

Conclusion

In this article, I have presented my own view of some aspects of a career as a mathematical modeler in the biopharma industry. If you are considering a job in industry, I recommend that you talk with others who have worked or are working in industry. You can do this by attending sessions at the Joint Mathematics Meetings such as career panels with people in industry, or by attending a meeting that industry modelers are attending (see the table above). You could also invite some of these modelers to speak in your department's applied math seminar either virtually or in-person.

References

R. Allen and H. Moore, *Perspectives on the Role of Mathematics in Drug Discovery and Development*, *Bull Math Biol.* **81** (2019), no. 9, 3425–3435, DOI 10.1007/s11538-018-00556-y. PMID: 30693431.



Helen Moore

Credits

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A Personal Story of a Career Trajectory to BIG

Marisabel Rodriguez Messan

Deciding what to do after graduating either with a bachelor's, master's, or PhD degree in mathematics can be overwhelming; especially when your academic studies were chosen solely based on what you enjoy doing and learning the most—for me it was mathematics. In this article, I will share the story of how I got to where I am with a job as an employee of the United States (US) government and give some advice based on my experiences along the way.

I believe that where I am right now in life was largely influenced by where I came from and my upbringing. So, let's start from the beginning. I grew up in Mexico, in a

small border town to Texas. Living so close to the US and hearing about the amazing opportunities an education in the US provides made me dream of one day having such an education. Upon completing my secondary education in Mexico, I was very fortunate that my parents did everything possible to enable me and my siblings to obtain a college education in the US. Coming from a different country with a different education system and language felt overwhelming. However, it was the start of a big adventure, and my plan was to excel at all costs. I attended a predominantly Hispanic institution in the south of Texas, The University of Texas Rio Grande Valley. Although I am a Latina/Hispanic, I still felt like an outsider; this was difficult at times but in the long run I found myself striving to excel without being labeled as a minority.

At first, it was not clear which field of study I wanted to pursue. After trying a few disciplines (e.g., graphic design), I eventually decided to major in mathematics. At the time, I was not completely aware of how easy or difficult the path would be or where that would lead me after graduating. However, math felt comfortable, challenging enough, and somehow promising for a future career.

I finished my bachelor's and master's of science degrees in math at the same university. Then, I decided to pursue a PhD in applied mathematics because I felt there was more to learn not just academically but about life itself. This decision was really motivated by the fact that I attended a summer research internship out-of-state where I was exposed to many other applications of mathematics and fell in love with research. During the PhD at Arizona State University (ASU), my intellectual capabilities were challenged and stretched more than I could have ever imagined. However, I was suddenly on the path to accomplish things that previously felt unreachable. Though my time pursuing a doctoral degree in math was very challenging, it taught me to go out in the world and face almost anything.

A couple months before my PhD graduation, I started to wonder what type of job I should look for, either in academia or in business-industry-government (BIG). As graduate students we become very familiar with what the job and life of a professor looks like. We think that it is the safest path and feel afraid to look anywhere else. Although I contemplated the idea of applying for a tenure-track position, I wanted to experience something different since I felt that I've been in a school setting my entire life. However, by the time I graduated, my partner (who also graduated with his PhD a few months before me) had taken a job in a small town. When this happens, your job options narrow and you may need to make a few compromises. This was my situation, and I ended up accepting a teaching position at Dartmouth College while we determined if this is what we wanted for both of our careers. I found my experience in this teaching position very rewarding, especially mentoring minority students who approached me about my career path and were looking for guidance. It was at this moment

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that I realized how someone like me, who is Latina/Hispanic, was making an impact and opening paths for others to come. Also, during this time, I learned where my passion lies, which is doing research and continuing to learn. Therefore, I started to look for other opportunities where the primary job was research. I was offered a postdoctoral research position at ASU while visiting Brown University. However, during this time I was living away from my partner (again making compromises), and therefore I was still in search of a job located where my partner was. Thanks to the connections I made at Brown, I was able to find other job opportunities in Maryland where my partner was then working. I applied for an ORISE postdoctoral fellowship in the government (a contractor position), which I believe has a two-way benefit. On one side, you, the future employee, get to learn more about the organization/agency to determine if that type of work setting agrees with your career goals; and on the other side, the employer gets to know you (your work ethic, performance, etc.) to assess if you could make a good addition to their team without been fully committed. Also, keep in mind that there are no assurances the agency will offer you a permanent position, however your chances increase because now you have acquired more knowledge and experience from that specific office/center/agency.

After almost two years as a fellow, a statistician full-time employee (FTE) position opened, and I decided to apply. Because organizations in the government offer equal opportunity to the public in general, I had to apply through USAjobs.com and compete with all applicants. After a few months I was offered the position and converted from contractor to FTE and have been in this position since then.

Along my trajectory, I learned a few important things that I would like to share here:

1. Do you need a PhD to get a job in BIG?—Not necessarily. It will depend on the type of position you would like to have. For instance, if you would like to lead a research project, then yes. You can get an idea of what type of jobs are out there, the degrees required, and specific tasks/responsibilities by searching through LinkedIn Jobs, for example.
2. Is there a specific path you need to follow to get a job in the government, business, or industry?—No. I suggest not overstressing to fit a specific job profile because along the way you may realize that this is no longer what you want to do or the availability of such jobs may change by the time you graduate. Currently in BIG, you may find many job descriptions asking for experience in statistics, programming, and/or data analysis. If your degree says mathematics or applied mathematics, you can still apply to all of those positions, just make sure you have some experience in at least one of those through a class project, an internship, or an online course you took. As a PhD student, get involved in projects in these areas and perhaps make

them part of your dissertation. As an undergraduate or master's student, get involved in research projects early on and obtain internships.

3. I found that as a new graduate, looking for postdoctoral positions (or trainee positions) either in government or industry is the best path to introduce yourself to that world.
4. Be open to keep learning and humble yourself. I believe these go hand-in-hand, because there is a lot to learn in different types of job settings beyond what we learned at school. Being humble and eager to learn will help you adapt more easily to your new job and develop faster professionally.
5. Build and maintain your network. As a student, it is very important to meet and connect with peers who at some point may become your coworkers or employer. Attend conferences and workshops to showcase your work and let people get to know you. Also, once you graduate and are part of the workforce, keep building your network. Find career mentors and keep in touch with those you have met before, because you never know how that relationship is going to help you or who you may end up helping or guiding.
6. Be open to compromise. Just like in my story, you may find yourself in a situation where you may have to compromise. Remember that every bit of experience counts and although you may not end up staying at a certain position long-term, you will gain a new set of skills/experiences.
7. Don't be afraid to make important decisions during your career path. Taking a job in any BIG position doesn't mean you must stay with that employer for your entire career. Remember that this is your career, and you can make the decision to leave at any point if this is not fulfilling your objectives or your goals have changed.

Every step you take, even with setbacks, is important. As I end this article, I want to leave the reader with one of my favorite quotes:

“Do not be too timid and squeamish about your actions. All life is an experiment.”

—Ralph Waldo Emerson



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