If at First You Don't Succeed, Don't Give Up on Your Dreams . . .

Pamela Ann McElroy Brown

In the Beginning

I first fell in love with chemistry in high school, admiring the patterns in the periodic table which allowed prediction of the properties of the different elements, enjoying the challenge of balancing equations and stoichiometry, and recognizing the potential for solving societal problems with chemistry. Even before that I had fallen in love with babies. My sister was born when I was 10 years old and we shared a room. Her sweet smile and joy at discovering the world were irresistible.

My goals when I left for college were to get a degree, maybe even a master's, get married, work for a few years, have a baby, stop working, and in the 5 years before kindergarten earn a PhD. I would then get a job as a college professor when my child started school, where I could continue to conduct research and help to educate the next generation. I really wanted to be around in those important preschool years which I had seen with my sister were precious but fleeting. It did not matter to me that no woman in my family had even attended college, this was my plan! My own mother, a farm girl from central California, had dropped out of high school after 10th grade and was married on her 17th birthday, the first day she was legally able to do so without parental permission. I was born when she was still a teen and was often mistaken for her younger sister. She felt trapped by her lack of education and

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domestic responsibilities, and constantly urged me to get an education so that I could be economically self-sufficient. My father was 8 years older than her and earned a good living as a radio announcer. He felt, however, that since he was the sole wage earner, all childcare and housework were my mother's responsibility. Finding a husband when I was in college, who would help with the housework and childcare and was supportive of my dreams, was an important component of "the plan."

The Plan Unfolds

I began dating my future husband Harvey in college. After earning my BS in Chemistry from the State University of New York at Albany, my tuition and living expenses were paid for by a Gulf Oil fellowship while I worked toward a master's degree at the Massachusetts Institute of Technology (MIT). After finishing my master's I was employed a year at American Cyanamid doing research on hydrodesulfurization catalysts. We saved enough to get married and buy our first home. I needed to relocate as my husband worked in the family demolition business and did not have that flexibility. I was able to find employment at Pall Corporation, a manufacturer of medical and industrial filters, working in technical service. This was my dream job. I would arrange for potential customers to send samples to our labs to determine which of the products would best meet their filtration needs. I would also travel to their facilities and deliver equipment so that they could evaluate the filters themselves under process conditions. I would help existing customers if their specifications changed or if they encountered problems. Once I discovered I was pregnant I decided that I would return to work after a few months of maternity leave. I enjoyed my job, had family living nearby to help out, and also felt the financial pressures of home ownership.

Motherhood

My daughter Heather was born when I was 26. She was beautiful beyond words and seemed perfect. Unfortunately when she was a few weeks old it was discovered that she had a congenital birth defect—a dislocated hip. She was born without a hip socket and if left untreated would walk with a limp and develop painful arthritis at an early age. The treatment was a brace that needed to be worn essentially 24 h a day, 7 days a week for a year or more. The brace pushed the legs into the pelvis, slowly creating a hip socket in the soft, infant bones. If the brace wasn't readjusted correctly after diaper changes, etc., the treatment would be ineffective. I decided to resign from my job and stay home and take care of her. My second daughter Vanessa was born 17 months later. When the girls were 18 and 35 months old I returned to college to begin work on a PhD. I had been awarded a Teaching

Assistantship which paid for my tuition and provided a stipend for expenses, which I used for childcare. I took classes in the evenings and taught a 6 h lab on Fridays. Because I already had a master's degree and had also taken graduate courses as an undergraduate, I was able to complete my required coursework in one academic year and pass the qualifying exams. I made arrangements with one of the faculty members to begin research on my dissertation the following fall, again receiving a stipend and tuition paid through a research assistantship. This is one of the many advantages of pursuing graduate work in the chemical sciences—the opportunities to earn a degree with no out-of-pocket expenses in exchange for working as a teaching or research assistant. My education was supported by the National Science Foundation and a James Lago Fellowship.

My dissertation project involved a novel process for the purification of terephthalic acid (TPA), which is used to synthesize the long chain polyester, polyethylene terephthalate (PET). PET is used to make products ranging from plastic soda bottles to fabric. The PET produced today is much stronger because it is made from purer TPA. My work contributed to this improvement.

A little over 3 years after starting research I successfully defended my dissertation. During this time I became an efficiency expert—I would plan meals a week in advance, so I would only need to make one trip to the supermarket. While my fellow graduate students would socialize in the mornings, I would get right to work, arriving early and leaving late to avoid rush hour traffic. About a year before finishing my dissertation my son William was born. Fortunately, all experimental work had been completed and my advisor, who was very supportive, allowed me to finish up from home and continued my financial support, although at a reduced level. During naps I finished writing computer simulations and my dissertation. After earning my PhD I was exhausted and took several months off. I then continued to work for my advisor for a couple of years on a part-time basis as a consultant—I would come in and run experiments, do literature surveys, and write reports. I also published two papers on my dissertation research in peer-reviewed journals during this time.

There were many people along the way who served as my mentors. As an undergraduate at the State University of New York my Physical Chemistry professor, Dr. A.J. Yencha, provided me with the opportunity to conduct research with him. He provided invaluable advice when I applied to graduate school. My PhD dissertation advisor, Dr. Alan Myerson, was extremely understanding and supportive of my family needs. He helped me to develop a research project where much of the work could be done at home using the computer. He made sure that I had access to the resources needed in the laboratory. He was a brilliant scientist combining his responsibilities as department chair with an active research program. He was patient when experiments led to a dead end and helped me to develop more successful approaches.

A Career in Academia

I decided that a career in academia would allow for good work–life balance and was a better fit for my interests and the realities of the local economy. The chemical industry in the metropolitan New York area was shrinking and positions were few and far between. The academic calendar was much more flexible than that of the corporate world. When my son was in kindergarten I started a one day a week position teaching a physical chemistry laboratory at Barnard College. After a year I was offered a full-time position as a visiting assistant professor at Stevens Institute of Technology. It was a 9 month a year non-tenure-track teaching appointment. I hadn't even applied for the position but had been highly recommended by my dissertation advisor when someone else left just before the start of the semester. I was thrilled! My coworkers were nice and the students were a delight to work with. I stayed at Stevens for 4 ½ years but became increasingly frustrated by the lack of job security and professional growth potential—there was always uncertainty waiting for another annual reappointment, and no opportunities to conduct research. My salary was also considerably less than that of the tenure-line faculty. I enjoyed developing new curricular materials and managed to present at educational conferences and publish in educational journals. One of my happiest memories was taking two of my children with me to present at a conference in Washington, DC.

Finally, I was offered a tenure-track position as an assistant professor at New York City College of Technology (then New York City Technical College), a branch of the City University of New York, in a 2-year chemical technology program. The department, Physical and Biological Sciences, included faculty in biology, chemistry, and physics. By now my children were 16, 14, and 10—they were growing up fast! Since my commute was 90 minutes each way, arranging car pools to after school activities was a perennial challenge. Meals were planned a week in advance and fortunately my oldest daughter enjoyed cooking and frequently prepared dinner. When she was busy we often had "frozen food feasts" to save time but still have meals together as a family. After dinner everyone would finish their homework at the kitchen table and I would help them out as needed. Their academic success was a high priority. Harvey was also a big help despite his long hours. I continued to have childcare available after school and on school holidays, but my oldest daughter in particular was beginning to resent having a "stranger" in the house.

There are three major areas of responsibility for tenure-line faculty—teaching; service to the department, college, and university; and scholarship. In 2-year programs the major focus is on teaching and service, although there is the expectation of scholarship as evidenced by publications, presentations, and other scholarly work. Faculty employed at the City University of New York, which includes community colleges, 4-year institutions, and graduate and professional programs are employed under a collective bargaining agreement. The expectations of productivity in all three areas are the same, although the emphasis is different depending on the focus of the institution. When I began, my teaching load was

27 h annually, typically 15 h one semester (five sections meeting 3 h each week) and 12 the other (four sections meeting 3 h each week)—teaching and service were the main focus. I also advised students, helped those in my classes during office hours, was the faculty advisor to the chemistry club, wrote letters of recommendation, helped students obtain internships, and served on several campus-wide committees. I ran for College Council, the faculty governance body, and eventually chaired the committee making policies related to students. I began a research program with undergraduates, presented at regional and national conferences, and continued to develop new curricular materials and publish in educational journals. Every summer I applied for, and was awarded, grants through the American Chemical Society's Project SEED, which provided generous stipends to promising but underprivileged high school students. The undergraduates developed their own mentoring skills working with the SEED students and had fun. One project even resulted in a publication in the *Journal of Undergraduate Chemistry Research* while one of the contributors was still in high school!

After 3 years I applied for and was awarded a promotion to associate professor and after 5 years I had tenure at long last! My two daughters had graduated high school and went off to college and my son was now in high school—where had the years gone?

Teaching in a 2-year program allowed me the opportunity to teach the subject that I loved and really make a difference in the lives of my students. Many of the students that I worked with went on to graduate and professional schools. Some are even adjunct chemistry faculty members on my campus—sources of inspiration to current students. Mentoring promising high school students was a delight. A moment I will never forget is when I heard a knock on my office door one summer while on the phone. Not wanting to get up I asked, "Who is it?" My SEED student responded, "A budding scientist."

When the Chemical Technology Program Coordinator was appointed as Acting Dean, I became the Program Coordinator. In addition to teaching, my responsibilities now included scheduling chemistry courses and faculty, interviewing and recommending adjunct faculty for part-time teaching positions, handling student complaints, evaluating transfer credits, and facilitating monthly meetings with all chemistry faculty members to discuss departmental issues such as curriculum development, text book selection, and social activities. I set up the annual meeting with our External Advisory Board, made up of alumni and other representatives of local industries, to assure that our curriculum met workforce needs. I continued to conduct research with undergraduates and involved high school SEED students during the summer.

Sixteen months after being asked to be the Program Coordinator I was asked to serve as Acting Dean of the School of Arts and Sciences. Two years later after a national search I was appointed dean. In that capacity I oversaw eight academic departments. Part of my responsibilities included fund raising through grant writing. I was the principal investigator on a $1 million National Science Foundation (NSF) grant to increase the number of STEM graduates and was the co-PI on several other NSF grants, totaling over another $2 million.

After 6 years as dean, I had the privilege of serving as a Program Director for the National Science Foundation in the Division of Undergraduate Education, in Arlington, Virginia, under a 1-year appointment. The National Science Foundation is the largest government agency responsible for supporting external research. Scientists and engineers submit proposals which are reviewed by experts in the field, to help assure that only the most meritorious are funded. In my capacity as a Program Director I managed a portfolio of ~50 current awards and made funding recommendations totaling ~$13.5 million. I identified reviewers, assembled and oversaw review panels, and contributed to new solicitations. I also traveled around the country providing outreach to the larger undergraduate education community through presentations on funding opportunities, NSF initiatives and also offered grant writing workshops.

Upon my return to the college I was promoted to associate provost. My responsibilities now include oversight of program review and reaccreditation, program and curriculum development, faculty professional development, and coordinated undergraduate education.

My oldest daughter, Heather, has chosen a life in academia and is a lecturer in Health Economics at Newcastle University, in Newcastle, England. She earned a PhD from Sheffield University in England and is married to Adam. They met in Scotland while she was doing a postdoc. They recently became parents to baby Sadie. Vanessa works in Human Resources and lives in Manhattan, New York. William graduated from law school and works in labor law on Long Island, New York. My husband Harvey and I are still happily married, enjoy traveling and local cultural activities, and are looking ahead to retirement in a few years.

While I consider raising my children to be my greatest life work, my career was always a source of great pride and joy. A job in academia allowed me to do both. My oldest daughter tells me that my insights helped her earn her PhD and obtain her position. She teaches graduate students and her research is her most important professional priority. Vanessa fondly remembers Saturdays at science fairs and William always enjoyed the kitchen table science experiments I tested on him before demonstrating to my classes (red cabbage juice is a great pH indicator!).

Throughout my professional life, mentors continued to play an important role. As mentioned earlier, once I became the Dean of Arts and Science I wrote a successful National Science Foundation $1 million STEP grant to increase the number of graduates in science, technology, engineering, and mathematics (STEM) at my institution. My Program Director, Dr. Susan Hixson, provided much needed advice on how to successfully manage a large, multidimensional grant. Through annual meetings for principal investigators, I became part of a national community dedicated to student success, sharing information and ideas. I was asked to review proposals and met Program Director Elizabeth Dorland, who purposely arranged connections within the chemical education community. Through her intentional networking I met Dr. Rick Moog, principal investigator (PI) on several NSF grants and was able to introduce Process Oriented Guided Inquiry Learning (POGIL) on my campus. I also met Dr. David Burns, another PI, and helped my campus join the Science Education for New Civic Engagements and

Responsibilities (SENCER) community. Both initiatives led to innovative curriculum and improved teaching.

The greatest challenge that I encountered in my career was obtaining a tenure-track position once I returned to the workforce full-time. While tenure-line positions were once the norm, there is a growing shift towards part-time instructors. While some are employed full-time in industry and teach part-time for personal satisfaction or supplemental income, many patch together full-time employment by working part-time at multiple campuses. For those in this situation, there is little security, much hard work, few if any opportunities for research and scholarly growth, and typically annual salaries much lower than those of tenure-line faculty. At my campus about 50 % of the classes are taught by part-time faculty members.

In my opinion the best way to prepare for a tenure-line position is to speak to as many people in academia as possible to learn about the culture and expectations. Ask about the hiring process and the characteristics of successful applicants. Peer-reviewed publications are a benchmark of scholarly accomplishments. Plan for publishing even before commencing research. Read the journals and model your writing after successful authors. Obtain teaching experience—you can start as a tutor or peer mentor as an undergraduate and serve as a teaching assistant (TA). Look for teaching opportunities in graduate school. Read journals such as the *Chronicle of Higher Education* to learn more about the issues facing higher education today. Assessment of student learning and cycles of continuous improvement are mandates of the accrediting agencies. Learn about assessment and if possible get solid experience. Read journals such as the *Journal of Chemical Education* to learn more about pedagogy, curriculum development, and effective practices in the class room. Learn about strategies for writing proposals—in many cases grants will fund your research and other projects. In summary, academia is a challenging career, with many demands, requiring years of preparation. It is also extremely rewarding, with opportunities for work–life balance and personal satisfaction.

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?

I decided that a career in academia would allow for good work–life balance and was a better fit for my interests and the realities of the local economy.

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

There were many people along the way who served as my mentors. As an undergraduate at the State University of New York my Physical Chemistry professor, Dr. A.J. Yencha, provided me with the opportunity to conduct research with him. He provided invaluable advice when I applied to graduate school. My PhD dissertation advisor, Dr. Alan Myerson, was extremely understanding and supportive of my family needs. He helped me to develop a research project

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where much of the work could be done at home using the computer. He made sure that I had access to the resources needed in the laboratory.

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

The greatest challenge that I encountered in my career was obtaining a tenure-track position once I returned to the workforce full-time. While tenure-line positions were once the norm, there is a growing shift towards part-time instructors. I accepted non-tenure-line positions to gain experience and kept trying.

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

I always try to look forward.

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

In my opinion the best way to prepare for a tenure-line position is to speak to as many people in academia as possible to learn about the culture and expectations. Ask about the hiring process and the characteristics of successful applicants. Peer-reviewed publications are a benchmark of scholarly accomplishments. Plan for publishing even before commencing your research. Read the journals and model your writing after successful authors. Obtain teaching experience—you can start as a tutor or peer mentor as an undergraduate and serve as a TA. Look for teaching opportunities in graduate school. Read journals such as the *Chronicle of Higher Education* to learn more about the issues facing higher education today. Assessment of student learning and cycles of continuous improvement are mandates of the accrediting agencies. Learn about assessment and if possible get solid experience. Read journals such as the *Journal of Chemical Education* to learn more about pedagogy, curriculum development, and effective practices in the classroom. Learn about strategies for writing proposals—in many cases grants will fund your research and other projects.

About the Author

Pamela Brown is currently the Associate Provost at New York City College of Technology, a comprehensive college offering both associate and baccalaureate degrees, and one of the 23 branches of the City University of New York. Prior to this Pamela was the Dean of the School of Arts and Sciences, after having served as the Program Coordinator for Chemical Technology, a 2-year degree program. She continues to hold the rank of associate professor in the Chemistry Department. In 2011–2012 she had the privilege of serving as a Program Director for the National Science Foundation in the Division of Undergraduate Education. Her education includes a BS in Chemistry from the State University of New York at Albany, an SM in Chemical Engineering Practice from the Massachusetts Institute of Technology, and a PhD in Chemical Engineering from Polytechnic University (now NYU-Poly).

Graduation Celebration—from left to right: Harvey, Vanessa, Pam, William and Heather

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