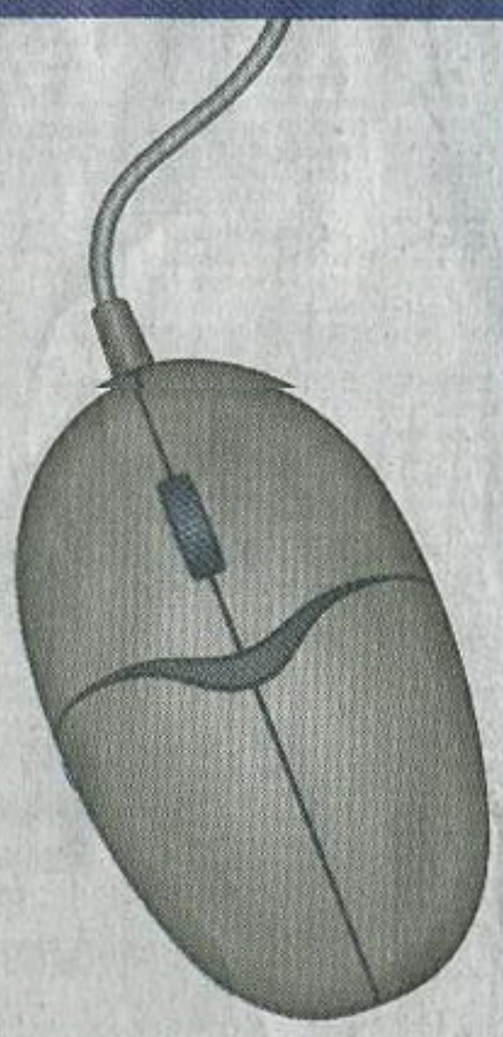

Engineers Can *Design Their Own Career Paths*

by MEG BARONE

Engineers not only have the ability to design their own career path; they have the skills to get America out of the recession and back into a booming economy.

Now, some people might think that statement is a bit unrealistic, especially considering that countless engineers have joined the unemployment lines in the last two years and many engineering projects have ground to a halt because of the credit crisis.

Those gloomy facts aside, industry experts are optimistic about the engineering job market now and especially down the road. After all, according to the federal Bureau of Labor Statistics, engineers are employed in every major industry. It's hard to do without their expertise. The list of the types of engineering, or specialties within the field, include Aerospace engineers, Agricultural engineers, Biomedical engineers, Chemical engineers, Civil engineers, Computer hardware engineers, Electrical engineers, Environmental engineers, Health and safety engineers, Industrial engineers, Materials engineers, Mechanical engineers, Mining and geological engineers, Nuclear engineers, and Petroleum engineers. And that's just a partial listing.

Evangelos Hadjimichael, Ph.D., dean of Fairfield University's School of Engineering, said engineering is a good profession or discipline to pursue. "It always has been. It always will be. Technology results from the creative competencies of engineers. Engineers produce new technologies. They always look to the future, not to the past," Hadjimichael said, adding that those technologies generate more than 45 percent of the country's Gross National Product.

The Bureau of Labor Statistics website says earnings for engineers vary significantly by specialty, industry, and education. There is a wide range in salaries from about $43,000 to more than $140,000. In addition to certain academic requirements, engineers must also be licensed through accredited organizations.

Hadjimichael said engineering is a good field to go into for those who have a good grasp of mathematical and scientific concepts, and for those who have creativity and vision, the inclination to create and innovate, and the ability to create the technologies of the future.

Some people believe that engineering and the vision it demands, and the research and development that results from engineers' creativity and innovation can help pull the country out of the recession. Tarek Sobh, Ph.D., dean of the School of Engineering at the University of Bridgeport, said there are at least five emerging fields within the engineering profession, all of which will be in demand in a matter of years. Sobh said the engineering areas that are experiencing explosive growth are Biomedical engineering, Environmental engineering, and Nanotechnology.

Good areas to pursue within the profession are the areas of information technology, software engineering and software development. "Software is ubiquitous. There is no technology that doesn't require some kind of software or network technology, so software development is a very nice area of engineering to go into," Hadjimichael said.

Also good areas are what Hadjimichael calls the "old standbys, the old line" engineering: mechanical and electrical. "Particularly mechanical engineering is in demand," he said.

Some of those fields will not have jobs available until after the economy rebounds, but other areas, such as energy and the environment, can help fuel an economic recovery. It's just a matter of getting people to buy into the vision.

"We are at the stage where there has to be a cry for doing something on the national level. In the 1960s, when we said we were going to the moon everything changed. Technology became a cool thing. It became a national mission. That's what we need in the area of energy," Sobh said.

When sustainability and renewable resources become a national priority then they will create jobs not only for engineers but for a broad workforce, from blue collar to Ph.D.s, he said.

"We need a whole wide spectrum of engineers (in the environmental and energy fields). We need research engineers who would made alternative energy mechanisms more efficient; and by alternative energy I mean solar power, bio-fuels, wind turbines, hydrogen cells, the whole spectrum of renewable energies, not only for powering our homes and businesses but also for commuting, for transportation," Sobh said.

The energy industry calls for a wide range of people in engineering from those with bachelor's degrees to those with advanced degrees, Sobh said. He said the field needs people who know about mechanics to operate wind turbines, people who know about physics to create more efficient solar panels, you need people who can create better materials, and you need electrical engineers because eventually these new technologies will become part of the power grid, he said.

Leslie Haines, vice president and manager of New England operations for Parsons Transportation Group, which has offices in Connecticut and elsewhere, said environmental engineering is going to need engineers in a variety of facets.

"There are the kind of things that we do (at Parsons), which is essentially to evaluate projects for their impacts on the environment and try to develop mitigation plans, and then there are people who work on clean ups of sites that have been contaminated by previous uses - gas stations, chemical plants," she said.

Then there is the area of sustainable design and reducing carbon footprint; how to design an environmentally sensitive building, road, or anything. "That's the one that really seems to be taking off," said Haines, who is also Connecticut's National Director to the American Council of Engineering Companies.

Hadjimichael said there are engineering competencies and skills just waiting to be used. "It's just a question of creating the proper framework where they can be used profitably. When the framework is distorted and out of shape, we don't take good advantage of our competencies, skills and knowledge. We've got to get back where we have the proper framework for creative work that is good and competitive with the rest of the world. After all there are global issues that are involved here," he said.

"I have no doubt, when we are able to put our financial house in order, when things get back to normal, we will be able to take advantages of our competencies and talents in more productive ways. A framework will be created by companies or by organizations, for profit or non-profit, where our creative competencies can come to fruition better. Right now, credit is tight and business cannot expand as readily as it used to," Hadjimichael said.

Haines said public companies are holding their own and may have work available but private companies may take more time to rebound. She said financing for projects dried up. Projects were either scrapped or put on hold because companies couldn't get financing and those companies with money were nervous about spending it. But, Haines said, some of those project will eventually have to move forward. Haines said transportation engineering has been hit hard by the recession but this area is likely to rebound with a vengeance.

For example, Haines said, New England has the oldest infrastructure in the country but there are other areas in the country which have experienced bridge collapses. "Eventually it has to be addressed. There is a huge latent demand for civil engineers for transportation infrastructure in the country. It's not happening as quickly as anybody had hoped, but it's not going to go away," Haines said.

The types of people who are needed in the transportation field are generally civil engineers or environmental specialists and natural resource specialists because every transportation project requires environmental documentation before the project can be permitted and built, she said.

"It is possible to get a degree in environmental engineering. It's usually a subset of a civil engineering degree," Haines said. She said many people get a general civil engineering degree and then get a masters in environmental engineering or another engineering discipline.

"There are a lot of specialties out there," Haines said.

It's not enough in this complicated world to specialize in one field. There has to be some integration between disciplines. "That integration of knowledge is important," Hadjimichael said. "Engineering works in collaboration with other fields," he said.

"Undergraduate education must educate the whole person. It's not meant to make a great specialist out of you. You become a specialist on the job when you are hired or in graduate school pursuing a master's degree or a doctorate," Hadjimichael said.

Hadjimichael said Fairfield University is working to create a program that integrates knowledge from engineering and knowledge from medicine or healthcare. But integration extends into many other fields. "When you talk about environmental engineering, this reflects collaborative work between engineers and ecologists and environmentalists," he said.

"The horizon is broadened in terms of the implementation of integrated knowledge across different fields to create something new. This is an exciting thing," Hadjimichael said.