Interview with an Optics Luminary

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Educated in physics, optics and law, Bill Greener is a gentleman farmer, small business investor and partner with the law firm of Bond, Schoeneck & King, PLLC.

OSA-RS: Please tell us about yourself.

Bill: I can remember, as far back as the age of nine or ten, wanting to grow up to be a physicist. In seventh grade, I did a poster report on the laser, but I didn't realize then that optics would be prominent in my life over the next fifty years. As a sophomore majoring in physics at Canisius College, I and a senior physics student built a four-foot-by-eight-foot sandbox in a windowless basement lab, set it on inner tubes, melted lead to make our own lens bases, constructed a dark room, and a year or so later made a hologram. We were able to publish a note in JOSA. I was lucky to have a supportive and enthusiastic advisor; with his help we made apertures and studied diffraction patterns. By the time I was a senior, that windowless basement room had become a teaching optics lab.

I turned down an offer to go for a PhD in physics at Notre Dame and instead attended the Institute of Optics at the University of Rochester, where I earned an MS degree in Optical Engineering. My roster of instructors included Brian Thompson, Rudolph Kingslake, M. Parker Givens, and post-doc Duncan Moore. I did grad student labor in another basement lab with Moshe Lubin on a laser project that evolved many years later into the Laboratory for Laser Energetics.

In 1976, I accepted a job offer from Pratt and Whitney Aircraft in West Palm Beach. At a remote site in the Everglades, past two checkpoints of armed guards and with a 'secret' clearance, I was part of a team that built and tested the closed cavity of MIRACL (Mid-Infra-Red Advanced Chemical Laser). This was a hydrogen-fluoride gas-dynamic laser whose thirteen-inch cavity mirrors were cooled by jet fuel. We also developed Shack-Hartmann wavefront sensors for control of a giant deformable mirror that the Naval Research Laboratory was building. The idea was to shoot the laser at a target, measure and correct the wavefront errors of the reflected light, and focus that 'mother' on the object to be obliterated.

After five years, 'greener' pastures were calling back in New York, so my wife and I packed our van, enrolled in the agriculture college at SUNY Alfred, bought an abandoned farm in Steuben County, and farmed embryo transfer dairy calves for the next eight years.

Motivated by other untellable events, we both applied to law school. I flubbed my LSATs and spent the next 18 months at White Sands Missile Range working as an independent optical engineer for United Technologies Corp (the parent company of Pratt and Whitney Aircraft) with my old friends who were now shooting down Army fired missiles with MIRACL. At the time, MIRACL was the most powerful CW laser in the 'free world,' boasting a then-classified focused output of 2 MW/cm^2.

Finally, in and out of SUNY Buffalo law school, a federal court clerkship with Judge Telecsa, a three-year stint with a small patent boutique law firm in Rochester, and off to Corning Inc. where I was a senior patent attorney in charge of their worldwide erbium-doped fiber amplifier portfolio during the frenetic years of fiber optics. As a patent lawyer in a high tech company, you spend a good portion of your time with scientists and engineers. Corning had some of the best; my office at Sullivan Park was a few doors down from Don Keck, an optical fiber pioneer.

After five years, the dot-com hurricane hit and Corning sold most of its photonics business. I left Corning, very briefly joined Kodak, and then went to Bausch & Lomb, where I managed the ophthalmic laser surgery portfolio whose technology base was in Munich, and worked on ophthalmic wavefront technology that fortunately provided lots of interaction with David Williams at the U of R.

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I left B&L and joined Bond, Schoeneck & King, opening the Ithaca office in 2005. Bond is a 'business-based' law firm headquartered in Syracuse that has been in business since 1897. With over 200 attorneys, we are the largest law firm in New York state outside of New York City. We have a significant intellectual property group that includes ten US-registered patent attorneys. My primary clients include the University of Rochester, Cornell University, and University of Central Florida/CREOL. Some of the exciting technologies I work on include multiphoton and computational imaging, ophthalmic biodynamics, nanophotonics, micro- and opto-fluidics, quantum optics, and collapsible plastic containers.

OSA-RS: How did your scientific background prepare you for law school?

Bill: I decided to go to law school when I was 37. Equipped with an MS in Optics, two years of teaching freshmen physics and optics at SUNY Alfred, eight years on the farm, and eighteen months in the White Sands desert, I entered law school with a chip on my shoulder ... a 'styrofoam' chip as it turned out. Well, not quite, but the majority of my fellow first-year law students were straight out of college, meaning most had sparse life experiences. One would think (as I did) that it would help a new lawyer significantly if he had a little meat on the bones of life before going out to earn a living trying to understand and fix clients' problems like loss of freedom, loss of money, and even loss of life.

Law school does not teach someone how to be a lawyer, but if you have an engineering background it does teach you that 2+2 pretty much equals whatever you can convince certain others what you want it to be equal to. Facts are always facts, but the laws are different in just about every jurisdiction; and the application of the 'law' to the facts has a way of generating outcomes that are not always expected.

Realizing soon enough that law school was (again, to me) an anomalous, nonlinear, round-cornered bubble, I took a systemic approach to problem solving; that is, I tried to shape the legal dilemmas thrown at me into broad systems of problems and solutions that I previously encountered on the laser range or on the farm. My farm, especially, was like a huge living laboratory. There were animals to take care of, equipment to run and maintain, crops to grow and harvest, accounts to balance, and countless other things, which daily formed a long line waiting to get into the theatre of 'what could possibly go wrong today?' OK, one day the token billy-goat gets the metal tag-ring on its collar encircled around the live electric fence wire at the far end of a six acre pasture. I believe that experiences like these taught me best how to deal with the empirical inequalities of legal reasoning.

Fortunately, however, the practice of patent law is as much science as it is law. If it weren't for that, I might still be milking cows.

OSA-RS: What does a patent lawyer do?

Bill: A patent attorney can and does wear many hats. Two practice areas, however, that tend to be mutually exclusive (although not tactically or strategically) are patent 'prosecution' and patent 'litigation.' Although an attorney does not need to be a 'registered' patent attorney to litigate a patent dispute, an attorney does need to be a 'registered' patent attorney to practice 'patent law.'

Patent prosecution spans the alphabet from first hearing about an idea or concept to obtaining a granted patent, ideally one that will withstand any potential litigation assault during its twenty-year lifetime (this is where the 'tactics and strategy' connections link prosecution and litigation).

A basic concept is 'ideas are not patentable.' Assuming the legal criteria for a patent can be met, patentable subject is limited under US law to

a) a Process – an act, or a series of acts or steps to produce a given result;

b) a Machine – a concrete thing, consisting of parts, or of certain devices and combination of devices to perform some function and produce a certain effect or result;

c) a Manufacture – an article produced from raw or prepared materials by giving to these materials new forms, qualities, properties, or combinations, whether by hand labor or by machinery; and

d) a Composition of Matter – all compositions of two or more substances and all composite articles.

Specifically excluded from patentability are laws of nature, physical phenomena, and abstract ideas. There continues to be active controversy at the Supreme Court level over the patentability of algorithms, methods of doing business, and human organisms.

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So, what is it I do as a US registered patent attorney? Generally speaking, I'll be contacted by a potential new client or receive an invention disclosure from an existing client. I then like to meet with the inventor to flesh out the details of the invention and determine the most commercially valuable form of the invention for which we will apply for patent protection. This often involves commissioning a patentability search through a professional search firm and then analyzing the results both technically and legally to determine how best to proceed. At this stage I like to draft the broadest claims covering the commercially valuable aspects of the invention that I believe would be patentable over the prior art of which I am aware.

Once I and the inventor (and often a licensee) are comfortable with the content and scope of the patent claims, I prepare the specification and drawings. It's important to know that the 'claims' of the patent are the 'legal definition' of the invention (intellectual property), just as the deed and survey provide the legal definition of 'real property.' Claim wording, therefore, must be mindful, prophetic, and 'right.'

We electronically file the application in the Patent and Trademark Office (USPTO) and then wait for twelve to eighteen months (or longer) to get our first substantive response, which in 99% of the cases is a rejection of the claims. The examiner will do a search and provide reasons and references that she believes render the submitted claims 'obvious' and/or not new (novel). My job is to respond to this and convince her otherwise, preferably with my arguments and without amending any claims or, by amending claims if absolutely necessary (there are significant legal implications to amending claims). If successful, the examiner sends out a 'Notice of Allowance'. We pay an 'Issue Fee' and the applicant is subsequently granted a patent 'on the allowed claims.' I will say that the process I have described is a sugar-coated version of what actually happens. The law has become so intricate and nuanced that an "a" or an "it" can make or break fortunes.

A 'patent agent' is a properly qualified person who has taken and passed the 'patent bar exam.' A patent agent can prepare and file patent applications on behalf of an applicant, but not being an attorney, cannot provide a client with a 'legal' opinion about the 'patentability' of an invention or the 'validity' of an issued patent, for example. As a patent attorney, I also provide opinions about a client's right to use their invention, whether patented or not, and their risk of being sued if they do make it, use it, sell it, or even offer it for sale. I prepare confidentiality agreements, review contracts, prepare license agreements, and every day do what all attorneys do – advise their clients of the risks associated with prospective actions.

It's hard for me to imagine a more interesting, challenging, and satisfying way to spend my working days. I love the technology, interact with incredibly dynamic people, and operate potent legal machinery to get results that potentially impact the world; great stuff!

OSA-RS: You've described a career that many optical engineering students might not think of.

Bill: As a kid mystified by the mathematical language of science, a high-schooler determined to become a physicist, a rebellious college physics major, and a study-drunk grad student, I thought science and engineering existed independent from, and superior to, everything: business, politics, even religion. My days as a corporate engineer employee, a government subcontractor, a self-employed farmer, and much later a seed stage investor taught me how essential integration of, and interdependence with, business, politics, even religion is to successful results.

In 2008 I joined with 41 other investors to form the Seed Capital Fund of Central New York. One evening every month, a few entrepreneurs would make their pitches to us to invest in what truly were some very interesting dreams, plans, and products. As investors with too little time and too little money for too many things, our collective inner voice chanted "make it easy for us to say NO." Many reasons made 'NO' an easy answer; the takeaway being that the coolest, sexiest technology cannot exist nor succeed independently of good business, politics, and definitely a lot of praying, faith, and hard work.

Practicing patent law enabled me to integrate my love of science and engineering with tools that make great technology accessible and sustainable. I encourage anyone with a passion for technology and a presence in the real world of today and tomorrow to explore the career field of patent law. I'm happy to speak with anyone having such an interest. ■