

“One of the Big Values of a PhD to an Industry Role Is the Proven Ability to Tackle a Substantial Project Largely Independently”



Vijay Iyer



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Abstract In our interview with Vijay Iyer, he shares his journey from neuroscience microscopy to a role supporting neuroscience users at MathWorks. Vijay values independence, learning, and collaborations in his cross-functional industry position. He continues leveraging his specialized expertise and project management abilities from his PhD. He encourages mixing in reading, networking, and participating where possible (internships, freelancing) in the more innovative corners of the business world to help cultivate a vocabulary that bridges the worlds of academia and industry. Vijay advises embracing unplanned chances and focusing on transferable skills.

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Chris: Can you introduce yourself and tell me a bit about your current position?

Vijay: Hello! I'm Vijay, a fellow (he/him) from the US Midwest originally. I'm working as a "principal academic discipline manager (Neuroscience)" at MathWorks, the makers of MATLAB®. MATLAB is an interactive programming language and computing environment aimed at scientists and engineers. Neuroscientists began to use MATLAB in the 1990s and adopted it for many key computing workflows, including brain imaging analysis and behavioral experiment control.

My role would perhaps most closely translate to a "vertical marketing manager" if you were to look on job boards. "Vertical" is business-speak for focusing on a specialized application area from the customer's perspective versus any set of products/technologies from the company's perspective.

What was the focus of your PhD?

I completed my PhD at Rice University in Houston. It was through the Electrical Engineering Department (where I also got my undergraduate degree), but my research work was across the street in the Texas Medical Center, in the Neuroscience departments of the Baylor College of Medicine and UT Health Science Center at Houston. I fell into neuroscience accidentally by looking for an applied optics project. Laser scanning microscopy for neuroscience became the primary focus of my PhD. While my approach (the 'RAMP' dot in Fig. 1 from Lecoq et al., 2023, *Cell Reports Methods*) never took the field by storm as hoped, variations of it are still used for niche experiments today, which is neat to see. More importantly, I became as fascinated by neuroscience (and the adventurous culture of neuroscientists) as I was by the technology challenges which drew me in originally.

As you were finishing your PhD, what were you thinking about your career plans?

If you had asked me about a year prior to completion, I would have said that all options were on the table. My supervisor and I had different ideas for the next steps from the work I was completing, so the ‘direct’ academic path seemed unclear. But one thing my supervisor and I agreed on and spoke about was that completing a PhD was a lot like running a small business. Meaning you get to wear many hats! Of course there’s the scientific/technical work itself, but in the process of publications, conferences, presentations, budgeting, and engaging colleagues, you’re picking up skills associated with many other job functions (marketing, finance, even sales).

About 6 months prior to my end date, there was news of a new research institute (HHMI/Janelia) opening at the intersection of optics and neuroscience. That convinced me I should give it a try to go further in the same general niche since it was poised to grow. So for me another takeaway is to keep one’s eyes open at key junctures and be ready to adapt.

What happened next? How did you end up working at MathWorks?

Soon after arriving at the new research institute, I got diagnosed with an eye condition (keratoconus) that soon made optics work in the dark impossible to sustain. At that time, I was spending more time on microscopy software aspects, so I had the opportunity to join a newly forming scientific software team. We were software engineers with PhDs, i.e. one of the first research software engineering groups, although that term wasn’t yet in use at the time.

Most of my projects were in MATLAB, so I engaged regularly with MathWorks from the customer role. I joined several usability studies and interacted with several MathWorks engineers that way, especially for app building. With the encouragement of our local representative, I helped coordinate a visit for several of the MATLAB research software engineers to MathWorks early on. During those first 3 years, I also took a Python course from Enthought, one of the first companies from the Anaconda founder, and did at least one project in that emerging scientific language. In the last 3 years, I’d become the lead developer for *ScanImage*, an open-source app for laser scanning microscopy control. I was supporting nearly ten labs internally and nearly a hundred externally (the latter with grant funding). After exhausting some grant funding from the financial crisis stimulus funds, it became clear small business funding was the most viable funding source to support a broad community. After starting the company (Vidrio Technologies) on paper, I applied and got the notice of award a few months later. Then I transitioned full-time to the company, recruited and led the team, and enlisted co-founders. The effort was successful, but unfortunately I had disagreements with my co-founders (it happens). So

I left after the company was operational and had completed a major technological upgrade to the software.

As I was looking towards next steps, I included a call with one of the MathWorks contacts I had established as a customer. While it was an ideas call, to discuss some scientific hardware computing trends I had been noticing, this contact (now a senior manager) realized I was a ‘free agent’ as she put it. She offered to refer me to internal positions. Eventually I got routed to the vertical marketing team, which was seeking to expand into the sciences. At some point, I said if they would create a role for neuroscience, I would make the move to MathWorks. They ultimately created something close enough, so I took the plunge; and the role formally became neuroscience-focused after about 6 months there.

How have your career plans changed as you’ve continued on to your current position?

Most of my career plans have been unplanned! Being open to various possibilities has been key for me. This has steered me to embrace unique opportunities when they arose, like a new research institute, a new team forming within that institute (networking with the director establishing that team at an event), a new team being formed at an established company (via a referral that arose from providing user feedback to that company years prior), and the chance to found a spinout company from some of my work (being willing to write grants and take a risk when my circumstances were favorable). It’s also helped me adapt when I’ve had significant and unexpected health challenges, which led me towards positions with somewhat lower risk where I could continue to incubate things I cared about.

Can you tell us a bit about what day-to-day life is like in your current position?

Every day is different! Many companies have ‘cross-functional’ roles for individuals to fill in gaps between their larger team structures (functions), and I’m in one of those roles. So a typical day can include working with folks across very different departments. Primarily I work with colleagues in three buckets: product/technology-focused, marketing/communications-focused, and user/customer-focused. On top of that, I’m user-facing, so I’m bridging with users and customers in many fields of neuroscience, from human brain mappers to neural simulators.

The key to remaining grounded is to have an annual plan. As much as possible, every working moment of everyday ties back to the annual plan, whether it’s pre-planned projects or something opportunistic that fits into the plan framework. For this year, two of my biggest projects are MATLAB community toolboxes and

cloud-based workflows, so I’m spending much of my time helping open-source projects to improve or get off the ground, and proving out newer workflows (newer for both my company’s tools and its users). When I can find opportunities to accomplish multiple goals at once (‘double word scores’ I call them), I tend to jump at those for efficiency’s sake! So, for example, working on an open-source project that’s testing and proving out cloud workflows. One example is the BIDS Toolbox, a new open-source project aiming to facilitate accessing, inspecting, and working with cloud-based datasets following the BIDS (Brain Imaging Data Structure) standards, such as the datasets on the OpenNeuro data archive.

What do you like most about your work?

Independence, the opportunity to learn about a broad range of technologies and scientific areas as part of my job, and the chance to interact with many smart, motivated, and inspiring folks, both inside my company and among the users I support.

And what do you like least about your work?

As much as I know that it helps, I will never enjoy annual planning, which is a staple of larger companies. Every year, I develop an annual plan for my area, listing out usually about 20 projects for the year, including how highly each is prioritized, how much time each approximately takes, and any collaborators lined up for that area. It’s quite helpful when done, but while I’m doing it, my mind constantly gravitates to thinking about the projects I want to be actually working on. At least planning reminds me what I do enjoy most, so I appreciate it better!

How do you think having a PhD has helped you succeed in your current position?

My role is neuroscience-focused, so the specific PhD experience (plus postdoc and staff research experience) in neuroscience was integral to obtaining and having success within my current role. My employer also hires many neuroscience (and other) PhDs for positions outside that field. Certainly many general (e.g. critical thinking, writing) and more specific (e.g. programming, statistics) skills are honed through PhD training. But what I believe most makes PhDs (mine included) attractive and formative for industry roles is the proven ability to take on a substantial, complex project in a largely independent fashion. As such, my company regards PhDs as equivalent to several years’ work experience and I believe many others do the same.

If someone currently finishing their PhD was considering a position similar to yours, how might they decide if it would be a good fit?

There were points during PhD and early post-PhD years that I saw an interesting industry position, so I went ahead to apply and interview. While I ultimately chose to continue on the academic path, these were interesting and informative experiences for me. I'm noticing more industry internships among scientists these days, which I think is very healthy. Another pattern I'm seeing is recent graduates taking a gap year to do short contracts as a freelancer, including some or all with industry. This can be a great way to build up experiences and connections, and in some cases (e.g. open-source projects) a visible portfolio of contributions/accomplishments.

If someone was interested in pursuing a similar career path, what would you suggest they do to better prepare themselves?

I recall that during my graduate school years, I mixed up my reading to include some books about business innovation. Some books I read back then were *Open Innovation* (by Henry Chesbrough, about the changing landscape of how companies treated IP, towards greater cooperation alongside competition) and *Re-Imagine: Business Excellence in a Disruptive Age* (written by a consultant Tom Peters, who spoke glowingly about the inherent entrepreneurial nature of academics). I think reading a few business innovation books can be helpful towards building a set of ideas and vocabulary that feels familiar to academics and also helps to understand and communicate ideas in an industry/corporate context. These days, LinkedIn can also be a good source of information and perspective, with more scientists active there than I originally expected.

A lot of people like academia because they feel it gives them an opportunity to work on a topic that they deeply care about. Do you think this is also true in your current position?

I think deep care-aboutness can arise in several ways. They can arise from values, fascination, and curiosity, which are likely some of the biggest drivers earlier in one's career. In the course of the journey through a PhD in academia, I believe these drivers can start to evolve in a few (healthy!) ways. With growing familiarity with the intricacies of a given field, one may find specific areas or aspects they particularly care about, which at some level is intuition that there is *untapped value* in that

specific realm. Additionally, one begins to care about their colleagues in the field. These can become drivers for successfully staying within academia, but I also believe that maturation can be transferred to other realms if one steps back.

In my current role, I continue to pursue what I believe is untapped value in interactive programming interfaces made by and for scientists (something *designed*, beyond what ChatGPT or another LLM could ever do in my view). And I continue to interact with the neuroscience colleagues I came to care about and admire. At the same time, by joining a company team, I enjoy getting exposed to many other specific areas my colleagues care and teach about, and of course I've grown to care about a new set of colleagues.

Another reason many like academia is that they feel it provides them with more freedom than they think they would get in other positions. How much freedom do you feel you have to work on what you think is interesting?

I think it's important to distinguish between freedom to work on what one wants and independence in how one pursues that work. Continuing on a theme from above, one of the big values of a PhD to an industry role is the proven ability to tackle a substantial project largely independently. My role not only affords considerable independence, but it's expected from me and most other PhD-level roles. In terms of freedom, I find it's roughly equivalent but a bit different timing-wise, in terms of the accountability demands that (inevitably) accompany relative freedom. In more academic roles, many spend considerable time (I certainly did) pursuing grants to sustain working on what's most interesting to them. These are fairly intense but time-bound efforts. In my current role, I do twice-a-year presentations on big picture directions and various smaller-scale business-case proposals year-round for things I find interesting or important; it's more frequent but not quite as intense.

Have you thought about returning to academia?

I have thought about returning. I've been noticing a number of boomerang academics lately, especially in neurotechnology. I think it's a healthy trend, both for the individuals and for the academic departments, and I hope it starts to occur more in other fields. It seems especially a natural fit for individuals who want to dive deeper into one or a few projects and/or who enjoy mentoring early-career scientific professionals. Both of these often appeal to me!

Based on your journey, what advice or suggestions do you want to pass on to someone who's currently finishing their PhD?

If I were to recap some of the takeaways above, they'd be: keep your eyes and options open while focusing on doing solid independent work in your role. That's the best foundation for a career with the most freedom possible, regardless of which side of the 'divide'.

Is there anything else you'd like to tell someone reading this interview?

Along my journey, one pattern has sometimes occurred to me. While academia is geared towards researching lots of highly novel and specialized areas (I envision highly branched cerebellar Purkinje neurons), many of the dynamics in the field are about the goals of greater standardization. While industry is geared towards turning the crank on mainstream and mature knowledge (I envision less branched cortical pyramidal neurons), many of the dynamics are about how to efficiently reach into more specialized areas. Sometimes it seems to me like each is moving towards the other, which reinforces for me that the same individual can find themselves at home in either environment at different times.

Thank you for sharing your advice with us, Vijay!