

Profile: Helen Moore

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EARLY INFLUENCES

What sparked your interest in mathematics? When did you know that you would use math as a path to your career?

I have loved math since I was young. I was good at it, and solving problems and puzzles made my brain feel happy. I didn't really know what a career as a mathematician might mean. In high school, I enjoyed math contests. I knew college professors existed, and that was my career aspiration. In college, I wavered between majoring in math or physics. I thought both were beautiful. But one day I asked my quantum thermodynamics professor about the necessary conditions for the mathematics we were doing to be valid. When he told me not to worry about it, I decided I belonged in the math department. In graduate school, I got paid to study and do research in the mathematics that I loved!

Was there a pivotal moment/experience/ influential person that led you in this direction? Any memorable courses or experiences that made a difference in directing you to your career?

When I was a professor, I always looked for examples to show my students how math was being used in other fields. So when I had a chance encounter with a cancer biology group that wanted to do mathematical modeling, I already had ideas for a model to use. Over time, I shifted my research to work in this area full time—it was beautiful AND it could help sick people! I thought I would stay in academia, but I had the opportunity to work at Genentech, and it seemed so interesting. During my years working in industry, I have learned lots about the drug development process, which helps me know which questions are most relevant and what modeling will be best to answer them.

CAREER/CAREER PATH

Describe your current position and briefly, the path you took to get there.

In my current role at Bristol-Myers Squibb, I spend most of my time on the following tasks: reading papers on diseases and modeling techniques, creating mathematical models, writing code, attending meetings to plan or present analysis, writing email, teaching and learning from colleagues, and attending conferences. Every few months various outside experts are brought in to the company, and the entire department has the opportunity for a few days of specialized training.

How many hours per day or week do you typically work? Do you have flexibility that allows a good life/work balance?

I work a minimum of 40 hours per week, usually more, sometimes much more if there is a deadline. I arrive in the office sometime between 8 and 10 am, depending on errands I need to do before work. My department is filled with people who help each other. I look forward to going to the office, whether I will be spending the day coding or in meetings.

CAREER EXPECTATIONS FOR YOUR FIELD/POSITION

Where do you see the future of math in industry or in your particular career?

Since so much of our time is spent writing emails or giving presentations or participating in meetings, it helps to invest some time learning good communication skills. It's important to be able to explain mathematical and statistical results to people outside of mathematics, and persuade them to follow your recommendations.

I am expected to stay current in the latest mathematical and statistical techniques, and I am encouraged to publish. In contrast, some companies don't want to use new techniques until they have been adopted by others in the industry, and some don't want you to publish. Mathematics and statistics is very important to our field. The government agencies in the US and in Europe (the FDA and the EMA, respectively) require certain mathematical analyses in applications for drug approvals. In addition to that, innovative companies realize the benefit, and use additional modeling and simulation for internal decision-making. Currently, the demand for people who can do this quantitative work (referred to as pharmacometrics) is greater than the number of skilled people available.

ADVICE

If you could advise someone currently pursuing the same degree or profession, what would you say?

A PhD in math can be a good start to a career in the field of pharmacometrics, but you will need some additional learning. A postdoctoral position in pharmacometrics can add a solid foundation for an industry position. Doing a postdoc can give you the chance to learn physiology, basic pharmacokinetics (PK) and pharmacodynamics (PD), population modeling techniques, and software.

Any specific supplementary skills or training you can name that a person pursuing this profession should acquire?

If you cannot do a postdoc or if you want a head start, I recommend the following: read a basic book on PK/PD; read the tutorials on pharmacometrics on the American Society for Clinical Pharmacology and Therapeutics web site; go through a few of the Metrum Institute semester-long courses available on YouTube for free, including those for R, WinBUGS/OpenBUGS, and Population PK/PD.

Where can people find out more about your profession?

You can look for job listings on company web sites, or you can search online to find a recruiter to help you. LinkedIn is an important resource in this field. You should make a good profile with a photo, and link to people you meet. Include a reminder of where you met when you send your link request. A good place to meet both professionals and recruiters is the annual American Conference on Pharmacometrics.