

Interviews of the Margaret MacVicar Memorial AMITA Oral History Project, MC 356
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Louise Foley – class of 1970

Interviewed by Madeleine Kline, class of 2020

March 8, 2019

Margaret MacVicar Memorial AMITA Oral History Project

Louise Foley (PhD Chemistry 1970) was interviewed on March 8, 2019 by Madeleine Kline (SB Biology and Chemistry 2020) at her home in Fort Myers, Florida.

Dr. Foley grew up in Old Forge, New York, where she enjoyed swimming and skiing with her brothers. Her mother loved science but was prevented from teaching it, teaching other subjects instead. Her father was an electrical engineer who, for a time, worked on radar technology at MIT.

Dr. Foley, who always had an interest in chemistry, became enthralled by organic chemistry research while completing her bachelor's degree at the University of Vermont. She then earned her chemistry PhD at MIT under Professor George Büchi, where she studied an approach to the synthesis of quinine. Following graduate school, Dr. Foley worked for 10 years at Hoffman-La Roche on insecticides and antibiotics before returning to MIT to study biology and immunology. She then accepted a faculty position at the University of New Hampshire. Six years later, Dr. Foley returned to Roche to start the chemistry component of the company's oncology program. She worked at the company until she retired in 2002 to take care of her mother.

KLINE: I was hoping that you could speak a little bit about your mom being a closet scientist. What was it like growing up and how did your parents introduce you to science?

FOLEY: In those days, people that wanted to teach went to a normal school for three years, and got a license to teach. My mother had wanted to teach high school science, but just going to the normal teaching school, you really couldn't. And nobody there would let her study science. They said nobody will hire a woman science teacher. This was in the '30s.

Then she taught at a grade school in Stony Brook, Long Island. She said she was like the Pied Piper: she took the kids outside and showed them all the natural trees and plants and explained everything to them. During summers she continued her education at New York University and Albany State College, receiving a BS in Education. At these schools she again tried to become a woman science teacher, but they wouldn't let her.

They finally agreed to let her be an English major and a math minor. Throughout her life, she was just loved anything having to do with science. As kids, she did

the usual 'wander around and show us all the trees, the plants and animals and insects' and all that kind of stuff; it just was something natural for her to be interested in it. And I have to say she always got several newspapers and would devour them and find the articles involving science.

When I was in school, and even when I was working, she'd cut the articles out, and about once a month I got this packet of all the interesting science articles she had saved. I told her, "I wish you could read JACS [Journal of the American Chemical Society] and JOC [Journal of Organic Chemistry] and a few others, and abstract those for me, too."

She just was enamored with science, and frustrated, of course, that she couldn't teach it. But in those days, it was difficult, as it was when I finished my PhD. It was very difficult for me to get a job in the academic area, because they just didn't hire women.

KLINER: But you think there was progress from her time to your time.

FOLEY: Yes – at least I got into school to study science. I think going to MIT, it may have been an advantage to be a woman, because there were so few women applying to graduate school. I think MIT would never have admitted me as an undergraduate, because I didn't have the background and I did really badly on my SATs.

And Vermont [the University of Vermont] admitted me, for whatever reason. So that part worked out. It was to my advantage because I really did well there and got involved in research very early in my undergraduate years. That helped me a great deal.

KLINER: How did your mother end up in Old Forge, New York?

FOLEY: She married my father. Initially, he worked for GE as an electrical engineer working on television in the early days of television. Before the war [WWII], the Navy was looking for electrical engineers. He applied and was offered a job, so they moved to Washington. He worked for the Navy Department Bureau of Ships installing radar and training people on radar and then sonar on submarines, which was amusing because he hated going underwater.

He had spent time at MIT, in the Radiation Lab, where they worked on radar and did a lot to help get radar up and running. Anyway, after the war, his father, who ran a lumber and hardware business, was getting older. Dad said he'd come back and run the business, so we came back to Old Forge, which was a

great place to grow up. It was like living in the summer-winter resort, which it was. You could swim when you wanted, ski when you wanted, whatever. For us kids, it was a perfect move.

Mom used to substitute teach at the school, and we hated it if the phone rang at 7:00 in the morning. We'd go, "Oh god. Hopefully, it's not my class." When a teacher called in sick, they'd call mom to come teach, so sometimes we had mom for our teacher.

That's how we ended up in Old Forge. It was a very small town. In the summer it grew in population, but during the winter it was a very limited number of people. The school had a reasonable number of students, but no advanced classes at all. They just had the math classes without any advanced classes. And the chemistry course was just a single course without specialty. But my chemistry teacher, who taught all the sciences at the school, took an interest in me and let me do some experiments in the lab. We never finished one of them. Kept having problems.

KLINER: In the lab at your high school?

FOLEY: Yes, just the usual stuff.

KLINER: What kinds of experiments would you do?

FOLEY: We were trying to do some kind of chemical clock make some substance that changed color with time or magnetism. I can't really remember. We never finished it. Things kept going wrong. At one point, in the physics lab, we had to determine the speed of sound. I determined the recorded speed of sound is wrong, probably because the equipment we had was not very good.

KLINER: So you knew, once you got to high school, that you might be interested in chemistry?

FOLEY: Yes. I had been very fond of all the science classes that school taught. And then, when I took the chemistry class I just loved it. And who knew? At that point I had no idea that there were several different fields within chemistry. It was only when I got to UVM that I learned that there was more than general chemistry to study. The first year was a general chemistry class, which was horrible. It was like a repeat of high school, but I did OK.

I was allowed to take organic chemistry my sophomore year, which was unusual in those days. Usually it was your junior class. And as soon as I took that, I just

fell in love with it because you could predict what was going to happen. You learned the mechanisms, and you could figure anything out somebody threw at you. I sort of fell in love with organic chemistry but had no idea what I could do with it, except maybe teach in high school.

And then, that summer, I was given a National Science Foundation undergraduate research fellowship. This was right after Sputnik, and there was a lot of money for science in the colleges to try and encourage more Americans to get involved in science, so I got started in undergraduate research.

KLINE: This was after your sophomore year, after your second year of college?

FOLEY: Yes. And I continued doing research during the academic years and each summer thereafter. This was one reason why I didn't do too well in the MIT qualifying exams, it seems: I was too busy having fun in the lab to review physical chemistry.

KLINE: So you worked in the same lab at UVM for all of that time?

FOLEY: Yes.

KLINE: Which laboratory was that?

FOLEY: That was in Martin Kuehne's lab [professor of organic chemistry at the University of Vermont, known for indole alkaloid syntheses]. He died recently. Initially, I worked in the graduate student lab, which was fun. But then, when he discovered I was so good in the lab, he decided to bring me into his private lab, where he could teach me techniques – which made a huge difference, because by the time I went to graduate school I already knew how to do almost everything.

One of the first projects George Büchi [MIT Professor of Organic Chemistry 1951–1991; Camille and Henry Dreyfus Professor of Chemistry; recipient of the James R. Killian Jr. award; worked on organic photochemistry and structure determination and synthesis of Natural Products] gave me at MIT was to repeat a graduate student's synthesis. I think it was a test, and they figured it would take me a week to do. Well, within two hours I had it done and had all the spectra. OK.

KLINE: So you were doing organic synthesis at UVM?

FOLEY: Yes.

KLIN: What kind of synthesis were you--

FOLEY: We were working in the early days of enamine chemistry. The very early days, right after they had been discovered, we investigated a variety of different reactions and determined products and side products and things like that.

I came to love side products. You know, when things don't go the way you think they should, or maybe they do a little bit, but they also give you something else. Figuring out what that something else is and how it's formed usually allows you to figure out how to overcome that problem to get the compound you want. Sometimes the side product is more interesting than what you were trying to make.

So I just loved organic chemistry.

KLIN: And was that unusual at UVM? Did you have undergraduate peers who also were interested in that?

FOLEY: There were, I think, two people that were selected to do research the summer after my sophomore year. The other person got out of chemistry. Not me.

KLIN: Did you feel like what you were doing was uncommon, and did you feel pressure at that point?

FOLEY: You know, I grew up with two brothers and I skied on a ski team, which was basically all-male. And in high school, I was in the science area. Usually it was just me and the men, my male colleagues in high school that were taking the science classes. So I was accustomed to being around men. Nothing really struck me as strange until I tried to get a job after graduate school. Then I realized I was trying to do something unusual for a woman. But no, most of it was just like an additional example of life.

KLIN: You knew you wanted to go to graduate school right after you finished college?

FOLEY: I think after sophomore year I knew I wanted to do more. I didn't want to work for someone else who told me what to do, even though Martin Kuehne was very good about letting me go off in directions I wanted to. I figured the best way to do that was to get a doctoral degree, and Martin was very good about suggesting professors. One was his mentor, which was Stork--

KLIN: Who?

FOLEY: Gilbert Stork [Eugene Higgins professor of Chemistry at Columbia University; organic chemist who specialized in synthesis of natural products and discovered the Stork enamine alkylation]. He was first at Harvard and then he was at Columbia. Another one was George Büchi. And also, Jerrold Meinwald [Goldwin Smith Professor of Chemistry at Cornell University; cofounded the field of chemical ecology]. He was at Cornell. That was going to be my safety school if I didn't get into Columbia or MIT. I ended up getting into all three. Again, I think being a woman was an advantage at that time.

KLINE: An advantage.

FOLEY: The lab experience I had also helped but there were few women applying to grad school so I probably stood out, and I wanted to work for George Büchi. The one thing that is unique about George's papers – and I tried to do it in many of the papers that I wrote – is not just talk about the work, but also related things that become of interest in that work. George Büchi was always very good about doing that.

Those tidbits just showed how much knowledge he had. The great thing was, he shared it with all the students. We'd have an unknown, and we'd be working on the spectra trying to figure it out. If we couldn't, eventually he'd come in and ask what we were all doing. We'd say, "Well, we have this and we don't know what it is." He would sit down, and in few seconds have the structure, and then explain how he had deduced it from the spectra we had. There was this sharing of knowledge, which was really, really great. Getting into his group was the experience I had hoped for. Wasn't easy, though.

KLINE: Can you tell me a little bit more about Professor Büchi and what his lab was like?

FOLEY: Again, it was all male, except me. George did have several female post-docs over the years. I was once told he did have one female graduate student before me and she didn't work hard and falsified data. I think his attitude was that he would take women who were willing to work hard and were committed. Having a number of women post-docs would agree with that assessment.

At that time, every faculty member in organic, anyway, took three students a year, and he filled his group without me. And then, as was written in my ChemFormation article, [an article published on the MIT Chemistry Department website in 2014, currently available at <https://chemistry.mit.edu/support-chemistry/meet-our-major-supporters/louise-foley-phd-70-v/>], when I went to

him and explained that I had also been accepted with Gilbert Stork, who was a competitor of his, and would go there if I couldn't work for him, I think that was enough to push him over the edge. And, of course, I hadn't passed three of my four qualifying exams that were required to be admitted to the PhD program at MIT, so he agreed to let me into his group if I passed my courses and the qualifying exams.

KLINE: So your first year was taking classes and passing the qualifying exams, and then you started working in the lab?

FOLEY: Yes, I started research in January that year, so it worked out. Passing the courses and the qualifying exams convinced me I was smart. One option to passing the qualifying exams was to take a course with undergraduates at MIT, and I was scared to death of that. I taught myself the three areas, I reviewed physical chemistry, and taught myself inorganic. I had never had inorganic, and there was this Cotton and Wilkinson book about so thick. Anyway, so I taught myself all of this in, what, three, four months, and then did really well.

KLINE: The first time you took it, it didn't go well?

FOLEY: I took physical chemistry at UVM, but I hadn't had any inorganic chemistry and limited analytical chemistry. The guy that taught it was terrible. Only thing he taught us was about twin pan balances. You know these? And I was lazy that summer. I was having too much fun in the lab to review physical chemistry.

KLINE: You were supposed to take the exams before you even got to MIT, the qualifying exams?

FOLEY: Not the qualifying exams but the GRE, the graduate record exam. I had done 540 or something like that, pretty horrible. And again, they admitted me, I think, because of the research that I had done and, again, I was a woman. There were three women that made it into the organic section. One of those didn't pass the qualifying exams, and she just left. Another came from Bryn Mawr. She passed, and immediately started working with Glenn Berchtold [professor of synthetic organic chemistry who did his postdoctoral fellowship with Arthur Cope in 1960] and myself, although I hadn't passed the qualifying exams.

I went to MIT with the philosophy, "I'm going to learn all I can there. If I don't make it, that's OK, as long as I learn something while I'm there." It was really when I passed the qualifying exams and retook the GRE and got a really high score that I realized I wasn't dumb. Women have a tendency to think they're not capable of things.

And who is it? One of the professors at MIT, Buchwald. [Stephen Buchwald, Camille Dreyfus Professor of Chemistry at MIT 1984-present; known for developing the Buchwald-Hartwig amination and ligands associated with it.]

KLING: I took a class with him.

FOLEY: Many years ago, when he was first hired, George Büchi, if I was visiting MIT at the time, would have me meet some of the new professors. I met Prof. Buchwald, and I was very impressed with his science, and also the fact that he understood how women think – about [concern about] maybe not being as good as the men. And I thought, “You know, he's really good.”

KLING: Yes, he is. He won't even call the Buchwald-Hartwig Reaction by its name because he's too embarrassed by it or doesn't want to take the credit for it.

FOLEY: Being forced to study inorganic chemistry and pass my courses really convinced me that I'm smart enough. I can do this, which was-- It had a double-good effect, I think. I got into his group and I realized I wasn't as stupid as I thought I was.

KLING: I imagine you'd have to really be able to believe in yourself in order to advocate for yourself and keep going.

FOLEY: But in the Büchi group, we were all of us very close, and we challenged one another. If we saw a mechanism that we thought would be interesting, the whole group of us would get together and work on it. It was sort of nice having a group of really bright people that were continually challenging one another to learn new things. It was just a wonderful experience.

KLING: What were you studying for your PhD thesis?

FOLEY: We were working on a new synthesis of quinine. At the time, we were in the Vietnam War and the source of quinine was very limited, so we had a new synthesis. If it had worked, it would have been phenomenal. But it didn't work, and it was very hard to get to the compound to test the real idea. It took a lot of work and a lot of trial and error, but I enjoyed the challenges.

One of the first experiments I had to do when I got in the group with Büchi was to make powdered potassium. You heat it up in a solution and then shake the flask. George Büchi's comment was shake with one hand and hold the proper fire extinguisher with the other hand. But it was just a great experience.

And, as you know, I went back to MIT a number of years later to study something I had no background in.

KLINE: Yes – let's try and get there. After you got your PhD, you talked about how that was when you realized it was really hard to do what you were doing, as a woman.

FOLEY: Yes. I had really wanted to teach in a university, where I'd be able to do research. You couldn't even get an interview. I did get an interview with a couple of community colleges, and they all wanted to hire me, but they said they knew I wouldn't be happy there because I couldn't do any research.

KLINE: So you were hoping to go the academic route, just continue straight there, but instead you had to go toward industry?

FOLEY: Yes. In the end it turned out well, as I loved the combination of organic chemistry and biology that the pharmaceutical field provided. But even the chemical industry didn't hire women. It was also true of the pharmaceutical area. I went to Eli Lilly, and there they had one woman they had hired five years earlier. I was told, "She's worked out pretty well. We think it might be time for another one."

KLINE: How did that make you feel about working there?

FOLEY: Well, I said to the fellow, who happened to be a friend of George Büchi's, "If that's the only reason I'm here, you can take me back to the airport, because that's not who I am." And then I interviewed at SmithKline, which became – what is that now? I forget.

KLINE: GlaxoSmithKline?

FOLEY: Anyway, they were in Philadelphia. The fellow there asked me if there was anything special they should do because they had never interviewed a woman for a PhD position there. And I said, "Well, show me where the ladies' room is at the appropriate time, not the men's room."

But then I went to Hoffmann-La Roche. And at Hoffmann-La Roche there were already two women PhDs in the chemistry department. But as I indicated [in the MIT Chemistry Department profile about Dr. Foley that was published in 2014], the first thing in every interview I had, the first question was, "Do you have a boyfriend?" And if you said yes, that was it.

If you think back to the older women scientists in academia and industry, very few of them ever married. It was because you couldn't be married and have a career. And when I worked for the pharmaceutical field, I was many times denied a promotion or a salary increase. When I questioned, "Well, what's wrong?" "Oh, your work is wonderful. We love it." "Well, why can't I have a promotion or a salary increase?" "Well, you know, everyone else has a family to support." And I said, "Well, I could go and get married and have a family." And they said, "We'd fire you."

KLINER: So it's a Catch-22. They won't hire you if you're married, but they won't promote you.

FOLEY: But I loved what I did, so it didn't stop me from working hard. I think they realized they could do whatever they wanted to me. As long as they gave me a lab bench and chemicals, I was always happy.

KLINER: So how would you react when people said things to you about your relationship status, or about the fact that you're a woman? Would you confront people about that?

FOLEY: Being a woman in the 1960s and 70s meant you couldn't have a boyfriend and be able to get into grad school, have a post-doc or be employed. The faculty/bosses felt that they didn't want to "waste their time training someone who would go off and get married and not have a career." Despite that, I often felt that being a woman made it possible for me to be admitted into grad school. There were not many of us so the few stood out, and even though I had done years of research in organic chemistry, my GRE scores were not very stellar.

Since I grew up with two brothers and was on the ski team, which was mostly male, I was accustomed to be around males, so college and grad school were just more of the same. It never dawned on me that I was going into a field that was discriminatory until I started to look for work and once hired when it came to salary increases and promotions. While at UNH I also experienced discrimination and was harassed by one professor.

Again, the only thing that ever bothered me was the fact that I couldn't get these promotions or salary increases because I was a woman and I didn't have a family to support. That really ticked me off. But I was having fun.

KLINER: Where did you end up going after getting your PhD?

FOLEY: I went to Hoffmann-La Roche

KLINE: What were you working on there?

FOLEY: At that time, the company was in a variety of areas. I started working on an insecticide in process research. When I finished that there was an opening in basic research. Although my boss was very nice, he didn't get that I really wanted to do something different.

I took the job in basic research and I worked on antibiotics for a number of years, and that's where my interest in biology just got bigger and bigger. I learned bits and pieces, but the whole was sort of lacking.

KLINE: What were you working on, particularly with antibiotics?

FOLEY: I was working on aminoglycoside antibiotic. And toward the end, I was working on beta-lactams, a penicillin type and a cephalosporin type. I'm allergic to penicillin, so I couldn't work in that area. I had to work in a slightly different area.

KLINE: You were synthesizing them and modifying them?

FOLEY: Well, in the beta-lactam area we were making some new oxy derivatives, and seeing what kind of activity they had and what modifications we could make. And with the aminoglycoside, we did modifications, because we knew certain hydroxyl groups were modified in the body, deactivating it. We tried to see if we could remove the hydroxyl groups. And the interesting thing was that any hydroxyl group we removed caused a loss of activity which to this day leaves me wondering.

KLINE: And so that did get you interested in the biological side of--

FOLEY: Yes. Understanding better instead of bits and pieces. And when I went back to MIT, it was at the time where biology was becoming an area that a chemist could understand.

KLINE: More molecular focused.

FOLEY: Yes. Up until then, when I read biology papers, it was "the UV suggested this." And I'm going, "Huh? I want to know what's causing the UV." But anyway, the

first course I took was an undergraduate course that was team taught by various professors in biology each covering their area of expertise.

KLINER: This was when you went back to MIT? After how long at Roche?

FOLEY: I was 10 years at Roche.

KLINER: And you wanted to leave because you got more interested in this biology side, or you wanted to go back to academia?

FOLEY: Well, I had the option to go back to Roche after my leave. But I had paid my way so could take other jobs or go back to Roche. Being single, I had saved enough money to support myself during my leave which also meant Roche had no control of my future or what I was going to do while I was away.

KLINER: What did you do during your leave?

FOLEY: Studied cell biology at MIT.

KLINER: OK, I understand. You took a leave.

FOLEY: And immunology, while still doing organic synthesis.

KLINER: So you went back to MIT. Which was the class you took that you said that was team taught?

FOLEY: I don't remember what the number of it was, but I think almost every professor in the department came and taught a section of it. It was on Tuesdays and Thursdays, and it went on two hours with a break in the middle, which allowed you to go and ask questions.

That's where I got interested, also, in immunology – during that class. After a couple of the lectures, I went up and I said, “How does the immune system know not to attack itself?” And the professor said, “Ask me that question at the next meeting.” I had a weekend, so I went to the library and found a paper that explained it. So at the next meeting of the class, I didn't ask, and all of a sudden, I got this finger pointing: “Dr. Foley, I think you had a question.” I said, “I know the answer now.”

KLINER: Right now, I'm taking a cell biology class and an immunology class, so that's one of the things that we're talking about. I'm interested in how it's changed – how the knowledge in that area, especially, has changed.

FOLEY: I don't honestly know any more. It's not an area that I now follow. At the end of my time at MIT, there was an opening at UNH [the University of New Hampshire] for a temporary faculty member. Thinking I might want to teach in the New England area, I took the job. It was an all-male faculty, and it was not a good experience. They kept telling me to accept another appointment because they were going to have a full faculty position coming up, so I applied for that and interviewed. They had treated me really well when I was a temp.

KLINE: At UNH?

FOLEY: Yes. The first two years I was a temporary position. But as soon as I became a faculty member, I was treated really badly.

KLINE: How do you mean?

FOLEY: Heavy teaching load, no graduate students. I came to the conclusion that UNH should never have a PhD program, because the faculty, at least during the time I was there, didn't challenge the students. And there weren't enough graduate students to challenge one another, so it was really bad. I had several job offers, so I went back to Hoffmann-La Roche and started up the chemistry side of the oncology program.

KLINE: Interesting. You'd been at MIT for how long, and then at UNH for how long?

FOLEY: I was at MIT about a year and a half. After my leave time was over, I resigned from Roche and decided to stay on at MIT and take some more biology classes. Then the UNH thing showed up, and I stupidly decided to give that a shot. But it sort of convinced me – especially knowing how much I enjoyed biology reading and everything – that the industrial side and especially the pharmaceutical side was a good match for me, the mix of biology and chemistry.

KLINE: How long were you at UNH in the temporary position?

FOLEY: I think I was there two years as a temp and four years as full faculty, and tried to make changes, but the guys wouldn't listen. I still hear from students who I went out of my way to challenge who appreciate the fact that I forced them to do things that made them smarter, hopefully. But yes, it was a terrible situation. But I don't know. At the time, it seemed like it might be a good mix. Maybe I could go ski and teach and do research [I thought].

KLINE: But then you went back to Hoffmann-La Roche, and you started with oncology?

FOLEY: Well, I started the chemistry side of it. There was a biologist there that I worked with. He headed the biology; I headed the chemistry. He quickly realized I knew as much of the biology as he did, so we worked together really, really well. And it was fun. I never wanted any part of management, because I loved bench work so much. I kept getting more and more people working with me. People have strange habits that you have to work with, unlike things in a flask that often do what you want, but not always. But anyway, at one point they needed somebody to help out on a project in the diabetic area, and I could go back to full time at the bench.

Just before my father died, I moved over to the diabetic area, and after he died, I came back and worked there knowing at some point I was going to have to retire to look after my mother, who had a lung condition that meant she couldn't live alone. So that was the end of Hoffmann-La Roche for me. And I warned some of the people there that I didn't think Nutley was going to exist much longer.

KLINE: What was going to exist?

FOLEY: The company was in Nutley, New Jersey for a long time. That was the USA part of Roche, which is a Swiss company. Roche bought into Genentech. And now Genentech is the U.S. side of Roche. It was clear even when I left that the company was losing interest in the Nutley area. For a long time, the site ran 24 hours a day, because production was done on site, and that was slowly closed down. Then less and less research went on there, so it was clear it was going. And it did: they shut the whole place down. Huge facility. Now it's going to become a medical school and an office complex or a hotel. Don't know.

KLINE: In your career, especially at Roche and UNH, how do you think that having a background, having been at MIT, affected that trajectory, or did it?

FOLEY: Probably helped me get the jobs. And with George Büchi's reputation, if he recommended you, that was usually good for anything. But I had taught also while I was at Roche at Fordham, in the evenings. There was a group of students, older students, who wanted to go to medical school but lacked organic chemistry. Many of them were very, very bright. Unlike a lot of undergraduate premeds, they understood that they had to learn the material, and that just sitting in class didn't mean you got an A. One thing I noticed at UNH was that the premed students thought just being in class every day they'd get an A.

KLINE: I'm interested that you taught and that you wanted to teach, and that your mother also really wanted to teach science. I wonder what she thought of that, or if you got some of that desire to be teaching from her.

FOLEY: I think she was pretty proud of me, and saw that when I was teaching, I was very happy. Following her death, she had left letters for each of her children, and in mine she said she had never seen me so happy as when I was teaching. Both of my parents and my two brothers were always supportive of my choices, many of which were my doing things girls didn't normally do, so my life at home was great. During my school years my choices were also supported by my teachers. For example, I was a very good alpine skiing racer, and in the winter was allowed to leave school in the early afternoon to go to the ski hill to practice.

In the lab, I had assistants, some BS and some MS students, and they needed to continue to learn, so that involved teaching as well.

KLINE: In the lab where?

FOLEY: At Roche. One had to teach your assistants the lab techniques, but that wasn't enough. I wanted them to understand the chemistry, so I was teaching them there. I know I enjoyed it, and they seemed to also like to learn what was going on. I made sure when I hired somebody, they were someone that wanted to learn, not just do, in the lab.

And when the opportunity came to teach at Fordham, this also helped me to see how much I enjoyed teaching. At MIT, the basic organic course, which I also taught, with 400 students, is so large that you can't really allow questions and still cover the material.

KLINE: You had 400 students?

FOLEY: As the chair of the department said to me after I finished teaching my section, "Weren't you exhausted when it was over?" He said, "When I taught those big classes, I felt like I needed a nap afterwards."

KLINE: So you taught while you were there, taking courses on your leave?

FOLEY: On leave, yes.

KLINE: You taught the carbonyl chemistry portion?

FOLEY: Yes.

KLINE: And there were 400 students in that class?

FOLEY: Yes. And it was sad, because for me, the fun of teaching is you challenge the students, they ask questions, and it challenges you, because the questions say that however you explained it didn't help them. So you have to rethink how to explain it in a way that they can understand. It's a two-way street.

I had a boyfriend Roche didn't know about, and he would come up to Fordham after my evening class was over. We'd go out to dinner, because I was wide awake. The adrenaline was still running.

But anyway, at UNH I taught a one-semester organic class, and that class was small initially. It grew, but never to the point where you couldn't let the students ask questions. That class was biology majors, and people that needed to understand the fundamentals of organic chemistry, but not the nitty gritty of fancy reactions. I taught that class mechanisms so they would understand organic chemistry. Do you know ozonolysis?

KLINE: Ozonolysis? Yes.

FOLEY: They didn't need to know this, but I put it up. I said this plus O_3 gives this. How does that work? They thought they caught me, and so I had them figure it out. I drew everything out, and they worked their way through it.

KLINE: That's really neat. For us, in Organic Chemistry I you just learn the reagents for ozonolysis, and then in Organic Chemistry II you learn the mechanism.

FOLEY: Organic chemistry should be taught mechanistically. It's so easy to understand. A couple of my one semester students at UNH ran into some of the two semester students and were explaining to them how the reactions were working (mechanisms). One of the professors came to me and said, "Your students are making my students feel stupid." And I said "Well, can't help that."

I also found that carbonyl chemistry was spread out in text books and I thought it would be easier to understand if combined into one comprehensive section when taught. I used that approach ["Carbonyl Chemistry Unified" (copyrighted)] when I taught my one semester Organic course at UNH, and also introduced this way of thinking in the senior and grad courses I taught, also at UNH. Many of my graduate students said they finally really understood this topic after being

shown my approach and many undergrads demonstrated a good understanding as well. So, I think it worked.

The other thing you could do, which for me was fun, was you take an enzyme reaction like S-adenosyl-L-methionine, nature's methylating agent. You'd draw it up there and ask the students to figure out how it methylated a substrate.

These kids talking back and forth, you could hear them as they figured it out. Of course, it's not that difficult. But then one of them said, "Well, when the methyl leaves, it leaves a neutral molecule behind. What's better than that?" And I'm going, "Yay. It's fun just to let them think. Give them the fundamentals and let them work with it."

The other thing I did in that class was change the lab. In that lab, typically, they'd run this reaction or that reaction. You could walk into the lab and ask questions and they'd point to a book and say, "We're doing this step." And I went, "This is not science." And so I said, "Hmm. They learned some basic reactions which can be used to figure out unknowns."

So the grad student and I worked on a new lab where we'd give them a test tube which could contain one of three different compounds. They had to figure a way to test and see which one was in there using reactions that they knew. It was always reactions that we had covered in class up to that point. The students loved it. I would put a strong student with a weaker student. The two of them worked together, and both of them improved.

But the thing that was fun for me was, I could walk into the lab and asked them what they were doing. And they could tell me without pointing to something in a book. They'd say, "Well, we think it's this, and if it's that, this should happen." And that's science: question and answer. And if you get the wrong answer, well, that means it's not what you thought it was. So for these students, they loved that class. I don't know if UNH continued it after I left or not.

KLINER: At Fordham?

FOLEY: No, this was at UNH. I also taught a graduate course very similar to the way George [Büchi] taught his graduate course with some changes. I taught it, as he did from the current literature. One of the things that's difficult for graduate students to do is read the literature because there are a lot of name reactions. "What the hell is that?" So you stop reading it. Whereas, by teaching this course, I was able to explain to them what these various reactions were and also discuss why that reaction versus another reaction was used in this particular

case. The other thing I did which George didn't do was have the grad students pick a synthesis and present it to the group. One of the best ways to learn something is to present it to others. And the students all did a great job knowing I was going to ask a lot of the questions. But it was fun. And I really enjoyed teaching very much. If the atmosphere had been a little better, it would've been a good situation.

KLINE: At UNH?

FOLEY: Yes.

KLINE: When did you finally leave Roche?

FOLEY: I left Roche to be with Mom. I'd taken family leave in 2001 when she had pneumonia, and when I was with her, I realized that it was time for me to be with her, so I retired as of January 2002. And Mom, despite her COPD, and I had a good time. She had a great sense of humor, and she was sharp till the day she finally said she had fought her disease long enough.

KLINE: Did you talk about your work with her?

FOLEY: Well, the interesting thing was I was writing papers on the last project for the first two years after I retired, so I would give them to her. (My PhD thesis is dedicated to my parents. She tried to read that but couldn't figure it out.) But she said, "Do you understand this stuff?" I said, "No."

KLINE: No one does!

Have you been involved in chemistry and science since then?

FOLEY: No. With my brother, Jack, having Parkinson's, I became very interested in neuroscience. But Parkinson's is a strange disease, because there are no new drugs for it. The main drug is one that was found in the 50s, L-DOPA, and that's still the mainstay. It's ridiculous. I kept hoping there'd be something new.

The deep brain stimulation was something that Jack considered, but he said that he had been told he wouldn't be eligible for clinical trials of anything new if he had that, so he never did. I still read cancer research and, as I said, the neuroscience area, especially the Alzheimer's and Parkinson's areas. I don't know if they work on Parkinson's in the brain area at MIT. (I forget what the name of that school is.) Also, at MGH [Massachusetts General Hospital] several years ago I spoke to the head of a biology group there who was very interested

in the Parkinson's disease. I so enjoyed it. Anyway, now my reading is basically the *Science* magazine.

KLINE: So there's probably not a lot of skiing around here [in Florida], right?

FOLEY: Well, you know, I have osteoporosis with skinny bones. I can't take any of the medication for it. I work out at a gym locally, but downhill skiing is sort of out of the question at this point. I haven't skied now since 2002, when I retired, but I still remember it fondly. My brother, who just died, and I went to Switzerland and skied in Switzerland and met up with George and Anne Büchi, which I did every couple of years. I joined them up in the hotel in the mountains in the beautiful Wengen area of the Swiss Alps.

Maybe someday [I'll go] cross-country skiing. Last year, I stayed up north until mid-February, which is very late. The reason I stayed was that I built a new house and I wanted to be there when it was finished, so I could get everything out of boxes. So I stayed and I kept thinking I could go cross-country skiing, but I was too busy.

KLINE: Do have a home in Old Forge still?

FOLEY: Yes.

KLINE: And you spend the summer months there?

FOLEY: Six months there and six months in Florida.

KLINE: Wow, pretty nice.

FOLEY: I think at some point I'll probably stay up north full-time and not come down. But after this past week [when my brother died and I was up north], I'm not so sure. God, it was cold.

KLINE: I'm wondering: Did you have women colleagues at any of the places you worked?

FOLEY: Yes, several but at MIT it was Martha Link Casey [PhD Organic Chemistry 1968; worked as a research scientist at the University of Wisconsin-Madison and then as an administrator] that I keep in touch with – Christmas cards, et cetera. She was a good friend. I think she had wanted to work for George Büchi, but he wasn't taking women so she didn't get to. So she worked with Dan Kemp [Daniel

S. Kemp, MIT professor of organic chemistry known for Kemp's triacid and the Kemp elimination] and did really well. She was really bright.

You never knew George Whitesides [MIT Assistant Professor of Chemistry 1963–1982; currently a Woodford L. and Ann A. Flowers University Professor at Harvard; a founding core faculty member of the Wyss Institute]. George Whitesides was at MIT as an assistant professor when I went to grad school. He is really very nice, but he has this voice which is very intimidating. At one point, Martha gave a seminar on tunneling protons or something like that. I didn't understand it but she did. Anyway, Whitesides asked this question in his intimidating voice. Her answer was so good he was left speechless. And I went, "Yay, Martha."

KLINE: I hope I can meet Martha. We will try to include her in this project.

FOLEY: I hope so. You'll enjoy her. And she also experienced doubly the problem of being a woman, because her husband got his degree – he was the first PhD of George Whitesides – and went to Wisconsin as a Chemistry Professor and had a wonderful career. But she couldn't be a chemist there, because at that time, husband and wife teams couldn't be faculty members. But initially she did a postdoc and then went into administration at Wisconsin. So she has an interesting story, I think.

KLINE: Well, thank you so much for taking time to talk with me.

FOLEY: You're welcome.