MATH Drives Careers

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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 actually enjoyed math quite a bit as a kid—attending math and programming camps in the summers. I defaulted to being a math major since it was my favorite subject, but I knew nothing about career options. I intended to become a mathematics professor since it was the only job that I knew about. Eventually, I came to learn about many other options, like the job I have now as a researcher in a national laboratory.

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? Any obstacles you needed to overcome?

It was pivotal for me to participate in the NSF Research Experience for Undergraduates after my junior year of college and to work summers as an intern as a graduate student. This broadened my perspective on research and computing, not to mention looking great on my resumé.

CAREER/CAREER PATH

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

My current position is as a researcher at a national laboratory.

What is a typical day at work for you? Please list your job responsibilities. What are you responsible for?

An ideal workday involves working on current projects—brainstorming with colleagues and visitors, coding or testing new algorithms, and writing and reading papers. During the summer, I get that added bonus of working with student interns.

Most of my work is for government sponsors, so I interact with them to understand the problems they are trying to solve. Typically, the problems we work on are so difficult that they are not even well defined. At least as much time goes into defining the problem as goes into solving it.

I also spend time thinking about the future—planning future research activities for my own team as well as being involved with larger planning efforts involving larger groups of people looking at the direction of the field and new areas for investment.

I travel regularly to speak at international conferences, to attend various workshops, and to visit collaborators.

Finally, I spend time on service activities such as planning meetings and workshops, mentoring, editorial activities, etc.

What do you like best and least about your profession? What is the stress level associated with this type of position?

There's probably no better career than being a research mathematician. Generally my work is to find important but difficult problems and then come up with ideas for solving them. This may seem stressful, but applied math researchers chip away at the problems piece by piece until we come up with a (partial) solution. The best ideas usually involve collaborating with people with different backgrounds, from very theoretical to very applied.

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

I believe in hard work but also work-life balance. Being rested, in body and mind, is critical for creativity. In additional to my regular job, I am a certified yoga teacher and teach a weekly vinyasa flow class.

CAREER EXPECTATIONS FOR YOUR FIELD/POSITION

How/why are applied mathematics and/or computational science important to your industry? How are they used?

I work at an engineering lab, and the engineers know quite a bit about mathematics, algorithms, and computing. The engineers turn to applied mathematicians and computational scientists when they have problems that can't be solved by existing methods, oftentimes because they want to scale to new levels of fidelity. More and more often, we are also assisting in large-scale data analysis, using a combination of numerical and statistical techniques.

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

Computational science is still a growing area, involving mathematicians in the development of complex simulations. Now there is an emerging area of computational data analysis, which often complements the work in computational science.

ADVICE

If you could advise someone currently pursuing the same degree or profession, what would you say? What are some steps you would recommend to students, or to those in their early careers, that perhaps you wish you had taken earlier? Are there things you would have done differently?

Having strong coding skills will open many doors—be sure to take classes that involve scientific coding projects. Experience in MATLAB or Java is a great starting point. Knowing C, C++, or Fortran is critical for scientific computing. Knowledge of parallel computing theory and practice is also an extremely marketable and rare skill. With an uptick in the mathematics of data sciences, we are also looking for people with training in statistics, machine learning, and experience with real-world data.

It's also useful to have some complementary coursework and/or experience in an application area like engineering, biology, chemistry, computer science, and so on.

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

Internships and other summer experiences are a great way to get a feel for other research topics and career opportunities.