

## A Franchise of One

by Jerry Woodall

Everyone I know has strong opinions about what the new millennium will bring. Well, that's all the incentive I need to toss my soothsayer hat into the ring. My topic in this regard will be: careers in science and engineering for the 21st century. "Oh no, spare me," you groan. Read on. This thing is trickier than you think. The reasons are both subtle and obvious in hindsight. And my "advice" is not so obvious.

The professional career environment has changed dramatically over the past ten years, especially at the large, U.S. corporate R&D laboratories. Except for a privileged few, what used to be "cradle-to-grave" career opportunities at a single company have virtually disappeared. As is well known now, the disappearance of these lifetime employment opportunities was a result of intense global competition, which nuked the copious corporate divisional profit margins. These profits were the main funding source for the corporate labs, especially in fields of R&D not directly related to future business needs. In its place we now have: (1) very little R&D on basic science and non-business related research, (2) reduced employee benefit packages, (3) the elimination of full employment policies, and (4) sudden unexpected company "right sizing," i.e., mass employee firings. This condition has produced the need for most science and engineering professionals to develop multi-company careers. It has also resulted in the disappearance of employee-company loyalty. Among the implications of this last effect, is a very gloomy outlook for future U.S. economic competitiveness, a topic worthy of a separate treatise by a futurist.

These corporate changes have also produced dramatic effects at both government R&D laboratories and research universities, particularly in the form of cutbacks. The cutbacks in government spending on R&D at both government labs and research universities have been well publicized and debated. The cutbacks in armed service agency spending in general and on basic research, i.e., "6.1 and 6.2," in particular, are, at the very least,

draconian. The end of the cold war brought about a complete revision of the R&D strategies of these agencies. The result has been fewer dollars spread among fewer government employees but among many more university faculty. The budgets of government agencies noted for science funding, e.g., the National Science Foundation, have not kept pace with either need and demand, or the average growth rate of the U.S. economy. It is somewhat ironic, however, that the cutbacks in spending for R&D at both corporate and government laboratories have presented special opportunities for



research universities.

For hundreds of years, the main functions of universities were education, training, and scholarship, including discoveries and breakthroughs in the sciences. About a decade ago, owing to severe global competition at the marketplace, major high tech corporations began scaling back and downsizing "blue sky" or "curiosity-driven" research at their corporate R&D labs. As a result, breakthroughs and innovations in materials and devices were also added to the list of research university functions.

Very recently, large corporations have dramatically increased their reliance on outsourcing of product components. In addition, interest in adding a materials design science and engineering component to the overall functional design of products has been mounting. This has produced a "golden opportunity" for universities to participate in the rewards of technology realization, especially for

niche market products, while still maintaining traditional academic purity.

So, what's the point? It's this: as the millennium approaches, professional scientists and engineers need to become more like athletes, artistic stars, doctors, and lawyers. Each of us needs to become a franchise! Yes! I am now Professor Jerry Woodall, a franchise specializing in exploratory compound semiconductor materials and devices. I used to be one of many corporate fellows at a large computer company, but not any more. I continue to work in teams, but I work as an individual franchise. (Hmm. Maybe I should have an agent!) Be you an undergraduate or graduate student, junior or senior faculty, or a company-employed scientist or engineer, you too need to become a franchise to survive and prosper as the new millennium begins. Successful consultants out there are already doing this.

Now, for the big question: what's the best career for me? No. The question is: what's the best career PATH for me? That's right—career path. Even if you are a junior or mid-career university faculty member, it is very unlikely that you will remain at the same university until retirement.

So what is the guiding light? The answer is as simple as it is trite. When I ask my students during the first class of each semester, "What is the most important thing in life," I always get the same wrong answers—getting rich, marrying well, getting a good job, doing R&D, etc. They always state secondary or consequential goals. The right answer is: HAVING FUN! Everything, including happiness and self-fulfillment, follows from this. Therefore, using this principle as your guiding light, finding the right career path reduces to finding the career path that will maximize a lifetime of fun.

Okay, how about some specific recommendations? Here is my top four list: (1) Starting your own company; (2) Working for a promising new start-up company; (3) Being a faculty member at a good research university that is very good in your field of interest; and (4) Being a

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## Free Radicals

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manufacturing (yes, manufacturing) engineer in a viable/promising new products division of a historically proven good company. These are careers. A career path would be to either modify or evolve one of these over time, or sequentially lace two or more of these in the appropriate chronological order. Mine was: (1) staff member at a corporate R&D lab, (2) fellow at a corporate R&D lab, (3) professor at Purdue, (4) professor at Yale. (By the way, an okay answer could be: one in which you have enough money and time to spend it at a golf course, if playing golf is really fun for you.)

A few comments of justification—The large companies are becoming mainly centers for system product assembly, marketing, and distribution. They need vendors. And what could be better than owning a company that makes a component they need? Also, consider a job related to the Internet. The Internet is not only here to stay, most billionaires believe it will be where most of the worldwide economic growth will occur during the next century. The trick, of course, is hooking up with a winner (easier said than done). But, if you get off on earning big bucks, give it a whirl. If cerebral activities or fame are fun for you, try university life. If you are at mid-career, it's best to enter the system with tenure. However, you can still have lots of fun as a junior faculty member if you don't mind writing grant proposals!

Careers I would recommend against include R&D at all companies. If they are large, you will be a slave to the whims of inept division product managers and their flawed visions of future products. So, when you finally realize you need to leave the place, you may not have anything (important) to show for your effort. If they are small, and the "product" you are developing gets "canned" before coming to market, where and what is your next job going to be? It's hard to move from Acme Semiconductor Products to, for example, Motorola, without something to show for it in your vitae.

Finally, I am not kidding about life's premier principle of having fun. Good luck with your career. And if you find something better than my job, let me know. ■