Spotlight on Hidden Physicists

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The Law Scholar

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My undergraduate physics degree helped to launch my legal career in a very concrete way. It got me admitted to a school I am fairly sure I would never have had the opportunity to attend had I majored in almost anything else. My grade point average coming out of college was lower than any of my classmates at Columbia Law School. Yet they all had history and political science degrees. Because I was a physicist, I did not need to be quite as “perfect” as my classmates to get admitted.

Once in law school, it became clear why. I was better prepared to meet the expectations imposed upon me by my professors. It seemed as if many of my classmates were unaccustomed to working long hours to prepare for class. They preferred to study as little as possible and, just before examination time, spend several sleepless nights in preparation for the big test. That does not work in law school, and nobody who has attempted a physics experiment or spent even a little time in a working lab would think it works in science either.

“My degree in physics also provided various intangibles that tend to play in my favor. A junior partner at the firm where I began my career was interviewing me and noticed that I had a degree in the sciences. He asked me if I knew why spiders tended to inhabit his window but not the windows of his colleagues across the hall. Of course, that has little to do with physics, but the partner in question seemed to assume that science majors know everything scientific that there is to know. I hazarded a guess: namely, that his window was on the north side of the building and thus had less sunlight than those of his colleagues on the south side. He was so impressed, he told me years later, that he strongly recommended me for a position on the basis of that answer alone! I still don’t know if I was right, ironically enough.

A few years later, the same firm sent me to Indonesia to work on a very high-profile arbitration involving a major client because the dispute involved a power plant. My firm figured I could understand the generation of electricity from a steam turbine better than anyone else. I was able to take advantage of this opportunity in order to move on to the next phase of my career as a law professor, a job I have held happily for the last seven years. In many ways, I owe it all to physics.

Now I tell virtually anyone who enjoys science to get themselves a bachelor’s degree in physics.”
Like many physicists, I have always enjoyed learning and discovering how and why things work. I majored in physics and computer science at John Carroll University in University Heights, Ohio, and after graduation, I developed prototype software for cockpit displays at Rockwell Collins. After a few years I had a better sense of what I truly wanted to do. I wanted to work on visually integrating physics and computer science in a way that would entertain people. So I earned an MS in computer science at the University of Iowa in Iowa City, focusing on computer graphics.

I then applied for a variety of jobs in computer games, visual effects, and animation. Fortunately, I landed a job at Walt Disney Animation Studios, where I’ve been ever since.

I started at Disney in the software group developing lighting and fur-generation software. After becoming interested in the artistic side of production, I was a lighting artist on *Chicken Little*. An almost entirely artistic position, the role required me to think about ways that light ought to physically behave in a scene to achieve the artistic goals set by the director.

I continued in both lighting and shader development roles on the next several shows. The fascinating aspect of shader development was writing code that described how objects made of different materials interact with light in a shot. I was algorithmically describing the physics of the computer world in an artistically controllable way. This synthesis of my technical backgrounds and my newfound artistic skills was a great way to bring together everything I had learned over my education and career.

Today I am the technical supervisor on *Zootopia*, an animated film scheduled to open in the spring of 2016. In this role I coordinate all the research and development for the film; I work with our technology groups on tool and process enhancement, supervise the technical directors on the show, and do show-specific research and development. As we move into production, my role will transition to ensuring that artists are able to keep working smoothly and any technical hiccups are short-lived.

As I try to provide artists with a tool set that is physically plausible but artistically controllable, I am constantly referring back to my background in physics. The basic problem-solving skills I learned in physics have served me well and helped me to understand the fundamentals of how things work. They’ve given me a broad base of knowledge with which to face the challenges I’ve experienced in a variety of roles at Disney.

“I am constantly referring back to my background in physics.”
I knew even before starting college that I wanted to study physics. What I didn't know was just how much a degree in physics would open career doors for me.

Coming from a family of scientists, I became interested in physics at a very young age. Exploring the field was always something that was encouraged and supported in my family, especially by my grandfather. He had an amazing way of making anything from cosmology to electrodynamics part of our dinner conversations. So when I started at the University of Virginia in Charlottesville in 2010, studying physics seemed like a natural fit. I became very involved with the university’s SPS chapter and its weekly Friday speaker series, in which guest lecturers spoke about their work.

While I enjoyed learning about theory, it was the applications of physics that really captivated me. Whether it was hearing about medical physics, nuclear engineering, or even the physics of climate change, I was continually impressed and amazed at how widely physics could be applied.

The summer after my third year, I studied international economics at the University of Oxford. It was there that I discovered an interest in economics and financial markets. I realized that the skills I had learned in the physics department were applicable to financial analysis. Calculus is the second language of the physics major, and my understanding of underlying mathematical concepts made the finance learning curve quickly scalable.

When deciding on a career, I wanted to find something that utilized my technical and analytical abilities in a dynamic and fast-paced setting. So I moved to Wall Street. While this might not seem like a typical career choice coming from the sciences, I believe my physics background more than adequately prepared me. My training taught me to tackle complex projects in an unbiased and analytical manner, rather than be intimidated by them. It also taught me to solve seemingly complicated problems by breaking them down into their constituent variables. Thanks to these skills, I was able to quickly learn how to analyze equities, derivatives, rates, and fixed-income securities to become a licensed broker.

I joined the Citigroup Institutional Clients Group after graduation and currently work there as a sales and trading analyst. The hundreds of computers, phones, and televisions on Citi’s New York trading floor provide an extremely intense and energetic work environment. I handle the analytics for our team; it is my job to understand and create metrics around investment trends in the hedge fund industry.

In New York I have met many other professionals in finance who made a similar switch from physics. I didn’t realize just how many hidden physicists were hiding out on Wall Street! 🎓