



Sloan Career Cornerstone Center

Profiles of Chemical Engineers



Raquel Widrig

**Associate Engineer
Genentech
San Francisco, CA**

Education:

B.S. - Biochemistry and Microbiology, University of Colorado, Boulder
M.S. - Chemical Engineering, Texas A&M

Job Description:

Associate Engineer in Manufacturing Sciences

Advice to Students:

"I think it's important to understand concepts, to understand mathematics. Chemical engineering is more of a way of thinking rather than what you learn."

Interview:

Widrig: My name is Raquel Widrig. I'm an engineer at Genentech in manufacturing sciences.

Q: What do you do with Genentech?

Widrig: My department is the technical support group for the manufacturing facility. I do process development and cell culture processes that we use to make pharmaceuticals. We have two main cell culture-derived drugs. One is used as a treatment for heart attacks, the other is used for cystic fibrosis patients.

Q: What do you like about this type of work?

Widrig: The charter of Genentech is to provide pharmaceuticals for large unmet medical needs. I'm happy to be part of that because I'm actually on the process development end of developing the drug. So I have a real impact on making the drugs so that we can sell them to people who need them.

Q: How are chemical engineers involved in process engineering at Genentech?

Widrig: There are a number of people who do the kind of process development that I do from an engineering perspective. I see chemical engineers as the bridge between basic science and

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a manufacturing process. We're kind of the money makers for the company. We take an idea and make it a reality.

Q: How did you end up working in the pharmaceutical industry?

Widrig: This is always where I wanted to be. I took an indirect path to get here. I started out as a biology/biochemistry major and got an undergraduate degree. I then decided that I wanted to change my major to chemical engineering. So I went to graduate school and got a master's in chemical engineering to complement the biology and biochemistry degrees because I really wanted to be in the biotech industry. I felt that was interesting and where I could make an impact. So chemical engineering really helped complement my undergraduate degrees.

Q: Do you see some benefits to getting a master's as opposed to just getting a bachelor's in chemical engineering?

Widrig: I think changing my major was more important than the fact that it was a master's. I think that I could have been just as successful with a bachelor's in chemical engineering. It was more the combination of my background that really positioned me for a career at Genentech.

Q: How did you get your first job and what kind of tools did you use to get it?

Widrig: My first job actually was for a company in Wyoming. I went through the campus recruiting office at Texas A&M and did several campus interviews. Unfortunately, being in Texas, the people that interview on campus are mostly looking for petroleum-related chemical engineers. I knew that's not what I wanted to be, so I took a position as an environmental engineer for this company in Wyoming. I wanted to be in biotech but, unfortunately, there's not a lot of biotech in Texas. So I wanted to get my feet on the ground before I really started pursuing what I wanted to do.

Q: You mentioned you were an environmental engineer? What do chemical engineers do as environmental engineers?

Widrig: What I did was more maintaining the environmental area around the plant, the facility where I was. Environmental engineers, I think, tend to focus more. It's more of a civil engineering type of job. The environmental engineers that I worked with who were not also chemical engineers had a different point of view, more from a 'how do we construct something that isn't going to impact the environment,' where chemical engineers kind of figure out what's impacting the environment and what you can do about it.

Q: What courses did you find most helpful in meeting the needs of your job?

Widrig: A lot of the mathematics courses were very helpful. That's mostly what I use here and in my previous job as an environmental engineer. Lab courses and chemical engineering were helpful-unit operations-type classes. Fluid Dynamics is the heaviest chemical engineering influence I have in my position right now.

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Q: Are there any courses that you wish you had taken?

Widrig: For my master's, I did what they called the retread program because I wasn't a chemical engineer as an undergraduate. I took a year's worth of undergraduate chemical engineering courses, then took another two-and-a-half years' worth of graduate level chemical engineering courses. Which meant that my undergraduate chemical engineering education was rushed. So I wish that I had spent more time on the undergraduate courses and taken more lab classes in the undergraduate portion of my career.

Q: What is a typical day like for you?

Widrig: I probably spend about 30% to 40% of my time in the lab. The majority of my time is spent in front of the computer or at meetings or seminars collaborating with other people throughout the company. My typical day, I get here, I check my e-mail. I see what I need to do. We have assay services department here. Any of the assays that I need to get in are usually done first thing in the morning, so I have to prepare samples and send them off to assay services. If I have an experiment running in the lab, I'll go and take care of my experiment. Usually after lunch is when I spend most of my time on the computer analyzing data that I've gathered throughout the past week.

Q: What kind of work do you on the computer?

Widrig: I do a lot of number crunching. My job consists mainly of data analysis and design of experiments, trying to optimize processes. We design experiments to look at different parameters that may affect the product, the culture. I generally input data, number crunch, and prepare graphs for a presentations.

Q: Have you thought about a long-term career path?

Widrig: I'd like to be a technical manager. I'd like to stay in the science area where I am now, but in a management level. I still like the hands-on part of my job, but I would like the responsibility for managing other people to get the job done.

Q: How do you prepare professionally for future jobs?

Widrig: I try to keep my technical skills up-to-date by keeping current with the literature. We have a nice library facility here at Genentech, so I spend some time in the library just doing literature surveys, things that are related to my project. Also, Genentech has a number of courses intended to develop people. So there are management skills type courses within the company that I've been taking.

Q: Do you have a mentor?

Widrig: Not at Genentech. When I was doing my undergraduate degree, I worked for the National Institute of Standards and Technology in Boulder, Colorado. That is actually where I first got my interest in chemical engineering. I was a biologist at the time, but I was working in a chemical engineering laboratory. My advisor there convinced me that chemical engineering was a good option for me. He was kind of my mentor and directed me to what classes to take.

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Even though I wasn't a chemical engineer as an undergraduate, I did take a lot of classes that weren't required for my biochemistry degree but were required for a chemical engineering degree. So I got a little bit of a background there.

Q: How much interaction do you do on a regular basis with non-engineers?

Widrig: On a daily basis, I have interactions with all areas of the company. Because of our department's position within the company, we have to relate to a lot of different areas of the company including process sciences, engineering, regulatory-a lot of different areas of the company. So I'm dealing with a lot of people who aren't engineers. Most of them are biochemists, but I also deal with lawyers and technical writers, all sorts of different areas.

Q: Is there a down side to chemical engineering?

Widrig: I think chemical engineers get a bad rap a lot of times. Most of what you see in the news is bad stuff about chemical engineering, plants exploding or whatever. And I think there's not enough PR on the good things that chemical engineers do. For example, I'm a chemical engineer and I work in the pharmaceutical industry. I think that would surprise a lot of people that I'm a chemical engineer who is doing something good for the company, for the country.

Q: What advice would you offer to someone interested in chemical engineering?

Widrig: I think it's important to understand concepts, to understand mathematics. Chemical engineering is more of a way of thinking rather than what you learn. I think that has been the most important application to my current job-an attitude and a way of thinking. A way of solving a problem.

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