. Consequently, I've seen faculty move to another faculty and start the tenure process all over again.

So again, a six year that needs to go in. Tenure period is really crazy. I've seen faculty just try to go into almost like a mechanical, automated mode of trying to churn out papers, have publications. They're driven during the time. They are taskmasters. Sometimes they may be a little hard on students, but it's because their futures are dependent on getting their tenure.

Once you are associate professor with tenure, most people do progress, but you better have certain ability to produce some research output, and you actually show value to the institution. But eventually, like most people spend enough time, it's a matter of time before they become a full research professor. Getting into other roles like head of department, it might work on a rotational basis. It might depend upon the influence that you lead. So consequently, beyond that, any administrative position, it really depends upon your skills really as an administrator.

So take maybe people skills and the network that you build becomes helpful beyond a professor. Work of a professor is not easy. Most people think that professors come teach classes. At least that's how we perceive it in India.

We think that they come teach classes and leave. But not really. They actually do a bunch of other things. A professor has, other than the teaching burden, which is only actually a limited burden, they actually have to do a lot of research work. with many of the ranking research rankings right now that is even in India that is instituted towards ensuring the professors spend lot more time on research and ensuring that India becomes top in terms of research output you can see that there is a drive towards getting more lot more recognition towards research and lot more incentive towards research so consequently the roles of professors even within India are shifting so they're significantly spending lot more time than teaching you or teaching students into actually doing research work but that is also only limited a professor is expected to also provide for the community so that means doing work related to department activities related to institutional activities that can be related to organizing meetings organizing workshops putting together certain panels together doing some evaluations doing postdoc doctoral reviews all

those become services right so that is again a significant part of their work. So, on the outside it may look like hey they just teach professors just teach class, but actually there is a rapid or immense amount of work that goes unnoticed by most students right, professors themselves know the kind of work that they do.

So, it is a calm life, but there is significant amount of work that they that they do that is not noticed by the general public ok. Nature of academic work, I still think it has not completely changed. It's a little bit like a little bit of ivory tower. Let's put it that way, where the reputation matters a lot.

Let's make that quite clear. Reputation of the kind of quality of research of a faculty become very important. So things like publications into top journals decide what status or a prestige of a professor is with respect to everybody else that they interact with. So that becomes largely a reputation or a prestige game. So there's a lot of internal tensions that are not noticed, but they do play a role.

Let's look at some of the pros. The advantage of an academic job is that there is tremendous freedom. If you are interested in technology work or if you are interested in a certain field of interest, for example, if you are a business faculty, you might be looking at... Traditionally, what is not considered a technical issue, right? It's considered things, for example, how do you develop a strategy of a company, right? And of course, if you are someone working in technology, like mechanical engineering, civil engineering, you'd be working on certain technologies or research in that direction.

But you are in the forefront of trying to create or explore new directions and gain new insights. And therefore, you have tremendous freedom to actually do creative work. okay most faculty are answerable only to their own department heads and they have some working agreement with their with their fellow academicians they have agreement with their institutions with their flexibility right so if you are not able to produce output for a certain reason is flexible you have you can adjust things to your working and the agreement is only between you and the department and not like for example with an industry where you are answerable to the larger market so if things don't do well your job is out right those kind of things do not work in the academic sector and the reason is creativity comes only from some kind of security that's understood so the ideas nurture creativity by helping faculty get a more supportive environment sabbaticals can be long it really depends if you are outside the country or in India but really the period can be pretty hectic so even even if it is in India it's two year period it can be hectic but if it is a six year period where the valuation happens yeah it's extremely hectic So, ability to move from the academic side to the industry side always exist, especially for people who do consultancy projects. So, lot of you will notice a lot of academicians actually go ahead have a industry network, they actually do projects for the industry and they offer consultation service. Some of the faculty actually move on to then head some things like a senior role within the private sector.

Advise them, drive certain growths. It is very common in US and it is starting to become common in India too. The vice versa from industry side to academic side is not that common, but the one-way movement from the academic settings to the industry settings is possible. So if you remember the graph from earlier in terms of salaries and freedom, one of the things that people might want to do is, hey, I have explored certain things of freedom. Now I want to go back and maybe explore opportunities to like drive more revenue or generate more salary and

then think about what that means for the future. Okay, so again, how do professors describe themselves, right? It's ideally what you would want to know.

If you want to be interested in a job, you should ask the people doing the job, how do they find the job, right? That's the easiest no-brainer for you to like understand what that quality of work is. If someone says they hate their job, and if it's a large public opinion, right? You might end up on that side hating the job, right? So you don't want to be that kind of thing. So take that as a way to get quick feedback. So for example, professors, they always say like they have a tremendous freedom.

They add a lot of value. They're able to like, drive innovation, they are able to bring tremendous changes to the entire world, right, depending on the work. So, I think in that sense, it is a very satisfying role. So, that is a key takeaway. There is not much threat, once you are a tenured professor, it is not really that much threat towards your job, a lot more security. There is of course, that internal, let us say, academic politics that happens, but compared to, I think, industry, it is okay.

If you look at the salaries that's currently paid, of course, in India too, the salaries paid for the faculty are among the top compared to any other public sector. So you're paying the same top salary. So if you are in the public sector realm, this is among the top salaries you can get. So it's a good salary that you get.

And every year, it is being revised. In US too, it is similar. Among the public sector jobs, they get really good salaries. So it's a satisfying job with a decent salary. And we looked about it in the graph in the first set of slides too. Moving to industry, one of the reasons why people move is that industries need a certain set of skills that are not available within the job market that they have. So, for example, when the automated driving vehicles that started to get popular, when the Tesla started to come out with automated driving.

So we had a bunch of companies come out in US, for example, Waymo and others. So one of the things that happened was industry would actually go to different labs where faculty were teaching courses for rather doing experiments with the students on machine learning and get the entire lab. So the faculty and students would be pulled over to come and join the industry. tremendous pay tremendous opportunity to actually drive change within industry and tremendous salary for the faculty and and for the students and ability to like take senior leadership roles within the the company so that happens that's an example of why skills become really important uh from the that skill transfer becomes important and why industry tends to poach uh the faculty or or trained people from academic side to come to the industry If you look at it, actually, I was at the IITM research park maybe a couple of months ago. There's a new trend that I've seen, and it's maybe kind of obvious, but a lot of faculty now are actually starting up their own companies.

So they're starting up founding companies within the university. They have like IIT Madras offers a research park, but so does other IITs, and so does many other universities out there. So it's a trend recently within India for faculty to actually start up companies on parallel. and actually commercialize those technologies. And they're doing really well. So traditionally, there used to be a difference between private sector jobs and academic jobs.

But those boundaries are breaking. This, of course, is true in the US. This has been so for the last maybe 20, 30 years or 40 years. You would see that all the technologies that have come out

have actually come from those hubs, like, for example, the Stanford hub for where the Silicon Valley is. or the Boston Hub, where MIT is, as just an example.

So faculty do tremendous work. They do cutting edge research. And industry works with the faculty to commercialize it. And many of the faculty actually have startups that allow them to commercialize the technology. So that's happening in India right now, too. And that's a trend that I notice is a happy, good trend that's happening within India. So, again, really, there are a lot of perks, a lot of skill that you bring as a faculty and better faculty have in terms of cutting edge research, cutting edge technology, then they have an easier bridge between industry and academia.

And that's a key call out from this particular slide. Nothing is without its disadvantages, of course. So if you look at disadvantages, it's going to be that you are pulled in multiple directions. So there is a teaching requirement. There is the research requirement.

There is the administrative requirement required from a professor. So they get pulled in a lot of different directions. There's a lot of significant work. Research is not a joke. Research involves not just the amount of time that you put into a lab, but generating a paper and getting it approved is a laborious process.

The citation process is crazy. I would say crazy, but that's how the process is. There's an entire mechanism to actually churn out. In fact, what I've noticed is that professors actually split the roles. They collaborate with different faculty. Some of the faculty are very good in writing.

Some of the faculty are very good in generating content. That is, they generate data and analysis really well. Some of the faculty are really good in getting it published. So they work, collaborate. So one of the reasons why some of the faculty collaborate together, because the work to get publications out is really time-consuming and massive.

There's a lot of review processes, a lot of things that go under the hood. Reputation becomes a very key. You notice that faculty live by reputation. So both the university reputation and their own individual reputations are tied towards the work that they do. So academic setting works in a very strange way.

There is a hierarchy internally and externally based on these reputations. And on the outside, it may look rather not required. But that's the nature of the game. So that's how it works. Compared to say industry, where it is what work you do and what outcome that you get for that year is all that matters.

Your past history does not matter. You just move on forward in industry. Academics tend to be like, your past history does matter. Where you studied, where you publish, where you work matters a lot into how you're perceived within that circle that you interact with. Let's look at some of the problems that the roles in academia face. So we talked earlier about postdocs and the amount of significant time that they have to waste. But during the time that they spent trying to get into the academic sector, they paid really like low wages.

So we're talking about, for example, US, the postdocs would be paid about \$30,000 to \$40,000, which is like the minimum wage. It's a hand-to-mouth existence. Pretty much no money left for doing anything else. So if you're thinking about the time spent for industry, there is a significant value that is lost by giving up those jobs in industry, for example, working in academia.

The getting a tenure track, as we mentioned, is really difficult. It's really stressful. A lot of faculty actually get stressed out. It's maybe not worth the effort and really depends upon your passion and interest if you want to get into being an academic space, if that's the kind of life you want to lead. Also, I want to call out that the whole system has impact related to how the equation works out for diverse groups. Of course, universities are aware of it and they're trying to fix these processes, but it is a work in progress. The whole process about industry getting into the academic life is different, of course, between India and US.

I think it is a lot more easier within the Indian sector. But if you are thinking about someone as trying to look into migrating to a different country, then you might want to think about some of the drawbacks associated with working in a different country and related to the long wait times, low salaries that you make. And then make a decision related to whether you want to migrate, whether you want to fix it within India, and then think about what the potentials mean for you. Some of the challenges within India are similar to, which is you do have a lower salary compared to what happens with, say, the industry sector. But as we discussed, there are new opportunities that are opened up because of the industry academic bridges and network through things like startups and others, which creates new opportunities. But as it exists today, there is still at least a salary difference between what you can make between industry and what you can get from academics.

We talked about the existing rules, but I think it's important to understand also from a perspective of what this means for the future of jobs. We have done a couple of slides on this, but I think the key thing to talk about is the nature of job market is changing. There is a lot of technologies that you would have heard like say artificial intelligence stepping in, doing a lot of work. What used to be done earlier in a significant amount of time can then be solved with a short period of time. The key takeaway is if you have deep technical skills that if you have the depth you're a specialist then it becomes really difficult to approach you so in whichever space whether it is academic side whether it is in industry you are settled deep in it becomes really difficult to remove that kind of jobs. The broader you are, the less value add you have, the less skills you have, the less niche skills you have, it becomes easy to supplant you or remove you.

So that's one of the key things to take, especially with new technologies coming in, which kind of makes that the general tedious manual job go away. AI is a classic example. Everything is being disrupted. But what does it mean for you is something to think about in these directions.

Okay, research skills are really important for heavy technical roles. So for example, if you're looking for companies like for example, AMD Qualcomm, they need creative breakthrough, right? Whether it is, how do you put push, pull the boundary, like push the boundary towards the next generation of technology is not coming from traditional solutions, it comes from extremely new ideas or creativity. So if you are someone working in trying to break the barriers, trying to come out with new creativity, and it can happen only if you are someone who has creative potential, has a lot of research work, a lot of background, then it makes sense that these kind of jobs, the new future becomes really open for you. Versus if someone who has skills that are replaceable, again, you might not be able to break into companies, especially in future. If they are taking in general PhDs now, in future, I expect that they will take in a lot more skilled PhDs than they do right now. So all research experience, finally about analytical skills, logical problem solving skills, they always transit.

So think about those natures, but we'll stop into that into, hey, this is what you want to think about. We'll dig a little bit deep, but always think about skills and value you add. It's a little bit about like job visas and stuff. But what I clearly want to call about is that India is a fantastic opportunity, especially because of growing economies, the population that we have, and the kind of opportunities we're bringing in through startups, through new openings in technology. And you should have seen that kind of breakthrough they've done with, for example, ISRO, right? ISRO has pretty much done at like one hundredth of a cost what NASA has been trying to do.

We are the people who landed on moon where... And we have been able to do a soft landing, right? Other countries are struggling. We have even had crash landings recently, right? So it's a tremendous success that we had and we should celebrate this. Okay. So thank you all. Hope that gave you a flavor. Cheers.