"A Career Path in Open Science Has Been a Great Fit"

Ana E. Van Gulick

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Abstract In our interview with Ana Van Gulick, she tells us about her PhD work and struggles with working alone and the slow pace of research. She subsequently worked as an academic librarian and learned more about data management and open science. Ana now works in a project manager role for Figshare, a company that serves as a scientific data repository. This role allows Ana to help researchers share their data, keep up with changing scientific research practices, and work across many disciplines. A PhD prepares people for many career paths beyond the specific academic field of study, as many skills are transferable.

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C. R. Madan (ed.), *Academia and the World Beyond*,
https://doi.org/10.1007/978-3-030-82606-2_2

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

Ana: Hi! I'm Ana. I was trained as a cognitive neuroscientist and currently work on supporting open research data at a technology company called Figshare that hosts a generalist data repository and builds data repository infrastructure for organizations. In my role as the Figshare Government and Funder Lead, I manage projects for clients in our government and funder sector that are both public agencies and private non-profits. I support both repository administrators and researchers who are the repository end users in implementing data sharing best practices so research results are discoverable and reusable. I also manage reporting and contract deliverables for these projects and work with our marketing and sales teams to find opportunities for our infrastructure to support open science at research organizations.

In my undergraduate research and for my PhD, I studied the high level visual system with both behavioral and MRI methods. I investigated how we recognize and categorize objects that we have a lot of experience with, such as faces. After completing my PhD, I worked in an academic library for 6 years. At Carnegie Mellon University (CMU) in Pittsburgh (Pennsylvania, USA), I first joined the University Libraries as a postdoc as part of a fellowship program run through Council on Library and Information Resources (CLIR) that brings PhD researchers into academic libraries in an effort to expand how academic libraries are evolving to respond to the changing needs of researchers. After nearly 2 years of postdoc, I was hired as faculty at the libraries to serve as the Liaison Librarian to Psychology and Neuroscience. The Librarian track at CMU is one without tenure, but with benefits and academic review similar to a teaching or research track. In both my postdoc and faculty role at the libraries, I focused much of my effort on open data practices and open science research workflows. I founded and directed the CMU Libraries Open Science Program that included training workshops, digital tools, and expert consultants to support more transparent, reproducible, and reusable research across disciplines.

What was the focus of your PhD?

My PhD training and research were at Vanderbilt University (Nashville, Tennessee, USA) in the Department of Psychology. There I was focused on understanding how we recognize and categorize objects using cognitive neuroscience approaches. To study these high-level visual processes, that is what happens following processing in the eye and primary visual cortex, we used both behavioral and neuroimaging techniques such as functional MRI to study downstream processing of visual objects. One question my PhD lab was particularly interested in studying was the effect of experience on visual recognition and a phenomenon called "perceptual expertise." Both the amount of experience and the type of experience recognizing

objects seem to influence how objects are recognized and what brain areas are recruited for this. There are certain categories of objects in the world such as faces, with which we have a high level of experience. Face recognition also requires not just categorization at a broad level, but individuation to recognize a specific person, which is a challenging visual task given how similar faces are to one another. It's been found that face recognition has certain attributes such as more holistic processing and recruits specific brain areas relative to recognition of other object types.

Much of my PhD work was aimed at understanding why these differences are observed with objects like faces by working to understand the effects of different types of experience. In some studies, this was done with training studies in which participants spent 10–-20 hours learning to categorize different novel computer-generated objects at the individual and higher category levels to see what impact these types of experience had on visual recognition. In other studies, we used real-world experience as the variable such as working with car and bird experts, that is, people with a personal interest in birds or cars who have both significant knowledge and experience with these categories. By designing visual and semantic tests about a variety of object categories from planes to shoes to mushrooms, we tried to parse the contribution of different types of experience versus baseline visual and intellectual skills to understand how perceptual expertise develops across individual differences in people.

Overall, we wanted to understand how experience affects visual recognition across individuals and how these differences are observed in the neural bases of the high-level visual system in the brain.

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

Over the course of the 5 years of my PhD program, I became increasingly interested in pursuing a career outside of the typical faculty tenure track. One of the main reasons for this realization was learning what I enjoyed about doing research and what I didn't. By my third or fourth year of graduate school, I had found that I really enjoyed active and collaborative work, whether it was working on research projects with other students and postdocs in the lab, doing analyses together with a colleague, or having subjects visit the lab and collecting data. This type of work made me feel like I had accomplished something each day and kept me motivated to do research. What I found I struggled with more was working alone, such as long periods spent programming code, reading the literature, or writing proposals or papers alone.

After having a first-year research project that moved slowly and wasn't published until my fifth year of graduate school, I learned about the sometimes truly slow pace of scientific research. While I think I had some understanding that research takes time from my undergraduate experience, I found it challenging to have projects that took not just many months or a year but truly took many years. A

faster pace of accomplishment like that more common in non-academic jobs would probably suit me better. I also did very little teaching as a graduate student as I was fortunate to have other sources of funding for my research and training, but based on my limited experience, I did not think that I wanted to have a future position with a heavy teaching component.

Realizing that the "active" part of research was what I enjoyed most and that faculty members spend little time doing research and much more time teaching and writing grants and papers, it seemed that wouldn't be the right match for me. Of course, that's to say nothing of the competitiveness of the tenure track job market, which would also have been a challenge.

Seeing that I liked working on a team and having projects that moved faster, it seemed that a non-academic position in a research field or applying scientific processes and knowledge in an industry setting would be a good path forward for me. Toward the end of my PhD, I was thinking about applying my research skills to scientific consulting or to user experience in the commercial sector.

To be honest, working in open data and open science was not a career path I considered in graduate school, although this was also a newer movement in science at that time as open science has evolved rapidly in the past 7 years. I also never considered working in an academic library on these issues as my experience with the library as a student was strictly limited to downloading journal articles online. I can say now though that a career path in open science has been a great fit – it allows me to be part of the research ecosystem, to support researchers and scientific discovery, and it is an exciting and quickly evolving field.

Working in an academic library was a great pathway into the fields of research data management and open science. This is a new area of work for academic libraries, and I feel like I got to have a significant impact on the program at CMU and to contribute to the broader library and open science fields. Nonetheless, the professional path forward in libraries usually involves becoming an administrator, such as an associate dean or university librarian and part of the library leadership, and after several years as library faculty, I decided I preferred to focus on working exclusively on open data and research rather than having to broaden my interests into more general academic library administration.

At Figshare, which is a relatively young (10 years) technology company, I've been able to focus on open research and work in a fast-paced environment focused on data repository infrastructure and support with an energetic and dedicated team.

Can you tell us a bit more about how you went from finishing your PhD to working in an academic library? Did you need to do any formal training in advance?

After completing my PhD, I began my postdoc in an academic library (at Carnegie Mellon University, Pittsburgh, PA, USA) with no formal training and really no idea whatsoever about the field I was entering. It was in many ways (and as with so many life stories) quite a matter of chance. The CMU Libraries had applied to host a CLIR postdoc focused on data in the sciences and social sciences but had had trouble recruiting someone from a science background for the position. The humanities reputation of libraries, I learned later, often results in this recruiting issue, despite the exciting work on data that libraries are doing currently. I was looking to move to Pittsburgh to be with my partner there, and a former advisor of mine, who was faculty at the university, pointed me in the direction of the position. I was pretty hesitant the position would be a good fit, given that I had visited the library in person exactly once during my 5 years as a PhD student, but seeking a first job to make the move, I was interviewed and was offered the job the morning after my dissertation defense.

Because the job was part of a larger postdoctoral fellowship program through CLIR, there was some training provided. I attended a 10-day training with the other 25 fellows in my cohort, all recent PhDs, which was aimed at giving us a crash course in academic libraries. Like so many disciplines, the library world is full of acronyms and jargon, and I will admit to feeling confused and fully out of my element at the training. I was one of only a few scientists in the cohort as many postdocs came from digital humanities backgrounds, which was a focus of some of the positions that year, which also contributed to my "fish out of water" feeling. At the same time though, many similarly had no library experience, and having this cohort was critical to helping me navigate the first year of my postdoc. We had monthly calls and met up at conferences and worked through the challenges of being the odd recent PhD working in a library. We faced similar hurdles in finding projects that we could contribute to and work that was appropriate for our skills while also integrating ourselves into the library culture.

I think culture is really the biggest part of what I needed to learn to work in a library actually. Researchers and librarians often talk about the same things but use different words. As a postdoc and later as library faculty, I felt that my role was often one of translator and then connector. So once I learned the "library language," I could interpret both ways – make library resources approachable to researchers by speaking their language and in the reverse help those in the library understand the practices of researchers.

That was the extent of the formal training, but I did learn on the job from those in the library such as working with our data and scholarly communication librarians. I was also lucky to have significant support to attend workshops and conferences, which was a huge help to understanding the larger research data management and open science communities. These data and open science communities have

grown significantly in the past 6 years and are now hopefully more accessible to those working in research communities including graduate students than they were when I was a student. Some events that I attended were focused on the library community, often data librarianship, a relatively new subdiscipline, and others brought together librarians, researchers and those from funders, publishers, technology companies, governments, and nonprofits as there are many stakeholders in the research ecosystem. The later I found a quite exciting community, and it is the world I have continued to work in following my time in libraries.

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

The best description of my current position is probably as a "project manager," but Figshare is fairly small and still has a scrappy start-up culture, so I do a bit of a lot of things. My main responsibility is managing projects for our clients who are governments or funders. As a technology company, Figshare builds the infrastructure for open access research repositories. We provide Figshare.com as a free, generalist repository that researchers around the world can use to share any research products, and we also provide our infrastructure as a subscription to our clients to build custom repositories that meet the needs of their specific institution or their researchers. In my first year at Figshare, I have primarily supported US government agencies who are looking to comply with mandates to provide public access to data as well as to support both their intramural and extramural researchers with a repository that can be used to make the results of their work discoverable, reusable, and more impactful. For these projects, I serve as the primary Figshare point of contact for both the project leads on the client side and for questions and support for the end users, that is, the researchers using the repository. From the contracting side, I provide regular reports on the project progress and repository usage and impact as required by the contract and meet any other contract deliverables. I conduct outreach and training such as webinars for researchers and even work with the academic librarian community who can point their researchers to some of these repository resources if they are funded by one of the agencies we work with. I also do curation of deposited research for some repositories.

Working with researchers on sharing data is something I did at the CMU library as well, which has an institutional repository powered by Figshare. For some repositories, especially in the government and funder space, Figshare is contracted to provide not only the infrastructure but also the experts to support researchers and review deposits before they are published. The goals of this review are to check the files and ensure the work is appropriate for the repository but most importantly to check the documentation included with the files and the metadata that will make the work discoverable in search engines and reusable by other researchers. At the beginning of open science, the emphasis was on making the results of research open, but

now as the open data movement evolves, there is increasing recognition that open does not always equal Findable, Accessible, Interoperable, or Reusable (FAIR, a common acronym in the field). Part of my role at Figshare is thinking strategically and working with clients and the larger repository and open science community on how we can enhance open data by applying emerging standards and best practices. Having an expert lead researchers through the data sharing process and check that metadata is as complete as possible is one way we're encouraging this.

In one project, I got to work on a pilot with the National Institutes of Health who partnered with Figshare on a 1-year pilot project to host a generalist repository for NIH-funded researchers. Some of the goals of the project were to evaluate the need for a flexible generalist repository in the biomedical data landscape and also to determine the effect of having a data curation expert guide researchers in using the repository and check datasets and other deposits before they were published publicly. Working with NIH-funded researchers, both intramural researchers employed by the NIH and extramural researchers at academic institutions who receive NIH grants, really brought together all of my career experiences bridging my experience as a scientific researcher with NIH funding (funding that had supported a large portion of my PhD training) and as a librarian working with open data practices. Now working with a large funder like NIH, I had the chance to provide a repository resource to a large audience of researchers across biomedical fields and to participate in the NIH open data ecosystem of discipline-specific repositories, generalist repositories, researchers, and specific NIH institutes funding the research.

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

Most importantly, I think it comes back to culture and understanding what the workflows, practices, and day-to-day activities of an academic researcher are. Being a PhD student exposed me to the reality of scientific research including the many stages of research project from planning and data gathering through data analysis and visualization, the ordeals of writing (and only sometimes getting) grants for funding, the often lengthy process of publishing papers in peer-reviewed journals, and many other institutional and lab workflows. I had grown up with a parent who is an academic, so I know quite a lot about universities having grown up around graduate students and listened to my father both teach and navigate university politics. But my father is a philosopher and so there is quite a difference in the day-to-day for a researcher in the sciences as well as a dramatic difference in the funding and publishing landscape. In my current position, understanding the life cycle of research data and the workflows for data and publications is key to understanding researchers needs and supporting them. Additionally, understanding the grants process and requirements of large funders such as the National Institutes of Health and the National Science Foundation especially around issues such as data management

and public access has been a great advantage for my current position. While I work in tech for a private company now, the larger community that makes up my clients, colleagues, and users is still the same one I was a part of as a PhD student.

What do you like most about your work?

Working in open research has been a great fit for me because I get to work with researchers and funders across many disciplines and help shape the future of scientific discovery, While I didn't want to continue on a tenure-track path, I really enjoyed working in cognitive neuroscience and being a part of the scientific research community. In my current position, I get support to do primary research from the infrastructure and training side and be a part of the larger research community still. It's been particularly exciting working with government agencies and other funders who support this work, as they are such an important driver of research practices and honestly allow research to happen. Scientific research is changing quickly with the rise of big data, digital data, powerful computing, and artificial intelligence, and getting to be a part of that through a product that I can help shape and projects that I manage is a great opportunity to support research reproducibility and discovery. I get to work with a great group of motivated colleagues and be part of professional networks that span the globe, and I think we will have a meaningful impact on what open data looks like in 10 years. I also enjoy managing complex projects (lots of to-do lists and post-it notes!) and working with lots of different people and different projects, so that diversity of experience in my day-to-day is great. While any labs I worked in as a PhD student were usually funded by the National Eye Institute or occasionally National Institute of Mental Health if they had NIH funding, in this position, I've gotten to look at data and work with researchers funded by more than 20 other NIH institutes across biomedical fields. I certainly don't always know what the data are or what they mean, but it's quite interesting to observe and learn about some many different types of research being done.

And what do you like least about your work?

The paperwork and reporting required for grants and contracts are probably high on my list of things I could stand to do less of as there is *a lot* of it as a government contractor and project manager. But I understand why it's needed. There is also a sales element to my work that can be stressful if it's not going well – while I'm not responsible for any sales quotas myself, I work with members of our sales team on finding opportunities and presenting our products to prospective clients. That being said, it is really great when you find someone with a problem that your product solves perfectly, and I really believe in the mission of the company, which is dedicated to making research openly available, so it's easy for me to stand behind our work.

I would also mention what I have experienced as a darker side of the open research community – one that can be quite exclusionary or antagonistic and seems to conflict with the mission of the movement. From my perspective, I've seen this take several forms including a strong in-group bias that's not welcoming to newcomers or those from diverse backgrounds, an overemphasis on computational or programming skills, and a combative stance toward only endorsing open source versus commercial or licensed solutions. There are many great people working in this community who are aware of these issues and actively working to resolve them especially around diversity and inclusion. Similarly, there are undoubtedly commercial players in the academic space that are a detriment to research, but I hope sustainability models, mission, and community contribution can also be considered rather than drawing a black or white distinction between open source or nonprofit solutions and those that use a commercial model to be sustainable.

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?

Getting to work on something you care deeply about is certainly a common refrain among academics; however, I think whether this is true for you in academia or in any industry is very individual and not necessarily tied to the type of employer. I was very passionate about working to understand human vision and cognition as a student and still am interested in this field, but I'm not sure that I was ever that passionate about a specific study I was working on. In many ways, I think I am more passionate about the work I do now because it is broader and easier to see the impact day to day. In academia, research areas become quite narrow quickly, so the work that you are doing is often focused on very granular problems and nuanced theories. In my experience in academia, it was hard to see the forest when you were working so hard on the trees in this scenario. In my non-academic roles in libraries and at a data repository, I've gotten to work on something I've come to care deeply about, open and reproducible research, in a way that more frequently includes a broader view, which keeps me motivated in the day-to-day work of projects and details. Even in academia, where you can choose your research program, you may not get to choose all of your work, for example, what courses you teach or what committees you serve on. I've found this to be similar in non-academic jobs as well, but luckily in my case, I personally care about the mission of the organization, which has led to a high level of personal interest in my work. Overall for me, I don't feel that I've sacrificed being passionate about what I work on for my non-academic career because I was able to find other work that I was equally interested in doing.

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?

Certainly, there are few jobs with as much freedom to choose your own work as academia, and many that do offer that freedom (e.g., being an artist or a writer) don't offer the same support and security of working at an academic institution. I've been very lucky in both of my post-PhD jobs, one at an academic library and one at a company, to have supervisors that provided a great deal of intellectual freedom to pursue new projects and to do my job as I saw best. In my current role at a data repository, I have work that must be done for which I don't have the freedom to choose which projects or tasks to work on as they are by nature part of my job. I would say this quite "well-defined" work makes up roughly half of my work and the other half is more flexible for me to design on my own even as it contributes to the goals of my job description. In this way, I can choose to do a webinar, write a guide or blog post, attend a workshop, or even come up with ideas for business strategies and product features on my own and contribute to my job, but in a way that is not prescribed such that it is still creative work. And while my main role takes much of my time, I'm still encouraged to continue professional development and training and can pursue my own research and scholarly work and be involved with research community activities as I have the interest and time. At Figshare, our team is still fairly small, and the relatively new business and products are still evolving quickly, which I think has given me more of a chance to take an active role contributing creatively to my job versus doing predefined work all the time. I'm also actively engaged in evaluating my job description regularly and have been encouraged to continue to adjust and refine, which certainly has to be done with business needs in mind as well as my own interests, but I am grateful for this flexibility. In the future, I hope this will lead to opportunities to be a leader at the organization.

I certainly don't have as much freedom as I would working in academia, but I have also been quite happy with the balance of freedom I do have. Recently, my supervisor asked if I was okay with the "lack of structure" in my day-to-day work, his thinking being that as a newer technology company, we work with quite a lot of uncertainty and still have a start-up-like organization structure, to which I responded that there was still vastly more structure than in academia, so I was quite happy with it. Like many PhDs, I'm pretty self-motivated to do my work and enjoy doing some work that is creative, but I also know that I prefer to work in a pair or small group and to have some degree of structure to my work goals. Given that I wouldn't want 100% freedom anyway (that sounds like a paralyzing lack of structure and teamwork), having the opportunity to contribute creatively to the organization and how I achieve my individual goals at work as well as the opportunity to shape my role in the future seems to be the right balance for me.

What are some relative benefits you've seen in working in a non-academic position?

I think that a common fear among those considering leaving academia is leaving the culture and community of academia. I grew up with an academic parent and had been around universities my entire life through graduate school and also experienced this concern in considering alternative careers, so it seems worth noting my experience on the other side. Academic culture has many wonderful qualities including flexibility and freedom, institutional support and benefits, intelligent and curious colleagues, and a continuous stream of engaging lectures and events to attend. However, as has been increasingly noted in recent years, academia is also highly competitive, which can lead to a culture of overwork and a lack of work/life balance despite the flexibility and can also reinforce biases in who succeeds. Depending on your personality and your approach to work, other academic adjacent career paths might offer structure and balance that are beneficial with less stress than academia.

In my roles outside of academic research, both at an academic library and currently at a company, I've found improved work/life balance including more respect for "off work hours" as well as many of the attributes I enjoyed about academic culture. In my current role, I rarely receive work messages on evenings or weekends, and if I do, I don't feel pressured to reply. Similarly, vacation time is respected as a time you can fully disconnect, which I find very valuable as well as having a dedicated vacation time allotment, which I've luckily found to be quite generous by American standards. At my current job, I still have the flexibility to design my own work day around meetings and commitments, to step out for a doctor's appointment or even just to take a break for a walk and shift my work time when needed – something I feared might vanish in an "industry job." At both jobs, I've found smart, highly motivated colleagues who are supportive and engaged collaborators, and some days I'm in meetings with just as many PhDs as if I worked in academia. The work culture of any organization should always be an important consideration for any job, and considering the pros and cons of academic culture should be no different; find a culture that is the right balance for you to be successful and happy whether that's in academia or elsewhere.

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

I would tell them that there are many opportunities both within academia (in traditional faculty roles and nontraditional roles) and in many other industries. They should feel confident that their experience from earning a PhD has prepared them to do many jobs well and that many of these jobs may seem far from their field of study

or distant from their real-world experience, but that does not mean they would not be happy and successful doing them. Think about the type and style of work you find enjoyable when choosing a career as well as the topic of your expertise. Many skills you develop as a PhD candidate – writing, synthesizing information, critical thinking, and problem-solving – are applicable across many domains. Good advice seems to be to do informational interviews with people working in different fields to learn more about them and how you might apply for jobs in that field if you are interested, although to be honest I did not do this myself (however, I have spoken to numerous PhD students since leaving academic research about my jobs!). When choosing a post-PhD career, feel free to consider things like work/life balance, work culture, salary, and location as considerations if they are important to you – they may even be more important to you than the specific projects you work on.

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

I think that the growth of remote work in many including tech may significantly broaden the non-academic options for careers post-PhD and hope this will help more PhDs find jobs that are the right fit for them.

Thank you so much for sharing your experiences with us, Ana!