Good Engineers Can Make Good Lawyers

Jason Balich, JD ▪ Wolf Greenfield

When pondering what to do with your chemical engineering degree, consider law. Many engineering skills prove valuable in a legal career as well.

The best career for any individual is, of course, one that they love. For some with a chemical engineering degree, that means becoming a practicing chemical engineer and designing new products and processes. But chemical engineers have a wide diversity of other possible career choices, including medicine, consulting, and law.

In the legal field, chemical engineers are particularly well-suited for roles such as patent prosecutors or litigators. Patent prosecutors and counselors analyze complex problems daily, break them down to their core elements, and persuasively suggest business-minded solutions to top-level management in the C-suite. Patent litigators protect manufacturers' technology and defend their freedom to use those technologies in court.

Chemical engineers who are considering a career in the legal profession may be surprised to learn just how fun the career can be. It's a career that I fell in love with, and many others I spoke with in preparing this article agree: a career in law is one that they love and think you might too. Read on to learn what chemical engineers in the legal field love about their jobs, the engineering skills that help them excel in those roles, and some of the perks of a legal career.

A career in law can be fun

Legal employment ranges from working for a company (*i.e.,* in-house), to working for a private law firm, to working for a government agency such as the U.S. Patent and Trademark Office (PTO). Within each type of employment, a wide range of positions are available for someone with an engineering background. Technology specialists assist patent agents and attorneys in understanding specific technologies. Patent agents work with inventors to obtain patents from examiners at the PTO — a process called patent prosecution, which is not to be confused with criminal prosecution. Intellectual property (IP) attorneys prosecute patent applications, counsel clients about IP strategy, and protect manufacturers' technology. IP litigators defend a client's freedom to use their technology in court. Each type of position and employer has subtle differences that make them fun and interesting in different ways.

Patent prosecution is like playing a game

Patent prosecution is the process of drafting patent applications that describe and claim an invention, and then filing those applications with the PTO in hopes of eventually obtaining an issued patent. Once filed, the patent applications are assigned to an examiner (*i.e.,* a person at the PTO who has a technical background in the technology that is the subject of the application) who then reviews the application to ensure it is allowable. Claims define the bounds of the invention that will be protected if it becomes a patent. An examiner will often reject the claims of an application. A rejection then requires that the patent prosecutor (the agent or attorney) either convince the examiner that the rejection was improper or amend the claims so that they will be allowed. Many patent prosecutors revel in this back and forth with the

examiner and describe it as if they were playing a game.

Rachel Lin, an adjunct professor at Fordham Law School and Counsel at Tarter Krinsky & Drogin in New York, NY, says, "I like the back-and-forth moves and countermoves with the patent office." As an undergraduate at Princeton Univ., Lin's favorite part of working in the lab was writing up a report after all the experiments were completed. Her love of writing translated well to talking with inventors, writing up their work in a form acceptable to the patent office, and then strategizing how to draft the claims. According to Lin, "it becomes almost like a game of strategy with the patent office to anticipate what rejections the examiner will make and to know how to respond to those rejections."

Jason Ploeger, a patent agent at Air Products who holds a PhD in chemical engineering from Massachusetts Institute of Technology (MIT), likens prosecution more to "a word puzzle," where he constantly asks: "What does each word mean?"

Brandon Blackwell, another MIT PhD chemical engineer and a Shareholder at Wolf Greenfield in Boston, drew the analogy to a game of chess where "you are always trying to think two or three steps ahead of your opponent. In playing the game, you may need to make some sacrifices, but you are always trying to keep your eye on winning the end game for your client."

Whether working at a law firm or for a company in-house, patent prosecution can offer the same excitement and strategy of playing a game day in and day out.

If prosecution is a game, litigation means war

Patent litigators enforce the patents that the prosecutors obtained — protecting the patents' owners against infringers (*i.e.,* individuals and companies that practice the patented invention without permission) — and defend the falsely accused. A litigation team may consist of several individuals, including technology specialists who are experts in a particular field, patent attorneys, testifying and consulting expert witnesses, and a variety of support staff.

Litigation is the legal profession's closest thing to waging war. Litigators speak in terms of "torpedoing the enemy" and "crushing" their opponents. While litigation often involves long and unpredictable hours, the fun reward in litigation is the win after all the hard work.

A win can take many different shapes. Winning may mean delivering a jury verdict for millions of dollars. A win might mean overturning that verdict on appeal or negotiating a favorable settlement before the case ever gets to trial. Often though, victories come in smaller forms, such as spending a week of sleepless nights searching for and finding a particularly good prior art article — one that predates a later issued patent asserted in a litigation — to invalidate the asserted patent. Other small wins could include putting together a winning oral argument for a motion or even prying an admission out of a reluctant witness. In each instance, a significant amount of hard work pays off in a single moment, bringing meaning to that work.

For some, nothing is more fun than the battles waged during litigations, and those who love litigation would gladly give up the more predictable schedules and lifestyle of a patent prosecutor in a heartbeat. If litigation sounds terrifying, you may be better suited to a life working in-house or with a government agency.

Life in-house delivers variety

Working for a company in-house can be a great fit for those looking for a more predictable way of life that still delivers a rewarding career in law. In-house patent agents and attorneys are often called upon to answer interesting, challenging, and varied questions from their internal clients. Variety can be a fun perk when working in-house.

"Variety is the spice of life," says Patricia Ades, an AIChE member and in-house attorney at J.M. Huber. Ades began her career at an environmental engineering firm, but a restructuring gave her the opportunity to rethink her direction. She went to law school and was hooked on IP law from her first class on patents. Today, Ades works on a variety of IP-related work, including IP licensing agreements, merger and acquisition work, and litigation. Ades explains that "practicing chemical engineering on an assembly line, you see variations on a theme," but as an IP attorney, "I get to work with different technologies and a variety of people on a regular basis." She enjoys seeing many different problems and the creativity required to solve them in a practical way.

Jason Ploeger also enjoys a wide variety of work as a patent agent at Air Products. "I enjoy sitting down with inventors and asking the dumb questions. If an inventor tells me a product stream is split in two, I ask, 'Why just two? Why not three or four?'" The sheer number of engineer and scientist inventors that Ploeger supports ensures a constant stream of new ideas and IP that he helps protect for his company.

Other benefits of working in-house include not having to track billable hours and a more predictable lifestyle, including the ability to plan vacations without fear that an onslaught of work will unexpectedly arrive just as the vacation is about to start.

The skills that make good chemical engineers make good lawyers

Not only is work in the legal profession fun, but many of the skills that make a good chemical engineer can also make a good lawyer.

Analyzing complex problems. If a complex technical problem needs a solution, chemical engineers have the training and experience to solve it.

When I was a product development engineer at 3M, I was routinely tasked to think critically about how to improve the throughput or yield of a process, or perhaps a product's performance. I had to come up with a hypothesis about how the improvement could be achieved and then test that hypothesis to see if I was right, which included developing a project plan and estimating key milestones for phase-gate reviews. I then used Six Sigma methodologies to design experiments, collect data into spreadsheets, and analyze the data to prove (or disprove) the hypothesis.

It turns out that those skills are the same ones that are useful as a lawyer. Most legal issues have a set of elements that must be satisfied to establish something to be true — very much akin to proving a technical hypothesis. For example, for a product to infringe a patent claim, the accused product must meet each and every element recited in the claim. But how do you know if it does? You know by testing the product to see if it meets the claim elements and carefully reviewing the product's documentation (manufacturing processes, specifications, user manuals, etc.) to muster the evidence needed to evaluate whether each claim element is met. This is just one example — the law is full of such element-by-element analysis.

"Lawyers need a problem-solving mindset," says Ades. "They need to be methodical, and have the same inclinations as an investigator." In addition, being an IP attorney requires you to dig into the technology and know what questions to ask, she asserts.

Rachel Lin adds that proficiency in Excel can be helpful. "Data from inventors is routinely presented in Excel and needs to be shown and explained in the context of a patent application," she explains.

An engineer's mastery of problem solving, the scientific method, and data analysis are all readily transferable to solving legal problems.

Explaining technology to laypeople. Also readily transferable is an engineer's ability to explain highly complex technology to others who have no technical training whatsoever.

When I worked as a marketer after my engineering career, I was astounded by how little my fellow marketers understood about the technology of the products for which they were responsible. I found myself explaining the technology to my coworkers (and then customers) in readily understandable terms using real-world analogies. Those same skills have become valuable as a lawyer not only when I need to explain complex technology to laypeople, but also when I need to explain the law in readily understandable terms to business people, jurors, and judges.

Jason Ploeger remarks that "anyone can explain a technical or legal concept if given 40 minutes, but not many can provide the same level of explanation if given only four minutes, and exceptionally few can do it in four seconds — the trick is in honing your communication skills to be one of those few that can do it in four seconds."

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Being succinct has value. I recently participated in a mock trial where laypeople were presented with opposing sides of a patent infringement case. The mock jurors were then video recorded to see what resonated with them. In their discussions, they better internalized short explanations using real-world analogies over longer explanations, even if the short version came at the cost of omitting some of the technical complexity that we engineers love.

Whether the listener is a business person, juror, or judge, laypeople demand a succinct and understandable explanation of the technology or law before their attention wanders. Chemical engineers often already have the valued skill of communicating the highly complex in simple and succinct terms.

Perseverance and a touch of healthy skepticism. Rarely does every experiment work or every hypothesis turn out to be true. Engineers are thus instilled with a level of perseverance and skepticism to see a project through and ensure that scientific conclusions are scientifically supported by data. The same is required of those in the legal profession.

Tom West, a registered patent agent who has an MS in chemical engineering from Rutgers Univ. and extensive experience with start-up companies, explains that engineers are "trained to think logically and objectively — a mental discipline that can be applied to the legal context." He adds that "if most people were to pick up the Code of Federal Regulations (CFR), their eyes would glaze over. However, engineers have experience reading and understanding complex documents, which is useful for reviewing regulations in the CFR for patent law and for other legal specialties as well."

Patricia Ades agrees: "Engineers who become attorneys tend to be more objective than other attorneys due to their technical training — they see all sides of an issue." Jason Ploeger describes this trait as the "engineering instinct."

Other perks of a legal career

Although, as Ades notes, "every career has its warts," a legal career has several other perks beyond its fun, fast-paced nature.

Learn cutting-edge technology without a day in the lab. As engineers, we love learning about unfamiliar technology, but sometimes running all those designed experiments can be

less than fun. Working as a product development engineer at 3M, I averaged one patentable invention per year. Now, as an IP attorney, I get to learn about new-to-the-world technology on a daily basis. A career in law allows exposure to new technologies that you would never have dreamt about, and you do not even need to be the one who invents them.

Often, there are no strings attached to get started. What many people do not know is that it is often possible to dip your toes into a legal career without any strings attached.

If you are still in college or getting an advanced degree, most universities have a tech-transfer office that looks to monetize the intellectual property that the university owns. They may have part-time jobs for students where you can get actual experience in analyzing IP and get paid for it at the same time.

If you are currently working in industry, seek out the person or department that is in charge of your company's IP. At a minimum, you can ask about the work they do and their experiences in an informational interview. Or, better yet, ask them if you can get involved. Tasks typically include working with inventors to draft invention disclosure documents, reviewing competitors' patents as part of a freedom-to-operate analysis, and reviewing the company's own IP to ensure that it is protecting all that it can and should be. Such experience can help inform you as to whether a legal career is right for you.

Lastly, several well-known law firms (including my own) offer technology specialist programs where individuals with a technical degree are trained as patent agents and are paid to go to law school part-time. You will eventually become a patent lawyer without ever paying a dime for law school. Even if you later decide that you don't like the work, there is virtually no downside because you will have no law school loans to repay, and you could always go back to your role in research, teaching, or industry. And, you might even be more valuable in those career paths with your experience in a law firm. Few other careers offer such a "try-before-you-buy" approach.

JASON BALICH, JD, is a trial and appellate lawyer at the law firm Wolf Greenfield, based in Boston, MA. He has a BS in chemical engineering from Princeton Univ., an MBA from Bentley Univ., and a JD from Quinnipiac Univ. School of Law. He is the co-inventor of four U.S. patents from his time working as a product development engineer for 3M Company. He was recognized in the inaugural "Best Lawyers: Ones to Watch" list by *The Best Lawyers in America* and has been repeatedly named to the list of Massachusetts Rising Stars by Super Lawyers.

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Law pays well too. While picking a career you love is more important to long-term enjoyment than the financial side of the equation, the pay for those in most areas of the legal profession is generous. An old adage says that the only difference between a chemist and a chemical engineer is that the chemical engineer gets paid twice as much. It should be no surprise then that a chemical engineer who is also a patent attorney gets paid even more.

Find out more

A career in law is an option for any chemical engineer — one that you may not have been exposed to as part of an undergraduate education, and one that may be more fun than you expect. If you are interested in pursuing this career path, you should seek out informational interviews with someone who will be frank with you (a sentiment echoed by all with whom I spoke in preparing this article); for example, speak to someone in a legal role in your company or an alumnus of your school. Those in the legal field are often happy to provide advice to help you evaluate whether a career in law is the right choice for you. CEP

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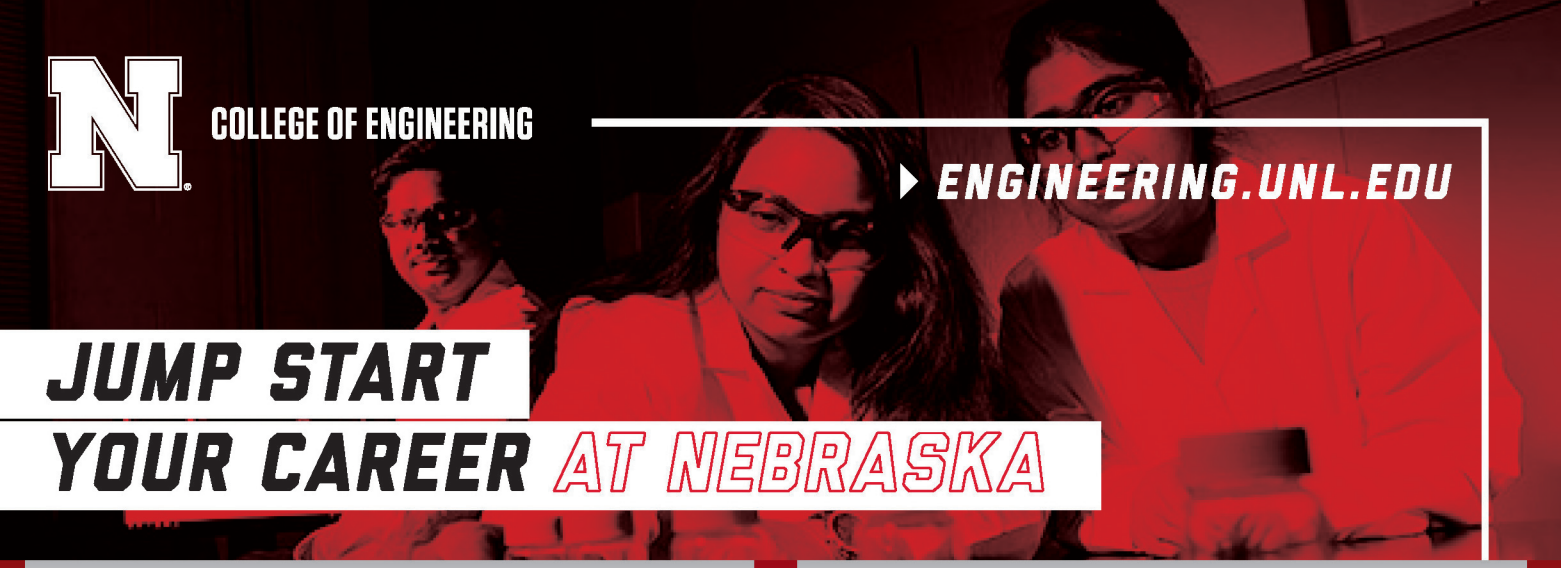

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