IT'S A GAME NOT A FORMULA

How to Succeed as a Scientist Working in the Private Sector

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Preface

Back in 2010, I published a book called *Turning Science into Things People Need*. It contained interviews with ten different scientists who had built successful careers in the private sector. I wrote the book during an extended job transition as something to do to fill the gap while I was looking for just the right opportunity to fit the new direction that I had decided to take my career. I didn't know for sure what I was going to do with the book once it was published. I had thought for some time that I'd like to write a book so that I could travel on a speaking circuit, and so when I met a publisher who was helping people create books based on interviews around a topic that excited them, I decided that the time was right.

The next task was to decide what I would interview people about as the core topic of my book. Since I was in the middle of a job search at the time, I had been reminded of the challenges a scientist faces when they decide to forgo the presumed 'conventional' career path of a professor and build their career path in the private sector instead. After a few weeks of consideration, I chose the subtitle 'Voices of Scientists Working in Industry.' By telling the stories of other successful scientists, I hoped I could attempt to open other young scientists' eyes to new career options and how to sell their unique scientist skills in the private sector. I knew that when I was nearing the end of my postgraduate studies, I would have appreciated a book that told the stories of other scientists who had built private-sector careers, and I had yet to find any other book that had addressed this topic. At the time, I was about a dozen years into my own career, and I knew many other scientists who had also build successful industry careers. They would give me a great pool from which to select interview candidates.

I had no idea where the journey that began with that book would take me. The seminar I put together to begin my speaking career focused on two key topics pulled from the book interviews: (1) jobs that scientists will enjoy and be good at in industry, and (2) the unique strengths that a scientist brings to the private sector. As I began traveling and speaking at universities, I learned so much more about where a typical university science education fails to prepare us for private-sector careers. When I left my job in early 2017 to found TurningScience, I spent time interviewing industry managers to learn their

perspective on how well early-career scientists made the transition into industry. From those conversations, I realized that many of the things we scientists were taught in academia actually work against us when we transition into the private sector.

I realized that we scientists tend to look for the 'right way' to do things. We are used to chasing after formulas and theories that describe the behavior of the universe, and this expectation that there is a 'right answer' tends to permeate much of what we do. But the world outside the controlled environment of the science lab doesn't work that way. It occurred to me that the colleagues of mine who were most successful approached their work as if it were a game, with rules that need to be followed but with no clear 'right way' to do things. They took risks, made decisions quickly, and didn't overthink things—fundamentally different from what the early-career scientists I'd worked with so often seemed to do.

I realized that what early-career scientists need even more than lectures on private-sector job descriptions and how to sell themselves to an industry manager is the understanding that the private sector is a game, and they need to learn to play it. That is how I came to write this book.

In the ten years since my first book was published, I've traveled all over the world lecturing to groups of scientists who are preparing to launch their careers. The one-hour talk that I gave in the early days of my book-speaking tour has since grown into multiple short courses, seminars, and two-day workshops. I've spoken to hundreds of science PhD students and postdocs, and conversed with so many of them about their career plans and job-search challenges. I've also interviewed many industry managers to learn where the biggest gaps are in the performance of the scientists they have worked with.

In my travels, I have visited a number of universities that are doing a great job showing their early-career scientists how important and valuable private-sector careers are. Many have excellent research programs that feature successful collaborations with industry. The Optical Research Center at Southampton University and the B-PHOT program at Vrije University in Brussels stand out as great examples. But unfortunately, many universities have still not fully appreciated the importance of helping their scientists transition into private-sector careers. They continue projecting the outdated view that most scientists will become, or should become, academic research professors themselves. This view is simply not reality, and it does significant harm to continue to promote it. Many PhD students still believe they should pursue academic careers as they approach graduation, and this hurts their career planning and potential. Furthermore, the lack of exposure to mentors with private-sector experience means that few scientists learn the important principles that are critical for their success in the private sector. Through my work with TurningScience, I encourage universities and PhD advisors that they need to prepare their scientists for the careers that they will actually have,

rather than continuing with the outdated view that most scientists will become professors.[1] There is still much work to do.

And in doing so, I hope we can remove the biases that promote views that either academia or industry are the only good career choices. This attitude is still far too prevalent, as illustrated by the following quote from one of the industry scientists in my first book:

> *In college, I had a professor who had a twin brother, and they had both gone to the same technical school in France. My professor continued on to an academic career, while his twin brother went into industry. The academic's perspective was that his brother may earn twice as much, but he was not discovering anything new. The one in industry looked down on his academic brother, thinking that he did work that didn't serve anyone directly.*
>
> – Antoine Daridon, PhD in Analytical Chemistry, Business Development and Marketing Manager at Metrolab Technology SA[2]

In this book, I express many opinions on both academia and industry, and these are in no way meant to disparage academia, nor suggest that the private sector is always a better career option for everyone. I've loved my career in the private sector and have known many others who found their industry careers exciting and rewarding, but I firmly believe that both segments are important to society. The private sector relies on new science coming out of academia, and academia benefits from the tools and techniques developed by the private sector.

In my work, I aim to project a better picture of both, in the hope that the participants in my workshops emerge with a better view of the need for cooperation between the two. I am also a proponent of collaboration between academia and industry.[3] Our best future is achieved with the academic sector in the private sector appreciate and respect each other, and work together. This means teaching new PhDs about both sectors, and that both sectors have tremendous value for our world. And it also means teaching PhDs how both sectors work and what working there is like, so that they can make the best-informed decisions about their own career paths.

The 'R&D Mindsets' concept that I propose in this book is intended to promote the appreciation of both the academic and industry sectors, as well as improving collaboration between the two. When scientists understand how the two worlds work and develop mindsets that enable them to be productive in both worlds, it will bring us closer to the desired outcome.

That is why I wrote this book. I hope you find it as valuable to read as I did to write.

David Giltner, PhD
Boulder, Colorado

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I'd like to acknowledge all the scientists and other private-sector professionals who shared their experiences with me, as well as the uncountable number of early-career scientists who have attended my seminars and workshops since I began this journey more than 10 years ago. Your stories are such an important part of this book, and your contributions will help so many scientists succeed by following your examples.

I'd like to thank my mother, Julie Giltner, for her never-ending support of my career and all that I have ever done.

Most of all I'd like to thank my partner, Eve Meceda, for her valuable support and encouragement throughout this book writing process, and in particular for being a wonderful companion through the COVID-19 pandemic, when I wrote this book.

Chapter 1
Introduction

What do you mean, 'It's a game?'

> *We're here to make a dent in the universe. Otherwise, why else even be here?*
>
> - Noah Wyle, playing Steve Jobs in the movie *Pirates of Silicon Valley*

We all set out to be scientists.

Most of us became scientists because we wanted to understand how the universe works.

Some of us wanted to use that knowledge to develop solutions that would make life better for us and our fellow humans.

This book was written for this second group of scientists.

I suspect that we all wanted to make our own dent in the universe. But as we pushed further into our early careers in science, many of us found that science research pushes slowly, that the dent it makes just wasn't big enough for us. Many of us realized that if we wanted to make a dent that we were satisfied with, we needed to hit harder and faster than simply publishing our research in scientific journals. So, we rejected the 'traditional' career path of the university professor, sometimes at the behest of our advisors, and we bravely entered the private sector. We were willing to take that risk in order to get that reward of a more satisfying dent.

Once we were in that first industry job, we learned that things work differently than in the academic research environment. We learned that success in the private sector requires different attitudes and habits than most of us picked up as graduate students. We learned that it's a game, and if we wanted to make our impact on the world, we'd better learn to play. I wrote this book to help scientists learn to play the private-sector game.

Chapter 2
Rules of the Game

How is industry different than academia?

Each of my private-sector career workshops starts with an interactive session that asks the participants to answer four questions. Their answers to these questions help me understand their backgrounds and direct the workshop more effectively. One of these questions is, 'How is working in industry different than working in academia?' From their responses, I've learned that many science PhD students are aware of a few of the major differences between the two environments. Most of them are aware that industry is about generating revenue, and many of them have heard that the pace of progress is typically much faster in the private sector than in academia. But beyond this, most PhD students don't know much about what industry is really like.

Of course, neither did I when I was a graduate student. When I decided during the last year of my PhD work that I wanted to build my career in industry, I realized quickly that I knew almost nothing about the environment where I decided to build my career. Because nearly everyone in the physics department had spent their entire careers in academia, there was no one to help me with my career planning. I remember the conversation I had with my advisor about my plans to work in industry, when she said, 'If you want to do a postdoc, I can help you. I have lots of connections and can help you get a great position. But if you want to go into industry, you are on your own. I don't know anything about it, and I don't know anyone who works in industry.' My advisor wanted to be helpful, but like so many successful academic researchers, she had absolutely no experience with the career path I had chosen.

Finding a job with no guidance was a big enough challenge, but once I started that job, the next few years were a very steep learning curve for me. I began my career at SDL, Inc., a company in San Jose, California that was developing semiconductor laser technology for a variety of applications. I was fortunate that they employed many PhDs, due to the cutting-edge nature of the semiconductor laser technology and the significant amount of research that was required to bring it to the level of a commercial product. Most of the

Industry: Persuasion

Industry is all about achieving results quickly. Only when a decision is made can a team make progress on one of many possible paths to achieve the desired results. The need for speed means decisions often need to be made without the luxury of certainty in the outcome. When proof is not possible, one relies on persuasion to move forward.

Data is important in the private sector, but many decisions are made without enough data to prove what the right decision is. There are two primary reasons for this. First, there is usually not enough time to collect a sufficient amount of data to be certain. If the team waits until the scientists collect enough data, the competition will have gained the lead and/or the customer will have moved on to another solution. Second, in many cases, no amount of data will show what the 'right answer' is.

Unlike the science lab, where researchers generally try to isolate a particular phenomenon so that it can be explained and predicted reliably, decisions in the private sector involve many additional considerations. Most of these additional considerations cannot be reliably predicted. These may include the future plans and decisions of their customers or of vendors who supply critical materials for their products. It may be that the value proposition of a new product depends on information that is kept private by the members of their target market. It may include unpredictable macroeconomic conditions or perhaps the unforeseeable impact of a global pandemic. And it certainly includes the fact that every company is a collection of human beings, each with their own private life that is impossible to predict. Rather than having too little time to determine the 'right answer,' the issue is that it is simply not possible to predict the outcome of most decisions in advance. It's best to consider that there is no 'right answer' to begin with.

Successful leaders in the private sector learn to make decisions quickly with limited data, and therefore limited certainty. They recognize the value of evidence, and they strive for 'data-driven' decisions when possible, but they realize that there is a limit to how much data can realistically be collected before they need to make a decision. They learn to move forward based on the probability of the outcome, rather than certainty. They work to get the odds in their favor and then move quickly.

And in an environment where you don't have enough data to prove your decision is the 'right' decision, you must persuade others to follow you. This is very different than academic research, where a scientist submits a paper for publication and expects that the referees will clearly see the merit of the paper and its conclusions based on the quality of the data and the analysis. Influence in academia is based on the quality of one's work, not the quality of one's argument. But in an environment where there is rarely enough data to do the talking, the scientist must speak for it. Persuasion and influence are critical to making progress.

Chapter 3
The PhD Stereotypes

How are scientists viewed by the private sector?

An Awakening

I didn't always plan a career in industry. In fact, for most of my academic career, I assumed I would become a professor. This was primarily because it was the traditional route for a scientist, and it just seemed like the natural career to follow when you have a degree in science.

But after five years of watching my advisor and the other professors in the physics department, I decided that career was not for me. I didn't like the idea of working in the same building, in the same office, with the same colleagues for the next 40 or so years of my career. I wanted something with more variety. Also, as much as I enjoyed working on fundamental physics research, I was beginning to feel a lack of satisfaction with simply producing publications that only a handful of people around the world would ever read. I wanted to make something tangible that people might use in a few years. I wanted to see the results of my work. So, I decided to head into the private sector.

I found my first job at SDL in San Jose, California, where my first task was to assist another young PhD physicist developing a laser system using semiconductor laser technology for a Small Business Innovation Research (SBIR) contract awarded by the U.S. government. Semiconductor lasers were a relatively new technology at the time, so the work involved a lot of experimentation to determine their capabilities. The intention was that the technology we were developing would ultimately be turned into scientific instruments sold to science labs as commercial products. However, in those first few months the work felt much like my PhD lab work, as I was just trying to get an experiment to work properly.

However, it didn't take long for me to realize that this private-sector environment I had entered was different than academic research in some very important ways. We had a paying customer, so this project was no longer a

Stereotypical behavior #2: They try to be 'too smart'

As reported by industry managers, this 'too smart' behavior typically manifests in three specific habits.

– **'Too smart' habit #1: They need to be the smartest person in the room.** One of the most common complaints is that PhD scientists seem to have a strong need to show others that they are smart:

> *One of the real hang-ups that scientists and engineers have is they feel like they have to be the expert and be able to provide all the answers. One thing you learn very quickly in business is just how much you don't know, and how much you need to rely on other people. The sooner that you learn that, the more successful you will be.*
> – Peter S. Fiske, PhD Geological and Environmental Sciences, Executive Director for the National Alliance for Water Innovation [12]

In an industry team environment, this often shows up as the PhD scientist suggesting that their knowledge and expertise are superior to others on the team, such as the engineers, who have been trained in a specific discipline. This is frustrating to the other team members who may have years of training in their specific discipline and may resent being told a better way to do their job by a newly minted PhD scientist:

> *Just because you 'played an engineer on TV' as a grad student does not mean you're a real engineer. You have your expertise, and you have to rely on your colleagues to be good based on their own expertise. You may have an expert in mechanical engineering and another expert in electrical engineering and another expert in software, and you can't be going around telling them how to do their jobs.*
> – Kate Bechtel, PhD Physical and Analytical Chemistry, Biophotonics Fellow at Triple Ring Technologies[9]

I suspect most of us who pursued a graduate degree regard our intelligence as one of our most valuable assets. Academia teaches us that we succeed by being smart and being correct, with the measures of success including passing the test, completing the degree, receiving tenure, or even winning the Nobel Prize. PhDs spend more time in academia than most others on an industry team, and during that time they are judged on their ability to work alone and be the experts on every aspect of their projects. It's natural that they might emerge with the habit of 'being the expert,' but this behavior can limit your performance on a team and can be a significant barrier to a successful industry career.

Interview excerpt: Kate Bechtel on the PhD Stereotype[9]

Kate has a PhD in Physical & Analytical Chemistry from Stanford and is a Biophotonics Fellow at Triple Ring Technologies in the San Francisco Bay area. Her full bio can be found in the Interviewee Bio section.

Dave: Have you seen other PhD scientist habits that don't work well in industry?

Kate: There's a stereotype of PhD scientists by many in industry that they're kind of useless because they get 'analysis paralysis' and can't make any decisions, or else they want to keep making things better and don't know when to stop and move on to something else.

And this stereotype is often true because, in academia, you're taught to stick with a problem until you get it 100% solved. Then you document the path you took to get from point A to point Z in extreme detail and make sure you understand every detail. In the real world, no one has time for that. You just need it to be good enough. Figure out when it's 80% done, and then stop working on it!

Dave: I was absolutely that PhD physicist who just kept working on the problem to keep making it better. The transition to a product-development environment was a real challenge. There were so many times where I realized I wasn't focusing on what was important, and I had to keep reminding myself to think differently.

Kate: I had those same habits, and it took me time to make this transition as well. I'm eternally grateful to my bosses, the founders of the company, who put up with me and took the time to train me, because I was not very effective when I first started. In fact, I remember early on I was in our office kitchen, and I was explaining to the CEO of the company how a particular project was going. I was outlining the details of every single approach I was considering, giving him the pros and cons of each option. He finally got fed up and said, "Just pick a direction and go with it! You need to move forward!" That really stuck with me.

Dave: We've learned that making a mistake might be fatal, such as when we are standing up to defend our PhD thesis. But that's a different kind of 'fail.'

Kate: Yes! I would say that in most things it's really okay to be wrong, and it's okay to fail. In fact, an example of a very effective staff member is someone who makes a mistake and then very quickly says, "Oh, I was wrong. We need to try a different approach." No one has any ill will toward that person. No one says, "I can't believe you made a mistake," because that's how you make progress.

Chapter 4
Your Private-Sector Playbook

Habits that Successful Industry Scientists Learn Quickly

The previous chapter described some of the stereotypical scientist behaviors that are not very helpful in an industry environment. Of course, many scientists have built very successful careers in the private sector, but they are successful primarily because they have learned quickly and adapted to the private-sector environment. Most of us do not learn much if anything about the private sector as graduate students, and so few of us enter the private sector with these habits.[1]

Some of us have been lucky enough to have patient managers to mentor us and help us develop new habits. I was one of these fortunate PhDs, but many are not so lucky. Not all managers are good mentors. In addition, many technical companies have managers with business or marketing backgrounds, so they may not understand how to transition a PhD scientist into a product development environment.

This chapter will help you learn how to be more productive and more effective in the private sector. Here are five critical habits that scientists who are successful in the private sector practice regularly.

Habit 1: Help the Company Make Money

The very first principle listed in Chapter 2 describes that 'what is created' in industry is profit. This is the most fundamental of all the principles and so it forms the basis of the first habit. A scientist who is successful maintains a consistent focus on how the work helps the company make money and be profitable.

During our time in university most of us had the freedom to work on an interesting problem simply because it was novel and represented an advance in knowledge. After all, it might lead to a new publication, and isn't that the primary metric of success in academia? As a graduate student making a meager stipend, our time didn't cost much anyway. Once we have jobs in the

Persuasion and integrity

When I speak to groups of young scientists, I find they are often resistant to the idea of being persuasive, or 'selling' their ideas. Many of us have unfortunately picked up the false idea that persuasion is about convincing someone to do something that they don't actually want to do, perhaps through trickery or a brute force overpowering of their will. This is not a good view of persuasion.

A much healthier view of persuasion that is fully consistent with the integrity that most scientists hold in high regard is helping another person see the same advantages that you do. If you believe that a particular decision is the best answer for you on the team, and you truly believe you've analyzed it enough that your opinion is valid, what's wrong with convincing the rest of the team that this is the right direction to move? Persuasion in this case is simply helping them see it the way that you do.

> *A really good way to think of persuasion and influence is to think about it like a strategy game, where you have to sell your vision to a group of people who don't think the way you do. What is important to them and their career goals? How might your idea help them advance? It is absolutely an intelligent game.*
> – Yasaman Soudagar, PhD in Physics, co-founder and CEO of Neurescence[8]

Another aspect of persuasion that often causes challenges for scientists is the fact that one must often present ambitious plans to either management, an investor, or a customer. To a scientist who has spent their entire career in academic research, where it is important to be very clear about the boundaries of certainty in one's work, this can be a challenging activity. Some even feel that they are creating fiction or even being dishonest if they sound too certain about things that are only projections or plans.

In academic research, a scientist typically communicates work after it is completed. This means they are usually saying, "This is what I believe to be true. This is what I'm certain about and will stand behind." The scientist in academic research communicates certainty.

In the private sector, it is very common to communicate what the company or the team is planning to do. Investors want to see business projection before they will invest their money in the company. Managers want to see market projections and product development timelines before they will authorize funding for a new product. Customers want to see performance specifications before they will sign a purchase contract, and if they are considering a new product or technology, they may want to see those performance specifications before the product has been completed and fully tested.

Chapter 5
The R&D Mindsets

The versatile scientists the world needs

In the previous chapters, I've outlined the differences between the academic research environment and the industry environment. While emphasizing the distinctions are critical for helping scientists transition from the academic environment into the private sector, I want to avoid giving the impression that a successful scientist must focus on only one set of habits or the other.

I also want to avoid an 'us versus them' mentality, which is ultimately counterproductive and yet far too common in both academia and industry. Most PhD scientists are aware by the time they complete their postgraduate studies that many science professors project a negative attitude about working in industry, and there are also many negative stereotypes about the academic research world that permeate industry. These attitudes are a natural result of our human tribal tendencies, but they are not useful.

A far more valuable perspective acknowledges the different goals of each environment; recognizes that the people who work in each may have different strengths, interests, and habits; and focuses on the value of healthy cooperation and even collaboration. Communities where the local university and local industry have recognized this value and have worked to encourage cooperation have shown significant benefit to both.[1]

Academia and industry are both critical for the advancement of humanity: industry relies on the new science that comes from academia, and academia benefits from the tools created in industry. Neither can achieve its full potential without the other—and humanity achieves the best outcome when both are equally respected, and the people in each field work together to create new knowledge and new solutions. The most versatile and influential scientist understands both environments and can function well in either one.

Research and/or Development?

The term 'research & development,' often shortened to R&D, is used in the private sector to describe two important activities in the creation of new technology solutions. These two terms form an excellent basis for describing

the differences between academia and industry environments, but also the basis for identifying where the two environments can benefit from similar perspectives.

The two elements of R&D, 'research' and 'development,' are quite different activities, with the former focused on the creation of new knowledge and the latter focused on the creation of solutions. The majority of the work that might be termed 'R&D' in the private sector is typically focused far more on development than research. Conversely, most academic groups are focused almost exclusively on research, although there are many great examples of commercially focused development work that resulted from private-sector collaborations.

It is valuable to consider that there is a different mindset for each environment. One is the research mindset, typical of academic research, and the other is the development mindset, which is far more prevalent in industry. However, I prefer to think of each mindset as associated with the activity that each describes—research or development—than with either academia or industry. This is because both academia and industry benefit from both mindsets, although in different measures.

The most valuable scientist understands and embraces both mindsets and learns to recognize which is needed in any particular project or activity. This will make them more versatile, more influential, and open them up to a much wider array of career paths and opportunities than simply embracing either the 'academic' or 'industry' mindset and working habits.

It is important that we acknowledge the valuable synergy that can be achieved through utilizing both mindsets in either environment. After all, why can't a scientist contribute to both the creation of new knowledge and to the creation of new solutions in a single career?

> *One of the biggest challenges (of my transition to industry) was understanding the difference between a research project and product development. The term Research & Development used in industry suggests that both of these are done in tight conjunction. However, that does not mean the activities are similar. They involve very different processes and mindsets that often conflict with one another. The cool part is, once a scientist knows their way around research AND development, they turn into absolute power players.*
> – Oliver Wueseke, PhD in Molecular Biology, founder and CEO of Impulse Science [2]

The R&D Mindsets

In short, the research mindset is focused on generating new knowledge and the development mindset is focused on quick progress toward a solution.

Chapter 6
Startups – The Ultimate Game!

Want to make your own dent in the universe?

Have you ever thought about becoming an entrepreneur? Many scientists choose to pursue the challenge and excitement of starting their own company at some point in their career. Many more scientists choose to join an existing startup to help commercialize some new cutting-edge technology.

But is a scientist a good fit for the startup world? Can a scientist really be successful as an entrepreneur? Many people consider the skill sets needed to be a successful scientist to be very different that those of an entrepreneur and assume that a scientist would not be good at starting their own company. After all, scientists figure out how the universe works, and they like to study hard problems for years, running experiment after experiment, until they find the right answers. That's very different than building a business. Companies do not have years to look around for the right answer. They need to move quickly, make decisions, and develop solutions for their customers, or they will not survive. So, a scientist is probably not well suited for launching their own company, right?

That's what I used to think as well. But as I reviewed the interviews of successful scientists in industry that I conducted to select the ones I would put in my first book, *Turning Science into Things People Need*, I found that half of the most engaging interviews were with scientists who had started their own companies. Five of the ten industry scientist interviews that I put in my first book were with entrepreneurs, all of whom had survived for more than ten years after founding their companies. And all of these scientist entrepreneurs credited their science background as an important part of their success.

Those interviews, along with all of the work I've done with entrepreneurs in the last ten years since that book was published, have convinced me that scientists can actually be great entrepreneurs. Of all of the stories I've collected from successful scientists in industry, the 'scientists-turned-entrepreneurs' have given me some of the most valuable advice for playing this game of 'turning science into things people need.' A scientist who becomes an employee in a larger company might manage to survive despite not being a

Chapter 7
Your Career Is a Game

Some pro tips for your private-sector career playbook

Throughout this book, I have described the private sector as a place that is best approached as a game, because of these three important principles:

There is more than one way to win,

Winning requires taking risks,

Knowledge alone does not make you successful.

Since being successful working in the private sector requires learning to play the game, it should come as no surprise that finding a job and building a career in the private sector is also best approached as a game. If you feel that your career is not everything you expected or dreamed it would be, perhaps you need to work on your game!

I am frequently approached by early-career scientists who asked me, "What additional training should I get in order to get the job I really want?" From this question it is clear that they are still taking the formula approach to their careers. Asking what additional qualifications they can add to their resume so the hiring manager will see them as the best choice for the job amounts to looking for the 'right answer.' I tell them that if they have a PhD, they already have more education and training than most people on the planet. I tell them they need to stop thinking in terms of 'qualifications' and learn to play the game instead. I say, 'You already have plenty of qualifications for what you want to do. Rather than trying to add more credentials to your resume, figure out what you want to do, find people who are doing it, and convince them you can do it also!'

In this chapter, I relay five private-sector playbook 'pro tips' to help you improve your own career, supported with stories from many of the industry scientists I've interviewed. I hope will give you new ideas and new inspiration for your career planning.

Pro Tip #1: Start with Why

I pulled the title of this pro tip from Simon Sinek's excellent book of the same title,[1] because I believe that starting with the purpose behind why you are doing something is one of the most important elements of success in just about anything you pursue. Scientists who describe the most rewarding private-sector careers can describe what it is that they set out to do with their lives and careers, and they know just how the career they've designed fits that purpose.

If you would like to build a more meaningful career than you currently have, I suggest you start by identifying your 'why.' To help with this, I've started this chapter with the 'why' stories of several successful industry scientists.

> *I distinctly remember that as a kid there were two things I wanted to do when I grew up. One was to be a stockbroker so I could wear fancy shoes. The second was to be a doctor so I could help people. I am not a physician or a stockbroker now, but I am a businesswoman who uses science to help people. And so, when I look back on my life, I realize that I'm doing exactly what I wanted to do as a child.*
> – Brit Berry–Pusey, PhD in Biomedical Physics, co-founder of Avenda Health[2]

Why work in the private sector?

The career paths of the industry scientists I've spoken to are very diverse, as are the reasons they love their careers. But when I look at the reasons why they choose to pursue a career in the private sector in the first place, two common themes emerge.

Theme 1: Didn't want the lifestyle of a professor

After years of observing the professors we worked with as graduate students, many scientists—myself included—decided that that we did not want their career or lifestyle. This may have been related to the work–life balance we desired, or it may have been that we weren't interested in a career spent chasing research funding, but either way, we wanted a different life and career than what we had observed.

Theme 2: Wanted to make a bigger impact

Many scientists felt drawn to make a larger impact than we believed we would achieve through publishing our research in academic journals that would be read by a handful of people. We wanted to make things that would change many people's lives in a year rather than in two decades, so we decided to go turn science into things people need today.

About David M. Giltner, PhD

David Giltner is an internationally recognized author, speaker, and mentor on the topics of private sector career development and technology commercialization. He began his science career with the intention of following the 'traditional' path to become a tenured research professor. However, during the final year of his PhD work, he decided that the academic career path was not for him after all. He completed his PhD and found his first job with SDL Inc in San Jose, California, developing scientific instruments based on semiconductor laser technology. Since then, he has spent more than two decades commercializing cutting-edge photonics technologies for a variety of applications including optical communications, remote sensing, and scientific instrumentation.

After beginning his career in the private sector, David quickly moved out of hands-on lab work into roles leading product development teams, and then into customer-facing roles in product management and business development. His diverse career path has included working with companies ranging from very large to very small, and this has given him a broad perspective on the private sector and what is required to turn a new technology into a successful commercial product. The extensive time he has spent working with both technical teams and company executives has taught him to function as an 'interpreter' between the different languages and cultures of MBAs and PhDs.

David has a BS in Physics from Truman State University and a PhD in Physics from Colorado State University. In 2010, he published *Turning Science into Things People Need* and began speaking to early-career scientists interested in building private sector careers. In 2017 he started TurningScience to provide training and support for scientists of all disciplines seeking to enter the private sector as employees, academic collaborators, or entrepreneurs. In addition to giving career-based seminars and workshops for scientists, he works as a consultant and mentor, for entrepreneurs and technology companies in the U.S. and Europe. He has a passion for travel, food, music, and the outdoors; and can usually be found attempting to combine these interests either abroad or in his home state of Colorado in the United States.

About TurningScience

TurningScience was founded in 2017 to help scientists design and build rewarding careers in the private sector. It began with career seminars that David began giving in 2010 following the publication of *Turning Science into Things People Need*, a book featuring interviews with scientists who transitioned from academic research into productive careers in the private sector. In the years since then, TurningScience has expanded its influence and impact to include every continent except Antarctica!

We provide seminars, workshops, and personalized mentoring designed to teach scientists how to transition from academic research into successful and productive industry careers. We focus on three specific career paths: (1) scientists working as employees in an existing technology company, and (2) scientists working to create and build a technology company of their own, and (3) academic scientists interested in building their research programs through collaborations with the private sector.

Our principles:

It's a game, not a formula
Success in the private sector comes from taking chances and going after what you want, not from finding the 'right answer.'

Tell great stories
Don't list your credentials and experience and expect other people to automatically see the value you bring. Tell stories that show them who you are and how you can help them.

Think big!
People will try to tell you what a scientist can and can't do. Don't let their limited views keep you from the career that is right for you. Take bold action and pursue the career path that you want to follow.

Make the world smaller
Science has always been an international pursuit, and this is one of its great strengths. We scientists can play an important role in helping others see how much we all have in common. Be part of the solution.