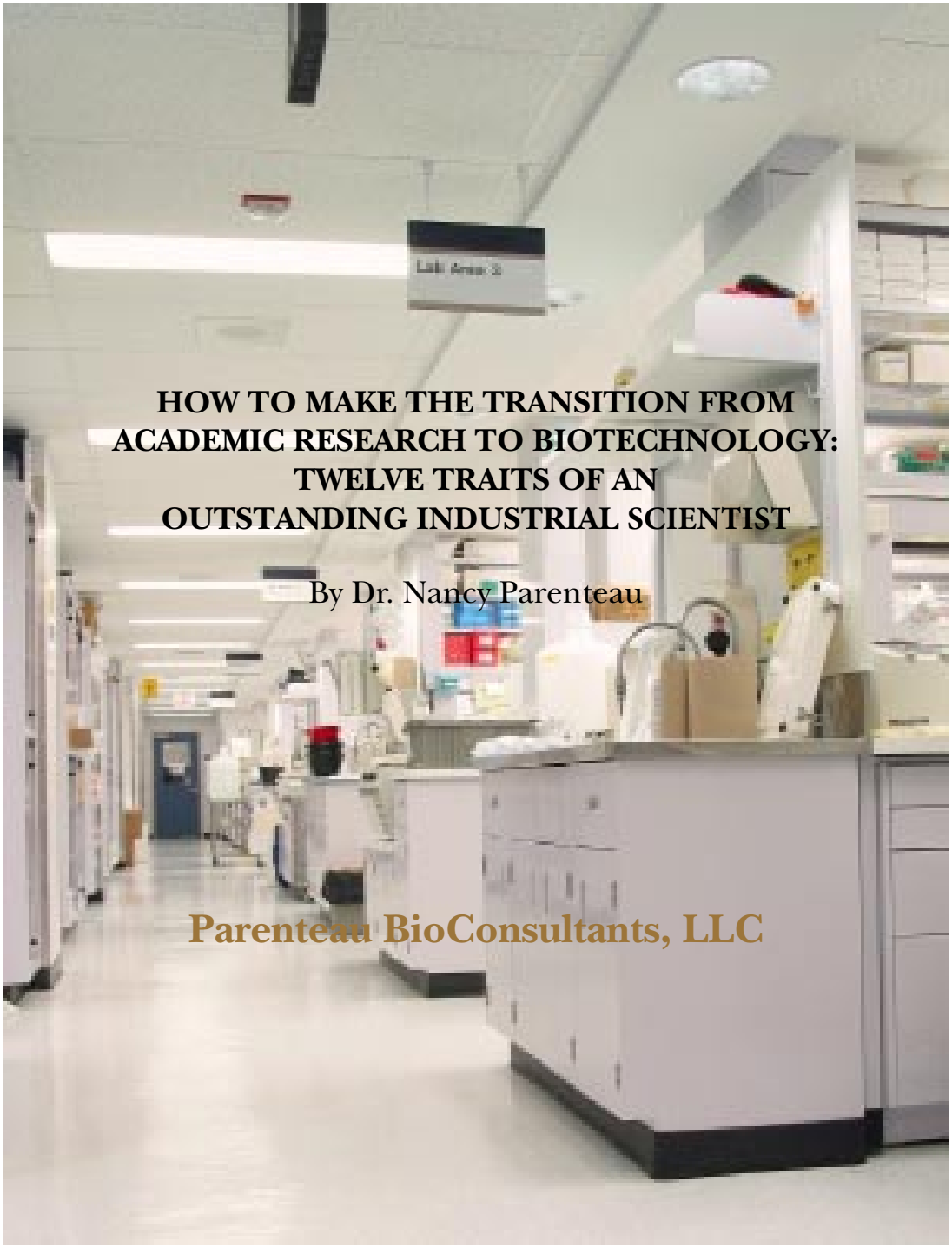

HOW TO MAKE THE TRANSITION FROM ACADEMIC RESEARCH TO BIOTECHNOLOGY: TWELVE TRAITS OF AN OUTSTANDING INDUSTRIAL SCIENTIST

By Dr. Nancy Parenteau

Parenteau BioConsultants, LLC

Whether you are at the end of your postdoctoral fellowship contemplating your next move, a distinguished professor being considered for that big position, or a new founder of a biotech start-up, a savvy appreciation of how science and research differs in industry can make you a more valuable player, ease the transition and help you achieve a successful and personally rewarding career in industry. If you think there is little difference between the two worlds, that good science is good science, think again. Of course, strong science is an important component, but great science does not automatically lead to great products. How can you be certain that your abilities to deliver great science will lead to great products? By being sure your *perspective*, *approach* and *research priorities* are balanced and focused on your corporate objectives. Skill in driving progress while maintaining this balance will make you a significant player in both science *and* business.

First, let's dispell some myths...

Myth: Industrial science is primarily applied science

While successful application of science is key in industry, applied science must go hand in hand with innovation and discovery. The term applied science often leaves the impression of boring nitty gritty but in actuality, it can be one of the most challenging and exciting aspects of industrial science. Engineers have always appreciated that but biologists need to appreciate that too. You are in industry to create something. Depending on the circumstances, that will more often than not require a mix of cutting edge discovery, a large dose of innovation and yes, some pretty mundane experimentation and testing, but in actuality no more mundane than running your 100th gel in a molecular biology lab or writing your 50th grant. What keeps your interest is the same in both worlds, what the results mean and in industry, what the results can help create. What could be more exciting than that?

Myth: Industry science is less competitive than academic science

Au contraire. In industry your competition comes from several directions. Competing research can come from university labs, private institutions and fellow companies, large and small. Long before the research appears as a publication, if it ever does, it will likely appear in a patent application. In industry, you worry about prior art and patents because they could limit your direction in developing your technology and products – a much greater potential impact than merely beating you to publication. Patent applications can appear long before there is even enough research to prove its utility.

Myth: Industry science is a more stable career alternative than competing for grants in academics

Not really. They each have their benefits and pitfalls. Small to medium biotechnology companies have a high degree of risk, particularly before there is revenue generation from a marketed product. Biotech has an awful habit of going on a hiring spree in the early days of R&D only to implement sharp cutbacks as the reality of overall productivity and time to market hits. But even very large biotech and pharma also change direction and lay off people. In academics, you may keep your position but be under tremendous pressure to bring in grant money year after year and you are only as good as your last grant. In academics, a lot will be riding on your own personal wherewithal. In industry, your welfare is impacted by many different factors, not solely your performance. Choose your industry position wisely!

Myth: A highly "productive" and stellar academic career means that the person will lead a highly productive team in biotech or pharma

Unfortunately, the approach needed to be highly successful in industry isn't necessarily the approach you, or your mentor used to become a revered university researcher. Again, it comes down to enabling the whole rather than individual pursuit. You may be a brilliant scientist in many respects, but if you cannot filter and prioritize the information, apply what you know in practical terms and lead others to do the same, then you should reconsider a move to industry. In addition, you should have in your core the desire to not only discover but to see those discoveries put it to practice. Perhaps a way to think about it is to be a biologist with an engineer's passion. Having had the pleasure of working with several outstanding engineers, I have learned that the one characteristic they all have is the strong desire to solve problems and implement knowledge. Developing solutions will be a key to your success and can be truly exciting if those soultions get your project to where it needs to be. Failure to appreciate the challenges of implementation means someone

else further down the line will have to make up for your shortfalls, making you much less valuable to a corporate research organization.

The phenotype of an outstanding industrial biologist

Passion and commitment may be a prerequisite, but successful R&D scientists also appreciate the difference between great academic pursuit and great commercial pursuit. Putting that passion to good use requires a targeted approach to science, the ability to prioritize research activities and data, the ability to recognize opportunity and problems, and the ability to integrate and interpret data input at several different levels. How does that manifest itself in practice? The following are some of the important properties of great industrial scientists we learned and observed during our many years in biotechnology R&D.

Stellar R&D scientists, managers and executives exhibit several telling features:

- **You'll find that their research plan is goal oriented and grounded on a core hypothesis.**

  There are basically two approaches to scientific research, the exploratory method often driven by technology, and goal-oriented research driven by the need to answer a specific question. While we can find examples of both in biotechnology, in most environments, the company is developing or hopes to develop, a product from the information. The best, most efficient, way to do that is by setting goals based on a core hypothesis.

- **They are not afraid of asking the tough questions up front.**

In our white paper on "Evaluating New Technologies Entering the Clinic: Eight Steps to Better Analysis" I mention the dangers of not recognizing the gorilla in the room. When I first became a CSO, I was reviewing a project with a team and asked why a pivotal point had not yet been addressed. A young research associate spoke up and announced that if they tackled the issue and it didn't work out, then they might be out of a job so they delayed addressing it. Ironically, I was thinking just the opposite, that they might be out of a job if they did not deal with it and perhaps take me with them. I assured them that finding the right path was all that mattered. With some initial fear and loathing, they addressed the problem head on, came up with a remarkably innovative solution and everyone was happier and more productive. The avoidance reaction is all too common in those that lack the confidence that they can solve problems and generate even better opportunities if necessary. You must be objective and fearless in your pursuits.

- **They appreciate that any weak link in the team will be their weak link and are comfortable with internal sharing and collaboration.**
  In an academic lab, your competitor may be just down the hall. In a company, your competitors are outside the walls of the company. It no longer hinges on individual achievement but success of the whole. It also means that even when you give your personal best, if someone working on another key area does not, it can still impact your ability to achieve. This is quite different from the university environment where you are largely reliant on your own intellectual and professional ability. Your best work may not become reality if another group within the company does not meet its objective. That can be hard to stomach, so use your talent to inspire and help your company colleagues – it can only help you and the company achieve.

- **They are aware that competition can come from all directions. academic, government and industry laboratories.**
  Keep your eyes focused outward on the competitive landscape. Remember those patent applicatios. Respect the fact that while you are focused on your company's issues, someone else is working on theirs. Efficiency and timeliness are key, because what is at stake is not just being scooped on a paper – it could mean your product or even your company.

- **They appreciate that their job performance could directly impact the jobs of many other people and are committed to the success of the company.**
  In other words, they take ownership at whatever level in the company they happen to be.

- **They have savvy interpretive skills; their scientific judgement is almost always right.**
  Interpretation of biological data is one of the areas most fraught with errors, omissions, and spin. In industry, you are trying to identify the *strongest* target and make a drug/therapy that works. Nature, as in Mother, not the journal, will be the final arbiter of your success. The only thing you care about is understanding how things really are so that you can understand what to do or where your technology fits. You must be correct. Errors in judgement or interpretation in industry can cost you your job, other people's jobs, and your company. You have to always nurture your skill. My worst fear as an R&D head was being naïve on a pivotal subject. Do not be hesitant to benchmark and seek counsel. Respect what you do not know – yet. Always be willing to learn.

- **They are able to prioritize and balance research activities to feed both discovery and development.**
  Prioritizing and balancing research activities is one of the most challenging things for a new industrial Ph.D. Great R&D is a balance of types and levels of research. Some activities will be basic science that is needed to add to the biological underpinnings of the technology, it may be to generate new leads for the future or fill in gaps in knowledge that will assist you in product approval. This has to be balanced with skillful application of this and other data and translation for practical benefit. Too often, I have seen colleagues or had staff that struggled with being able to manage what to do when. The way to accomplish that is to relate all activities back to a clear set of goals based on your core objective.

- **They can rapidly assess the value of their findings and information to the overall goal.**
  Being able to properly prioritize a research and development plan is not quite enough. You also need to be able to assimilate data and knowledge as they come in and place a value on them based on your objectives. In the scientific literature every finding ends with the words "potentially important", or something similar. That will not be good enough for you, you will have to judge what information is most important and deserves your attention. You cannot get lost in data. You will have to value the information and make choices.

- **They are able to integrate information from multiple fields and disciplines.**
  You are looking for validation of your target or technology. You are looking for clues as to how you can manipulate a biological process.

These clues can come from many different places. If you are working on a drug for rheumatoid arthritis, you will want to acquire knowledge about repair and regeneration of not only cartilage, but bone, skin, liver, kidney and so on. If you are a molecular biologist you will have to integrate cell biology, physiology, and perhaps mechanics into your spectrum – not just gene function.

- **They are able to learn from, and then table certain findings for a later day.**
  I have left many scientific careers-worth of potential findings on the table during my own 20 years in R&D. Working intensely at the cutting edge will often lead you to findings that, if your were back in the university, could keep you happily productive for many years. Sometimes those things have to be left for another day. Important findings are important findings from a scientific perspective but beware of tangents. Learn to balance discovery opportunities with the tasks at hand. Working on the possibilities for your 6th product won't do the company any good if the first product doesn't get out the door. You must be comfortable with this perceived "lack of intellectual freedom." Lack of intellectual freedom is often brought up as a concern about industry science. But in reality, great discovery science has always occurred within industry, but it must be balanced with company goals. And in reality, true "intellectual freedom" is even difficult to practice in academe these days.

- **They enjoy working in a multi-disciplinary, multi-faceted environment.**
  You should enjoy collaborative work. Also, work to be able to explain what you are doing to the non-technical members of your company. Take an interest in other goings on in the company. Appreciate their importance to the health of the company and show your appreciation!

- **They enter industry to put their talent to work while they develop their career.**
  Your scientific career should still be important to you. To succeed in the competitive and pressure-filled environment of biotech, you have to want to put your talent to work for the company *and* your own career satisfaction. No Ph.D. worth their salt is in it just to "be employed." If you find yourself in management, keep this in mind and take responsibility for helping your professional staff develop their careers and sense of self-accomplishment within the bounds of your company goals. Do not kill their personal motivation to achieve.

In summary, remember to:

- keep a company perspective
- prioritize based on a core goal
- approach every aspect in earnest

Every task can be rewarding if it gets you to your goal! Your abilities are a highly valuable company asset – take time to develop the skills that will make the most of your talent.

Parenteau BioConsultants is committed to our client's skillful and successful application of advanced bioscience. We appreciate that while graduate school may provide training in science, it does little to prepare you for a career in industry. This paper has outlined many properites that we have found to be important to success.

To your success!

Nancy

Nancy L. Parenteau, Ph.D.
nlp@parenteaubc.com

Continuing education on achieving life science leadership can be found on our website:
www.parenteaubc.com