## A Practicing Chemical Engineer

It took me five years to earn my degree. I graduated in '97, and have been a practicing chemical engineer ever since. "Practicing" seems to be the right word. There is so much to learn; I don't think my education will ever really stop. There are always more patents to read, more experiments to run, more ideas to try.

Sure, the engineering approach to problem solving is centuries old, but the solutions engineers come up with are often novel and creative. It is always challenging, always engaging, always interesting. One never feels that you have reached the end. There is so much to do, and so much to learn. Yes, "practicing" is definitely the right word.


Image courtesy of Procter & Gamble

## Torengos Tortilla Chips

Consider my latest project; creating the Torengos tortilla chip. Actually, it's not just my project; it's many peoples' project. In fact, of the two-dozen or so people working to create Torengos, half-a-dozen are chemical engineers. These chemical engineers fall into two camps, the product researchers and the process engineers. I'm a process engineer, but I appreciate what the product researchers do.

Product researchers are chemical engineers who search for the perfect product idea. All companies must make products that people want to buy or they will quickly go out of business. In fact, consumer preferences guide our whole development effort. So our product researchers must understand the psychology of consumers to predict which products will succeed. They need strong statistical skills to conduct and interpret taste tests. They need strong people skills to interact with consumers in focus groups. They need strong communication skills to share their results with the team.

It was a product researcher who discovered just how much people wanted a bowl-shaped tortilla chip that you can load up with mountains of salsa. They learned just how irritated people get with half-full bags of broken chips. They figured out how much people are willing to pay, how long the product needs to last on the shelf, and how many cans we will sell. Their goal is to design the perfect product. The only problem is they usually have no idea how to actually make the perfect product. And they have no

clue how to scale-up the process so we can make millions-and-millions of cans of the perfect product. That's where I, as a process engineer, get involved…

Process Engineers are chemical engineers who try to make the perfect product. This includes everything from bench-top to plant production. The process engineer uses chemistry and physics to transform raw materials into finished product. We need strong math and statistics skills to design experiments and interpret results. We need strong problem solving skills to troubleshoot equipment. We need strong communication skills to document what we learn and help management make the right decisions. It was a process engineer that figured out how to produce great tasting stackable tortilla chips on a continuous production line running at amazing speeds.

As a process engineer, I have contributed many things to the project. I created the transformation flow sheet for Torengos. This documents all the chemical and physical transformations required to make the product correctly. It is a recipe that works at any scale. Currently, I'm trying to figure out how to get the right amount of salt on each and every chip—a challenge because they move so fast. I'm concerned with patent protection for our product and our process. I'm also trying to figure out how we can speed up our equipment, so we make more product and charge people less. I can't solve any of these problems on my own. Everything is a team effort.

## Pride & Excitement

Chemical engineers, like all engineers, solve riddles and problems that have practical importance. It can be fun, but it's certainly not a game. Big money is involved. Our consumers' quality of life is involved. The fate of corporations is involved. And most importantly, your paycheck is involved. All of this can lead to stress. But it also leads to something else—pride. Pride in making a difference. Pride in contributing to society. Pride in making the world a better place. I am proud to be a chemical engineer and excited about our future. The thing that really thrills me about chemical engineering is breadth of the opportunities. There are so many industries one can work in. So many products one can work on. During my short career, I have already made wound dressings for 3M, circuit boards for AlliedSignal, and now tortilla chips for P&G. I can't wait to see what's next! It is true that chemical engineers, as universal engineers, get to work on everything from "potato chips to computer chips."

by Wayne Pafko,
a practicing chemical engineer