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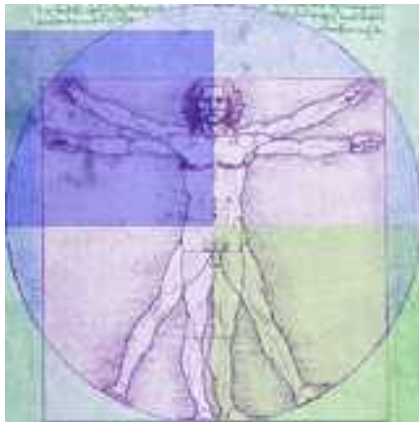
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Bioengineers in Biotech -- From University to Industry

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Bioengineers in the biotechnology and biomedical industries have a remarkable opportunity to accomplish what they do best: to integrate multiple disciplines and diverse skills to create and lead projects that can have a significant impact on health care needs worldwide. In addition, bioengineers in industry can acquire substantial technical and managerial experience and a broad professional perspective that are invaluable for future growth along many career paths, including scientific management, business, or even research and teaching in academia. My own experience in making the transition from the university to industry has been especially rewarding, as it has allowed me to combine my long-standing interests in technology transfer, strategic planning, and product development in biotechnology.

After earning my engineering degree from the University of California (UC), Berkeley, and a

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brief work experience in Switzerland, I entered the Ph.D. program at UC San Diego (UCSD) to obtain advanced training in bioengineering. Soon, I initiated a new cardiac cell mechanics project and was introduced to exciting advances in the emerging tissue engineering industry. By my third year as a graduate student, I strongly believed that a move to biotechnology would allow me to actively develop biomedical products with clinical and commercial promise and impact. I also felt that industry would provide me with the ideal environment for exploring the world of science and business. Most importantly, I believed that an opportunity in industry would allow me not only to apply my technical skills to a meaningful project but also to contribute my strengths in communication and teamwork to the growth of an organization.

I completed my Ph.D. in 1996 and traveled to England to complete a National Science Foundation fellowship in cardiovascular tissue engineering. In early 1997, I returned to California to pursue a great opportunity at Advanced Tissue Sciences Inc. (ATS), a biotechnology company focused on developing tissue-engineered skin, cartilage, and blood vessels for repair and transplantation.

In my first year, I actively helped to identify and acquire a \$2 million award from the National Institute of Standards and Technology Advanced Technology Program, which allowed us to build a project team to develop novel tissue-engineered vascular grafts. In addition to working closely with other scientists and engineers, I have had the opportunity to interact frequently with key partners in other departments within the company, including legal, regulatory affairs, and marketing. At ATS, I have also been able to grow and develop as a scientist and a manager and am currently a senior scientist in product development and the team leader of the vascular graft program. Although I have only been in industry for a few years, this experience has far exceeded my original expectations, personally and professionally.

Bioengineering is inherently an applied field that integrates different areas of biology, medicine, and engineering, yet many bioengineering Ph.D. students are

strongly encouraged to stay in academia. Consequently, making the transition to industry as a graduate student or a postdoc can be a solitary pursuit. But once you start the job search, you'll be happy to find that there are many people and companies out there who value bioengineers for their broad knowledge and diverse training. Based on my own experience, I've highlighted a few suggestions for making the transition, which I hope can help you find and build a new career in industry.

1. Identify Your Interests, Skills, and Strengths

First, you'll want to decide how you'll fit in technically. Are you interested in bench science, project management, product design and development, or process scale-up and manufacturing? These are just a few of the many options, and if you join a small and growing company, you may find yourself undertaking more functions than you had originally imagined! You should also be aware that industry is usually very team-oriented and often requires talented scientists and engineers who can stay effective in a constantly changing environment, which is often a hallmark of biotechnology. If you speak and write well and think you'll enjoy working with a broad range of people, a job in industry may be a good match for your skills and interests.

2. Find or Create the Right Opportunity in Industry at the Right Time

Ideally, you should start the discovery process and active job search a couple of years before you graduate or finish a postdoc. Realistically, it can take up to 1 year to research your companies of interest, make connections, interview and negotiate, make a final decision, and wrap up your current work before starting at your new job. The Internet is a great place to start looking, as many companies now announce job openings on their Web sites. In addition to *Science's* Next Wave, many professional societies and journals also post links to helpful job search sites. For searches in California, try checking out the site for [UCSD CONNECT](#), which is a model program for technology and entrepreneurship in high-tech and biotech.

More importantly, make personal connections in industry. Getting a job often does depend on who you know! Conferences are key places to seek out company representatives, and the poster and lunch sessions provide a natural environment for you to introduce yourself and speak informally about your work and interests. Some conferences also feature an employer-employee matching program with conference-site interviews. These one-on-one opportunities can really get your foot in the door, so at conferences, try requesting interviews with companies even if they're not hiring in your area. More often than not, they will be impressed by your interest and be glad to schedule time to meet you.

Finally, when is the right time to make the transition? It can depend on whether you want to develop a long-term research career or start making the move toward management or other areas. If you're interested in research in the long run, it may be better to continue developing your credentials as a postdoc or even as an assistant professor so that you can join a company as a senior group leader or as a technical director. On the other hand, if your long-term goal is to seek a career as a manager, corporate leader, or entrepreneur, an early move into industry can accelerate your exploration and experience in science and business.

3. Build a Professional Network and Stay Active in the Scientific Community

To continue your professional development and to keep your career options open, it's important to build and maintain your own network. You should try to keep publishing, acquiring funding, and filing patents, if possible. Try to stay involved with the community by participating in conferences, reviewing manuscripts for journals, working with student interns, and lecturing as a guest speaker. Be sure to keep up key relationships with people who are interested in your personal and professional growth. In an industrial environment, you may need to actively seek out mentors within and outside of your company.

4. Maximize Your Impact Within the Organization

Make the most of your first experience in industry by examining the key issues and challenges that you face on your job. How can you use your skills and strengths to make a difference? Set your goals early on and start working with other people to maximize your impact within the company. For example, my goals have been to work with a team to create new technical and business plans, secure needed funding, build a project infrastructure, and to establish our product position by publishing new work. Also, to maintain your effectiveness and breadth of experience, continue to strengthen your technical and managerial training and make an effort to understand processes outside of your own department. I regularly meet people in other divisions such as finance and marketing to learn how our own group can work effectively within the organization.

5. Plan Your Next Steps

What's next? Depending on your interests and opportunities, you can continue to grow within your company as a scientist or manager, or you can even return to research and teaching at a university. I was pleasantly surprised to find that the door to academia is still very much open, as several professors have approached me about faculty positions in their department. My own long-term goal is to lead the development of corporate strategy and to actively help grow an organization in a technology environment. In the

next few years, I hope to gain broader skills in general management, including finance and strategic thinking, and in venture development. Perhaps I will even have the opportunity to share my upcoming experiences in a future *Science's* Next Wave feature. Regardless, I feel that a strong experience in industry will only enhance the training for young graduate students and postdocs who truly want to make a difference in the growing field of bioengineering.

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By Sheema Inayatulla, 2 Nov 2001

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