



“INNOVATOR” TITLE SUITS KIMBALL WELL

Erin Kimball enjoys a good challenge, whether it's a difficult double major in chemical engineering and computer science at Rochester, rock climbing in the Alps, or living up to her title of “Innovator” at TNO, a company in The Netherlands that connects people and knowledge to create innovations for sustainable industry and society. Erin graduated from the University of Rochester in 2004, completed her PhD in chemical engineering at Princeton in 2010, and currently lives in Rotterdam, The Netherlands.

ED.: While at Rochester, you majored in two very difficult subjects, computer science and chemical engineering. What were your challenges? Why those two majors?

EK: I enjoyed chemistry and math and liked knowing how things worked. I talked to my high school chemistry teacher, and he said, “Have you ever thought about chemical engineering?” I hadn't even heard about it at that time, but the rest is history. Choosing to also go for computer science was different. I knew nothing about computers when I entered college so thought doing a minor in CS would give me a bit of an edge in the future. I then saw it was only a few more classes to get a major, so I figured why not?

The challenges—let me just say sometimes I am amazed it all worked out! First I had to make sure I could take all the classes I needed each semester without conflicts and apply each term to overload in order to finish in four years. Then there was finding the time to study . . . well, I didn't sleep much while I was a student at Rochester! The first year was quite difficult, but then I met some great friends to study with who kept me company while I worked at Starbucks. I just had to find a rhythm and routine that worked for me, and in the end it was worth it!

ED.: Was the ratio of female/male students in the two majors similar? If not, can you consider why that might be?

EK: The ratios were not even close; there were many more girls in CHE. I think it can be intimidating to enter into a field that is known to be male-dominated, and I'm sure this deters some girls from CSC. In general, girls don't grow up playing computer games, which, I think, leads to an interest in the programming behind them. On the other hand, though, we do grow up maybe cooking or playing with makeup—all chemistry, if you think about it!

ED.: What is your current job at TNO? Why is it a good fit for a person with your combination of skills? Though it's more suited to your chemical engineering background, what role does your CSC skill set play in your job?

EK: My current job at TNO is quite varied, which is described well by my rather vague title as “Innovator.” I get to work on all kinds of projects doing technical research and leading the scientific components of the projects. My focus is on carbon dioxide (CO₂) capture and a technology called Chemical Looping Combustion, which is a novel way to burn fuel that allows for almost 100 percent capture of the CO₂ without a high efficiency penalty. It is mostly chemical engineering problems—process design and analysis—but I actually use my CS skills with the modeling and data analysis that I do. It's great to be able to write a program in a couple hours that can manipulate data and do all kinds of calculations that would take weeks to do with Excel! And then, of course, the skills you need to handle two majors—time management, working in groups, being efficient—are extremely useful.

It's really amazing to work with all kinds of people in countries all over Europe while being between academia and industry. I still have freedom in my research but get to work directly with those who will apply it on a large scale.

ED.: How do you see technology improving the world's sustainability methods both now and in the near future?

EK: I think technology is essential. How we do things in the future may be completely different from how things are now. There's a focus in research now of mimicking natural processes that utilize CO₂ to do something useful. The European Union just put out a proposal call for the conversion of CO₂ to fine chemicals, most likely using solar energy or algae. These types of processes are so complex, having been evolved and optimized by nature for millions of years. They are only now becoming something that we can understand and learn from. It might then be that something that is a major pollutant today is a key feedstock in the future. Developments are also under way for utilizing other waste products that are now only accumulating somewhere. I think you will also see much more interdisciplinary technologies involving biologists, engineers, chemists, etc., and requiring much more complex optimization and control strategies from computer scientists.

ED.: Are there different environmental priorities in Europe than in the United States?

EK: I would say so. The EU is ahead of the United States, I think. It seems that the EU is willing to take more of a risk and a setback to reduce pollution, probably because the risk is shared among several countries. This is also tied to the more socially conscious systems that you see in Europe. As a single, very capitalist

economy, the United States is more cautious and doesn't have any agreements to keep with neighboring countries. The United States commits a lot to research, but the actual implementation of systems, such as carbon capture and storage, I don't think will have the necessary governmental incentives or industrial support to be realized in the United States before the EU.

ED.: Looking back at your computer science education, what was the skill that has had the most impact on your current success?

EK: I think the skill to take initiative has been the most important for me. In CS, you have to take initiative to make your projects function well and be what you want them to be. You need to find people to work with that will form a productive group. This was much more important in CS than ChE, I think because ChE has been around much longer and you must learn a larger body of techniques and practices that have been already developed over decades; in CS, you have more freedom, and the field is more dynamic. In my work now, I could easily sit back and do the projects that are just given to me, but it has been so much more rewarding to get out there and snatch the really interesting work. I have taken initiative to start a program to help international employees practice speaking Dutch with our colleagues and am currently organizing a study trip to Iceland. I have built a much larger network and have grown much faster in the company than I ever would without having taken the initiative to get out from behind my computer!

ED.: It's not all about work. What activities do you do for fun and relaxation? Since you seem to travel about Europe, what's your favorite spot to go on the continent?

EK: It is definitely not all about work! I'm still very much into rock climbing, which I got into with my CS friends at Rochester; salsa dancing, which I learned in graduate school; and snowboarding, which has been a passion since high school in Seattle. And of course traveling! I have been able to see so many different places since being in Europe, each with such a different character. From hiking in the fjords of Norway to climbing in French wine country to taking the train to Paris for the weekend, it has been an amazing experience! I would have to say my favorite spot to go so far is Switzerland. I had an amazing time seeing Zurich and Bern, and of course getting some Alpine snowboarding in. I went last summer for some more extreme rock climbing in the Alps doing all day multi-pitch routes and staying in a hut that had all of its supplies delivered by helicopter. It is the most beautiful country I have seen so far! The trains are good, the food is great, and there is always a new mountain to discover!