



Adventures in wonderland

Rochelle Young presents a personal perspective on the many challenges faced by scientists when becoming bioentrepreneurs. These can be overcome with a little curiosity, creativity, and commitment, she says.

It's the first day of class on a postgraduate program in engineering management, and the students, mainly engineers and life scientists, are looking anxious—mostly because the class has started with a metaphor: Alice's

Adventures in Wonderland. Alice is an appropriate role model because her journey is similar to that experienced by scientists moving from the safe waters of the laboratory to the uncharted waters of the business world. Alice left a safe and familiar environment and set off down a rabbit hole on a journey full of ambiguities, complexities, and only later, realization. She survived her ordeal because she was willing to change perspectives when faced with new ideas or situations. In other words, she adapted—

just what budding bioentrepreneurs must do.

Through extensive education, training, and research, scientists are regarded, and regard themselves, as experts in their field. The road to success is lined with obvious well-defined rules—and symbols—of success or failure. Scientists work in a world of shared ideas and principles. Moved from the world of research into the commercial world, one sci-

entist's comments sums up the foreign land in which he found himself: "Scientists are not supposed to think about the economic perspective on research and development projects. A scientist's work is supposed to provide scientific knowledge. Economics is quite another discipline..."

When scientists need to share their expertise with people in other fields, such as in the world of business, they struggle to find a common language. Experts in the world of business operate under a set of rules and agendas that is unfamiliar to the scientist. One government funding agency expert stated: "Universities, industry, and the funding agency hold incompatible concepts about research and development. We understand the need for academic excellence, but

we also want to launch products if we believe there is a market for them. We'd rather you continue your basic research, but give us the product so we can start marketing it for consumer use".

So what can we learn from Alice? Alice was curious, creative, and committed, and willing to change perspectives. Curiosity is often what attracts a potential bioentrepreneur to the laboratory in the first place and may be the motivator behind his or her foray into business. It is curiosity that keeps work fun and refreshing, but bioentrepreneurs need to back up that curiosity with creativity. Back down in the rabbit hole, Alice took the novel approach of changing her height three times: when small the world seemed overwhelming, but her small size helped her realize her limitations; when large she could gain new insights to help her cope with the journey ahead.

It takes commitment and perseverance for a budding bioentrepreneur to be willing to change his or her perspective in order to gain new insight. It took a conversation with a potential source of funding to get one scientist to change his perspective: "I have a grant to conduct the research, but I now appreciate the need for coordination from different disciplines to take vantage points from each one," he says. "It is better to have co-learners on a potential product rather than having to explain the process over and over again".

To ensure that perspectives are shared, one entrepreneur used a roundtable to ensure that everyone understood the game plan. It doesn't matter if those chosen are not involved in the company in the long run, but they provide valuable sounding boards and insights. For example, can an economist grasp the technical concept in the first place, and will a marketing expert see what makes the product unique? Working with others in different fields will answer the difficult questions and provide insights to new ones.

Know thyself

How can scientists start to make the transition? First, my advice is to "know thyself".



Rochelle Young is a professor of management engineering at the University of Colorado (Denver, CO; Rochelle.Young@colorado.edu).

**Table 1. A selection of programs offering bioentrepreneurial courses**

Institute (location)	Course name/contact
University of California San Francisco (San Francisco, CA)	Entrepreneurial program in biotechnology "Idea to IPO". Office of Industry and Research Development (OIRD) (jgoldsmith@research.ucsf.edu)
San Diego State University (San Diego, CA)	Entrepreneurial Management Center (EMC@sdsu.edu)
Brown University (Providence, RI)	Entrepreneurship Program (ep@brown.edu)
University of Pennsylvania	The Wharton School (gohne@wharton.upenn.edu)
Stanford Graduate School of Business (Stanford, CA)	Center for Entrepreneurial Studies (ces@gsb.stanford.edu)
Massachusetts Institute Technology (Boston, MA)	MIT Entrepreneurship Center (various programs) (ecenter@mit.edu)
Dobson Center for Entrepreneurial Studies (Montreal, QC, Canada)	Faculty of Management (Johnson@management.mcgill.ca)
Oxford Brookes (Oxford, UK)	MBA Entrepreneurship (mba-bus@brookes.ac.uk)
Stirling University (Stirling, UK)	Department of Entrepreneurship (pjr1@stir.ac.uk)
Entrepreneurship Development Institute of India (Gujarat, India)	Various courses on entrepreneurship (ediindia@ad1.vsnl.net.in)

Degrees and publications are valuable, but more intangible attributes win in business—adaptability, emotional intelligence, confidence (either in one's field, belief, or ability to interact with others), ambition, persistence, risk-taking, humility, flexibility, and patience are some of the many attributes essential for coping in highly complex, ambiguous situations.

Scientists can learn these by purposely placing themselves in different environments. Scientists are used to presenting their own work to experts in their field. They need to "turn the tables" and attend conferences that specifically address the elements of entrepreneurship as a "nonexpert"—often an unsettling experience. If biotechnology conferences are not available, then those addressing medical research are a useful alternative. It is useful to hear the jargon used by these experts, and in doing so assimilate what is expected from the scientist to satisfy marketing, business, and other agencies. Though frightening at first, the process becomes more familiar and can be fine-tuned with experience.

Confidence is a particularly important element of success. Bioentrepreneurs often reflect on how they coped with challenges in the past to build confidence in the future. In particular, they must be able to handle criti-

cism, and the many stressors involved in business life. Scientists often get stuck on the road to commercial success because they assume that the task ahead will be straightforward. However, bioentrepreneurship is not just about having good scientific ideas,

but also about obtaining funding, developing a prototype, and marketing the final product. This requires convincing others of your idea and involving them in your vision. One "triple" bioentrepreneur says: "Believing in the product and self is what counts ... finding others to share in those same beliefs is what success is."

Network skills

Building relationships is probably the most difficult task facing most scientists. For many, fear is generated when dealing with others from unfamiliar backgrounds. Returning to the Alice metaphor, scientists

can overcome this by accepting the need to change. There is considerable overlap—and therefore common ground—in the disciplines of science, business, and marketing; those setting out in this areas would do well to recognize this, but this realization requires a shift in perspectives.

Successful bioentrepreneurs have great communication skills: they write and speak clearly and confidently, and they are persuasive and creative. They also develop excellent social skills. As a manager and leader of an embryonic biotech company, a bioentrepreneur may have to play many roles, becoming "cheerleader", "coach", "devil's advocate", and "lawyer" in order to create a cohesive team. The ability to build and foster relationships both inside and outside the company is essential.

And finally, vision. The road from concept to conquest can be tough and scattered with pitfalls. What may have been an accidental discovery may or may not become a marketable product, and at times it can be belief in the concept that was the only driving force behind its success.

Fortunately for most bioentrepreneurs, there are several sources of training and education on becoming leaders and managers, as well as the more pragmatic financial concerns. For example, the University of Colorado has a graduate program in engineering management. The course provides guidance for engineers and scientists making the transition into leadership and management. There are also a growing number

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of courses that are targeted specifically at entrepreneurship, and recently one created specifically for biotechnology (see Table).

There is a saying that "to journey is better than to arrive," and many bioentrepreneurs who have realized their goals and emerge like Alice through the looking glass might agree. The entrepreneur has been on a process of self-discovery. They have learned to be creative, changing their perspective and views of the world, and have used their commitment to their vision to achieve their goals. Indeed, many go on to become serial entrepreneurs, suggesting that the journey may be an intriguing one.