

Chemistry in the Family

Cheryl B. Frech



As a girl with no brothers growing up in the 1960s, I got to participate in both traditional boy and girl chores and activities: mow the lawn *and* weed the garden, clean *and* cook the fish from a fishing expedition, and play with Barbies® *and* with Lego®. My father worked as a synthetic chemist and frequently came home smelling like organic chemicals, or more frighteningly now, the diborane gas that was piped into one of his labs for research on rocket fuel formulations. He sometimes took me to work with him on weekends. I delighted in one display of brightly colored inorganic compounds and another of the more pastel hues of the displayed rare earth compounds. By the time I was in high school, I was often one of just a few girls in my chemistry, physics, and advanced math classes. Yet not one person told me that the study of science was not for girls. So when I enrolled in college, I selected biochemistry as my major at Oklahoma State University.

A fairly typical undergraduate, I took my classes, studied, and had fun. My 17-hour first semester included one hour of marching band, which led in the second semester to a stint in the wrestling and basketball pep band and participation in

C.B. Frech (✉)

University of Central Oklahoma, 100 N. University Drive, Edmond, OK 73034, USA

e-mail: cfrech@uco.edu

concert band. My sophomore year I joined a sorority and continued with concert band. While no one in my science classes discouraged me from pursuing my major, I was more actively discouraged in the sorority. When it came time for officers to be selected, I was slated only for positions that required a lot of drudgework: service projects chairman, reference chairman. When I inquired about seeking more of a leadership position, I was told that would not be possible since I was “never around.” Around where, I thought? The television room, where girls congregated in the afternoon to watch soap operas and smoke? That was when I was in the laboratory for quantitative analysis and organic chemistry. I had missed a couple of days during initiation week, but that was because the concert band toured the state visiting high schools. Despite this less-than-optimal situation, I stayed in the sorority and graduated in four years with a respectable GPA and headed to graduate school in chemistry at the University of Oklahoma (OU).

When I arrived at OU in 1981, there were no women on the faculty, but just the year before, the Department of Chemistry had begun an initiative to recruit outstanding women for the graduate program. Waiting for me were a small group of women who were one year into the Ph.D. program and who would become my peer mentors and friends. While our undergraduate and high school friends had gotten married and started families, or gone off to work in banks and offices in their women’s suits, shoulder pads, and silk scarves arranged like neckties, we were wearing lab coats and immersed in stopped-flow apparatus, rotovaps, and nuclear magnetic resonance. We were required to spend at least one year as a teaching assistant. I found myself at 21 years old (and looking younger) standing in front of my first general chemistry laboratory section and looking completely indistinguishable from the students. In order to maintain order and to be recognized as the instructor, I realized I would have to dress the part and be a little bit strict, at least at the beginning of the semester. That was the origin of two habits that I have maintained throughout my career: always dress like you are the instructor (because you are) and establish some rules for your classroom (you can always ease up later in the term).

Throughout graduate school, I excelled at teaching and at presenting the seminars that constitute part of your degree requirements. Members of my graduate committee would say, “You explained that concept very well. Have you considered a teaching career?” I would always answer no, since I fully expected to work for a chemical or petroleum company, which is where my father worked and where my graduate school colleagues were finding jobs upon graduation. I met my husband in graduate school. Roger was already on the OU chemistry faculty, had been married previously, and had children who were in their teens at the time. We were married shortly before I completed my doctorate. I was able to complete one postdoctoral fellowship at OU before we moved to Mainz, Germany, where we both worked at a Max Planck Institute: he on sabbatical as an advanced researcher and I completed a second postdoc.

By the time we were in Germany, my biological clock had triggered, which in turn initiated many conversations about the possibility of us having children. Roger had entered the university system as part of the post-Sputnik science boom

generation. Almost exclusively men, they toiled away in the lab, wrote papers and grants, taught their classes, and traveled to conferences and meetings. Most of them had wives at home who managed the day-to-day tasks of the household and essentially raised the children. We knew if we had children, the dynamic had to be different, mostly because I could not be that kind of wife.

When we returned from Germany, I was hired for two years as a visiting assistant professor at OU, teaching very large lecture sections of general chemistry. I didn't know there were better teaching situations than 250 students in a lecture room, but I loved teaching, and started to work to bring more active learning into the classroom. In 1991, a permanent tenure-track position was advertised at a regional university in the Oklahoma City metropolitan area and I was encouraged to apply. Central State University, soon to become the University of Central Oklahoma (UCO), was hiring someone to teach general chemistry and serve as the general chemistry coordinator: it was if the job description had been written for me. The only downside was the 37-mile one-way commute from our home in Norman. I sought advice and someone asked, "If there was no commute, would you take the job?" I said yes, and he replied, "then take it anyway." I have now been at UCO for 23 years, commuting daily from the southern edge of the Oklahoma City metropolitan area to the northern edge. When I first started commuting I listened to audiobooks on cassette tape to cope with the 45- to 60-minute drive. The technology has changed from tapes to CDs to downloads on my smartphone, but I am hopelessly addicted to listening to books and am never without one in the car. People inquire about the stress of the commute. The time and distance intervals of the commute have been an excellent buffer between university and home concerns.

A few women taught in the UCO Chemistry Department before me, but none were in tenure-track positions. The year that I was hired another woman who already had a young child was also hired. Some faculty in the department had older children and some had grandchildren. In my second year at UCO I became pregnant. This was a pregnancy with major complications, and I missed several weeks of the fall semester after emergency surgery. My department chair treated this absence as he would have any other illness. As my due date neared, I planned to take off the entire spring semester and return to teaching the following fall. The state of Oklahoma offers no parental leave, so I was required to take an absence without pay. (This will no doubt be factored into my retirement calculations at some point, so there will be a financial repercussion.) Our daughter, Alison, was born in February 1993.

When I returned to work at UCO in the fall of 1993, we hired an in-home caregiver. Wanda was an older woman with a lot of experience in childcare who delighted in caring for Alison. I was still nursing Alison that semester, and was able to nurse her in the morning before I left, in the evening when I returned, and before she went to sleep. Neither of my children would ever take a bottle, so Wanda taught them to use a sippy cup from an early age. By the spring semester, I had weaned Alison so that I could resume travel since I had recently been elected chair of the local section of the American Chemical Society (ACS) and needed to attend a training conference.

My only sister is eight years younger than me. We were never close until we both became adults. I vowed that if I had more than one child, they would be close in age so they would have the potential to be closer friends and siblings. And so I became pregnant again when Alison was just a year old, and our second daughter, Emily, was born in April 1995. After her birth, we needed a little longer time as a family, so I took off another semester and returned to teaching in the spring 1996 semester. We again hired Wanda to care for two small children 4 days a week. On the single day that I was not teaching, I dropped the girls off at my parents' house in Oklahoma City on my way to Edmond, so that the girls could get to know their grandparents.

Because my work and home life are geographically separated, my children were not as present in the UCO Chemistry Department as other children might have been. And as such, I was not perceived as a parent perhaps as much as others who had to bring a sick child to work with them, or who had to leave suddenly to pick up a child from school or day care. Of course, this would not have been possible without Roger in Norman to respond to emergencies and to fill in when Wanda was unavailable. I am grateful that he was at a point in his career and his life where he could be the responsive and available parent when I was often an hour away.

The University of Central Oklahoma is a primarily undergraduate institution (PUI) and we do not have a graduate program in chemistry. When I was hired in 1991, the university was not far removed from its normal school/teacher's college roots. UCO faculty have always had a heavy teaching load, usually four courses per semester. Although the department has good instrumentation in chemistry, we have limited laboratory space for research. It's only been in the past year that we have carved out shared space for faculty to conduct research outside of teaching laboratories. In order to progress through the promotion process, I have participated in scholarly activity such as writing and reviewing chemistry teaching materials, writing invited book reviews, and serving as an associate editor for a chemistry journal. Being able to focus on these sorts of scholarly activities has been far less stressful for me than for my peers at research universities.

As the girls grew and started school, Wanda moved on to other babies and we hired college students to pick up our girls after school and stay until Roger or I got home. I never felt terribly guilty about not being around my children constantly. I completely subscribe to the "it takes a village" approach of raising children. Each of the women who cared for our children brought something to our daughters' lives that we could not. Wanda had an excellent singing voice, and had sung extensively to the girls. Two of the college students, Auva and Tonya, were excellent at crafts, and taught the girls how to make simple decorations for their rooms. Michaela was an engineering major who studied calculus on the couch in the afternoons: Emily was in awe. Today there is tangible evidence of the multiplication of these gifts: both Alison and Emily have worked in childcare and served as caregivers for other families.

At UCO I have always made a point to tell students in my classes that I am a mother, and to let them know that when I am not at UCO, I am doing the things that their mothers might have done: going to dance recitals, attending softball and

soccer games, and serving as a band parent. Our university has a large population of commuter students, many of whom attend school while raising their own children. Knowing that their instructor is also a parent makes it easier for a student-parent to let me know that they have missed class because of a doctor's appointment for their sick child: otherwise I might never find out the reason for the absence.

When I arrived home in the evening the four of us would prepare a meal and eat together. Over the years the girls heard many dinner-table conversations about our students, departments, and chemistry, and perhaps it prepared them well to face their own education head on. Even though we are both educators, unlike some of our daughters' friends' parents, we did not intervene in our daughters' public school education. If either girl had a teacher they did not particularly like, we told them to stick it out, rather than go to the school and demand a change. The girls learned early on to take responsibility for their own education issues. Emily was only in sixth grade when she realized that she was playing on a competitive soccer team while also enrolled in a rather lame physical education class at school. Figuring she had enough exercise playing soccer, she went to the office and arranged a schedule change and became an office aide for the rest of the year. Surprisingly, the school never contacted us for our approval.

When the girls were 5 and 7 both Roger and I applied for and were granted sabbaticals, and our family moved to Scotland for a year. Roger worked on various research projects at the University of St. Andrews and I taught two chemistry tutorials and worked on several writing projects. We lived in a small fishing village and I was able to work mostly from home and be there for the girls before and after school in a way that I could not in Oklahoma. This was a delightful respite and a cherished year for all of us.

Shortly after we returned from Scotland, I was elected Chair of the UCO Chemistry Department. The previous chair was male and single, and lived only a few miles from the university. Again, I told my colleagues that I could perform this job, but I would do it differently than my predecessor. In fact, the previous two department chairs had spent many nights and weekends handling work in their offices, but I knew I would not be able to do this, and be present for my daughters, who were 9 and 11 at the time. My approach was to organize the work and take what needed to be done home to complete after the girls had gone to bed. I also strove to delegate tasks to get more people involved and to mentor new faculty in projects that benefitted the department. I ended up completing two four-year terms as department chair. During this time our department grew in number of faculty members, credit-hour production, and chemistry majors, we completed several assessment reviews, and we modified our curriculum: a successful run, at least by my account.

In the department I heard minimal grumbling about my commitment to UCO in my role as a multitasking mother, professor, and chair. However, I served under one dean who did question my availability. When my daughters were in elementary and middle school, my schedule was such that I could drive them to school and then drive the 37 miles to the university, arriving between 8:45 and 9:00 before my classes began at 10:00 am on Monday, Wednesday, and Friday. I was never late to class. I was not, however, around at 7:30 am when this dean sometimes wanted to

speak to me. During an evaluation conversation, he mentioned that I was not always available when he called my office. I responded that I was always available by mobile phone, and that I was on campus on a regular schedule. He continued to push, blustering about how I might be needed to respond to a vague “incident” that might occur someday. I kept asking, “What, in particular, have I missed up until this point?” He had no answer, and I kept taking my daughters to school until they were able to drive themselves.

In addition to my role at UCO, I have been professionally active in the American Chemical Society (ACS), at the local, regional, and national level. I have met and worked with a number of outstanding chemists through the ACS. One of them is Helen Free, now in her 90s, who, among her many accomplishments, was President of the ACS and has been recognized for inventing diabetes test strips. I served on an ACS committee with Helen when she was well into her 80s and she still attends national meetings. Her husband had children from a previous marriage, and they had six additional children together. I once asked her how she had seemingly “done it all.” She replied that it was perfectly acceptable to pay for someone to do the things that you do not have the time to do or that you do not enjoy, such as cleaning house or cooking. What a relief! I immediately hired someone for biweekly housecleaning.

Being a professor and a mother is a challenge that will be unique for each woman’s family, career, and institution(s). There is no one “right” way to be successful. Strive to let go of being perfect, or at least perfect in all aspects of your life at the same time. You will miss a few of your children’s events, and you probably will not be as fit, relaxed, or current with your hobbies as you might have otherwise been. Don’t forget your spouse/partner: they are an integral part of the equation and they will still be around when the children make their way into the world.



Cheryl Frech, *left*, with Roger, Emily, and Alison Frech.

Interview with the Author

1. How has deciding to start a family or having a family influenced your career? How has your career influenced your family?

My two children were born while I was a tenure-track faculty member at a regional university. While I cannot say for sure that having a family influenced my career, I am certain that my career has influenced my family. My two daughters have only and always known their mother to work. This meant that we hired college students and other caregivers to be with them. Instead of feeling guilty about this, I tried to celebrate the different gifts that each caregiver brought into their lives: one sang to them when they were little, and hence, both girls can carry a tune (while I cannot). Two of the college girls were great at bringing crafts, so the girls are able to create things, and yet the sight of a glue gun terrifies me.

2. Did you have role models? Which examples were set for you in your childhood or while you were growing up?

I was born in 1959 and I did not know very many women of my mother's age who worked. My own mother taught school for a few years before I was born. Anne Plyer was the mother of one of my friends: her husband was a stamp-collecting friend of my father's and she was a chemist who worked with my dad. She was the only professional woman I knew growing up.

3. Have you come up against any significant obstacles during your career and how did you overcome these?

I would not say that I have encountered any significant obstacles in my career.

4. Is there anything you would have done differently or would not do again?

Women of my generation, who went to college in the late 1970s, had many choices available to them, but not nearly as many as today's young women. I was not encouraged to aim high (to attend a great school, for example) and that perhaps limited my career. But I have no regrets.

5. What advice would you give to young women hoping to pursue a career in academia? E.g., while studying, when planning a family

Many of today's young women are more aware of their options than I was at their age. They have heard about the fertility struggles of women who postponed childbearing into their 30s and beyond. My only piece of advice would be: always do your best (then you have no regrets) and don't worry about what other people think of your choices (they are too busy worrying about their own business). Both of my daughters have expressed an interest in becoming faculty members and I am glad that my experiences have not steered them away from this possibility. One is about to graduate with a degree in psychology and the other is a freshman biochemistry major—perhaps there will be more chemists **and** professors in our family.

My Mom and Science

By Alison Frech, age 21

Thanks to my mom, I wasn't privy to the fact that women hadn't always been encouraged to pursue a career in academia until I was nearly in middle school. I had long assumed that every mother was as delighted and involved with her career as my mother. This was enhanced by the fact that my parents conducted an annual chemistry demonstration at my elementary school, which elevated me to a celebrity status among my peers during the week they were scheduled to perform their science show. Together my mom and dad would dazzle us with beakers spurting copious amounts of foam or concoct liquid nitrogen ice cream. My mom was no assistant; the two of them ran the demonstration garbed in crisp lab coats, working as a team to interest the students before them in chemistry. This is illustrative of how I viewed their careers. Although I later learned about their separate focuses within chemistry, the perception that my mom was equally as capable as my dad has remained constant. Having such a strong role model in my life has allowed me to grow up sure of the fact that I am able to pursue and excel any career I desire, for my success relies on my ability, not my gender.



Alison, Cheryl, and Emily Frech on a return visit to Scotland in 2011.

Main Steps in Cheryl's Career

Education and Professional Career

1981	B.S. Biochemistry, Oklahoma State University, OK
1984	M.S. Analytical Chemistry, University of Oklahoma, OK
1985	Visiting Research Assistant, Technical University Berlin, Germany
1987	Ph.D. Analytical Chemistry, University of Oklahoma, OK
1987–1988	Postdoctoral Fellow, University of Oklahoma, OK
1988–1989	Postdoctoral Fellow, Max-Planck-Institute for Polymer Research, Mainz, Germany
1989–1991	Visiting Assistant Professor, University of Oklahoma, OK

1991–1997	Assistant Professor, University of Central Oklahoma, OK
1997–2001	Associate Professor, University of Central Oklahoma, OK
2000–2001	Visiting Academic, University of St Andrews, UK
2001–present	Professor, University of Central Oklahoma, OK

Cheryl is a fellow of the American Chemical Society and an Associate Editor and an Editorial Advisory Board member for the Journal of Chemical Education. In 1999 she received the UCO Neely Award for Excellence in Teaching.