“Y ou can be anything you want to be! There are so many choices! You can be an electrical engineer, a mechanical engineer, a chemical engineer, a civil engineer . . . .” Kanak Bhatia told her daughter. So it’s no surprise that she (a math teacher) and her chemical engineer husband Kamlesh have raised a son who is a mechanical engineer, a daughter who is an electrical engineer, and two daughters who are chemical engineers, Surita (pictured on the right) and Sujata (left).

Surita, the middle daughter, became a chemical engineer not because of her father’s influence, “although he certainly was happy with my choice.” Like many chemical engineers, “in high school, I loved both chemistry and math, so chemical engineering seemed like a natural choice. I also liked the fact that engineers seemed to provide an interface between science and society.”

After receiving her PhD from Princeton Univ. in 2000, Surita is now an assistant professor of chemical engineering at the Univ. of Massachusetts Amherst. Her position involves both teaching and research, where her interests lie in the areas of complex fluids, colloidal dispersions, and polymeric gels.

“I was overjoyed when I landed a faculty position! The job is so stimulating and exciting. I thought about doing this all through grad school, and some days I still can’t believe that things have worked out so well for me here at UMass,” she enthuses. Her most significant professional accomplishment was receiving the NSF CAREER award, which recognizes and supports the early career-development activities of teacher-scholars who are most likely to become the academic leaders of the 21st century.

Surita demonstrates that leadership potential in the wise advice she offers to young chemical engineers. “Being a successful engineer and/or researcher means that you will spend a lot of time defending your work and ideas. This is part of the training and culture of engineering. Don’t take criticism too personally, and if you encounter someone who is very negative, try not to let him or her erode your confidence or stand in the way of your goals. When you get frustrated, take a step back and remember that starting a career in science or engineering is a big accomplishment. Take pride in yourself and in your work, and don’t be afraid to seek advice and help from others when you need it. At the same time, remember to keep your work in perspective, and take time to spend with friends and family,” she counsels.

Sujata, the youngest daughter, is currently a medical student at the Univ. of Pennsylvania. She is in a dual-degree MD/PhD program designed to train “physician-scientists” — people who can apply their medical background to perform disease-oriented research. In May, she completed her PhD work in bioengineering, under the direction of a chemical engineer. “My research focused on developing experimental and computational models for white blood cell recruitment during inflammation. This process is implicated in numerous inflammatory diseases, including arthritis, coronary artery disease, and transplant rejection. I use chemical engineering principles in modeling, for example to understand the mechanical and chemical forces on a blood-borne cell,” she explains.

Going to medical school is challenging, she points out, “because learning medicine involves a lot of memorization. The philosophy of medicine is to teach you a general framework for recognizing a symptom pattern so you can quickly develop a list of possible diagnoses when you see a patient. The philosophy of engineering is to teach you a general framework for solving problems. The two philosophies complement each other. However, starting out in medical school was tough, because it was the first time I’d taken a closed-book exam in a long time.”

When she finishes her training at Penn (she expects to receive her MD in May 2004), Sujata hopes to pursue an industrial career in biotechnology or biomaterials with medical applications. “I would like to apply my training in medicine and engineering to improve human health. I believe my medical training has taught me what questions to ask, and my engineering training has taught me how to answer those questions.”

So just how much of a family affair is engineering in the Bhatia household? Everyone in the family loves science and values education. “We do occasionally talk shop at home, especially with my dad,” Sujata admits. Although they have never collaborated professionally, “I will bounce new research ideas off of my younger sister and ask for her input on proposals. All of my siblings talk to each other a lot about the ups and downs of research and graduate school,” Surita says.

Perhaps the tradition will continue, as both women say they would encourage their children to become engineers. Surita believes “chemical engineering is a great discipline, and it opens up so many different career paths.” Of course, as with any discipline, Sujata points out that they need “to give careful thought to what they enjoy and whether engineering fits into their vision for life.” With Bhatia blood in their veins, it’s likely that it will.

Surita and Sujata would like to hear from other pairs of ChE sisters or father-daughter teams. Contact them at sbhatia@ecs.umass.edu and bhatias@mail.med.upenn.edu.