

My Career as a Mathematician

While teaching mathematics is one obvious career choice for a mathematician, what else is there? This is about my career and its mathematical aspects.

Despite having been offered a professorship I would have loved, I declined it for personal reasons relevant at the time. While I have a degree in mathematics my most advanced degree, a PhD, is in Computer Science. I concentrated on mathematically oriented courses and so I did my dissertation, formulating new mathematical features for 3D recognition.

I consider myself a mathematician first and foremost. I spent my career in industry developing mathematical and engineering software. I also did the occasional purely mathematical analysis as needed and wrote internal reports of my results.

One analysis was suggested by a colleague, namely that I analyze the mathematics of a certain ad hoc, industry standard procedure. It sounded useful and I agreed, each of us expecting several pages of mathematical results. To our mutual surprise, when done I had written twenty-two pages of analysis, found a new method of computing something that led to a patent and showed how the ad hoc procedure could be systematized.

The new method should not have been patentable, but the US patent system is fundamentally broken and for self-protection every company must do what every other company does. Despite a Supreme Court ruling that “merely clever engineering” is not patentable and that I support, this is not even paid lip service to by the US Patent and Trademark Office (uspto.gov). The patent was granted.

A few years earlier I had an idea for a new algebra dealing not with numbers or functions but with diagrams of a certain kind (called “eye diagrams” from their general shape). I attempted to use my new algebra to develop a fast algorithm for computing these diagrams for a certain non-linear system we were then working on. In context, fast meant anything faster than perhaps a week (168 hours) of computation but I failed in the attempt. In failing I foolishly put the algebra aside.

A colleague had followed my work. With minor assistance from me he successfully applied the algebra to linear systems, developing a fast algorithm computing these diagrams for any linear system. Whereas previously there was an algorithm taking two days, an initial implementation of the new algorithm took only four seconds. Very satisfying.

My company correctly decided no one else in the industry had the mathematical background to invent this and decided to save money by not bothering to patent it. Grrr. The corporate world is not the uniformly horrible environment the comic strip Dilbert makes it out to be, but things like this do sometimes happen.¹

In case it is unclear, I am not trained as a research mathematician. My formal degree is a Bachelor’s although by now my knowledge is equivalent to that of a Master’s. I could not and did not advance key theoretical frontiers. All my work was applied to some specific. I did find that using the mathematical tools at my disposal was just plain fun.

Most of my days were spent developing high tech software alongside colleagues trained in an engineering field. Software and electrical engineers mostly but the occasional mechanical or other kind

¹ I have since learned of two instances of case law saying in situations like this, patent ownership reverts to the inventors upon leaving the company despite any employment agreement to the contrary. I read one of the rulings and found it made sense, the idea being that the purpose of patent law is to ensure knowledge is brought into the public domain. A company

cannot bury knowledge, not even out of foolishness. Rather than pursue the patent I am more likely to submit a paper on the new algebra and algorithm to a journal. Not having ideas lost is important to me.

of engineer. Lacking their engineering knowledge but possessing the mathematics required by their fields, I could understand with little instruction enough of what their fields were about in order to be useful. And having more mathematics meant I could contribute in unusual ways. For one group of colleagues I gave a talk on error-correcting codes at a level substantially more advanced than presented in this book. I believe they found it useful.

I was certainly a respected member of that team, one of several teams I enjoyed being part of and now miss in retirement. To any young people who love mathematics and are considering becoming mathematicians, I can tell you I found it both rewarding and respectably remunerative although you are unlikely to get wealthy.

It is hard to get a job when you are just a mathematician for few think to hire a mathematician and fewer know how to evaluate one. Having a computer science degree got me interviews and usually job offers. Only later would companies make use of my mathematical talents.

The one disadvantage I now have in retirement is that people who learn I am a mathematician are utterly convinced I worked with numbers, so usually I say I'm a retired programmer. In addition to not being inaccurate it is something they understand.