

**Interviews of the Margaret MacVicar Memorial AMITA Oral History Project, MC 356**  
Massachusetts Institute of Technology, Institute Archives and Special Collections

**Janice Ritenburg Rossbach** – class of 1951  
Interviewed by Emma Bernstein, class of 2020  
August 11, 2018 and November 11, 2018

## **Margaret MacVicar Memorial AMITA Oral History Project**

Janice Rittenburg Rossbach (SM Mathematics 1951) was interviewed on August 11 and November 11, 2018 by Emma Bernstein (SB Computer Science and Molecular Biology 2020), at her home at Brookhaven, in Lexington, Massachusetts.

Rossbach overcame a number of obstacles to pursue an undergraduate degree in Mathematics at the University of Massachusetts Amherst. Then, at MIT, Rossbach completed a master's thesis while working on Project Whirlwind, which developed one of the first large-scale, high-speed computers, and met her husband, Leopold Rossbach (SB and SM Electrical Engineering 1950). Following her first job at Arthur D. Little, Rossbach began work on a PhD at Brown University. She was disappointed not to complete the degree after her advisor solved her thesis problem despite her having also generated a solution. She went on to launch a 28-year career with General Telephone & Electronics Corporation (GTE), during which she contributed to both the Minutemen Missile program and the U.S. Navy's Extremely Low Frequency (ELF) project. In her retirement, Rossbach is a philanthropist, is politically active and maintains a vibrant social life with family and friends – locally, across the country and around the world.

**BERNSTEIN:** To start off, could you please tell us a little bit about your childhood?

**ROSSBACH:** Well, I was born in the Faulkner Hospital [in Boston] – I haven't gotten very far! It was May 12, 1929, which was Mother's Day. My father graduated a month later from Tufts as a mechanical engineer, and he couldn't get a job around here. It was hard for a Jewish engineer to get a job in those days. He finally got a job with the Wickes Boiler Company in Saginaw, Michigan, and he went. And then my mother and I went. I don't remember anything about it, but I guess we were there till I was about two. My mother got allergies. Nobody knew what that was, and they thought she was a mental case, with her allergies. My mother would have none of that, so we came back to Boston and we lived with my mother's parents.

I was very thrilled when I learned to read. I discovered the library. I was a very good customer! One time, they didn't want to give me more books, because they said I hadn't read the ones I took out before, so I offered to tell them what they were all about. They believed me, and so I got over that hurdle.

Then, my father managed to get a job in a laundry (The National Laundry) keeping their equipment going, so we moved to Roxbury [in Boston]. We were living in Mattapan [in Boston], where my grandparents were.

Actually, my father had some interesting jobs that, I think, got me interested in things [related to science and engineering]. There was something he was doing on a radio station. But it was the Depression, and that didn't last. And then – this really sounds as if I'm an antiquity – he had a job putting sound in silent movie theaters. And, of course, that was a good idea. There were still silent movie theaters at that time. But again, money was short, and that didn't last, either. And then, when I was seven, he got this job at the National Laundry [Company]. To this day, I do an extra rinse with vinegar. My father explained to me how soap was basic and clothes were more acid, so they put acetic acid in the rinse. I have some interesting memories about that job.

Anyway, we moved a fair amount. I lived in Roxbury. That's sort of painful, thinking about it now, because there are too many shootings and murders in the neighborhood where I grew up. On the same street where I lived, a little girl was outside and got shot – and she was on a better part of the street, actually, than where I lived.

BERNSTEIN: Was it like that when you were young?

ROSSBACH: When I lived in Roxbury, it was mainly Jewish. Then, a lot because of the redlining that the banks did, it became black. Anyway, we moved back to Mattapan, where we basically stayed till I got married. I think I was nine then, and that was good. That's where I grew up and went to school. I went to the Jeremiah Burke High School for Girls, now coed.

But it was the eighth grade in the Solomon Lewenberg Junior High School, I think, or maybe the ninth grade, when I took algebra. Oh boy, I loved it! I said to my father, "I like math. I want to study math." And he said, "That's good." And I said, "What's the best school for math?" And he said, "MIT." And I said, "Good, so I want to go to MIT." My father said, "Good luck." And I knew I was on my own.

What happened when I started junior high school was really important in many ways. I realized I'm backtracking. My father said to me, "You'll probably go to business college, like your mother and your aunt. But take the college course." "We have to make a choice," he said, "because you can always learn to type, and you get a better education if you take the college course." So I did. Well, as I said, when I told my father I wanted to go to MIT, he said, "Good luck."

Just recently I realized my parents were proud of what I did, but they never seemed to be paying attention – that I needed money to go to college. I don't know, if I'd managed to get it, fine. But I never thought to wonder what did they

think was going to become of me if I didn't go to college, until I realized my father had told me. I guess my parents just figured if I didn't go to college, I'd go to Burdett College, a business college, like my mother or my aunt. But I had different ideas.

BERNSTEIN: Could you say more about your experience in high school?

ROSSBACH: I had all A's in high school. We didn't have a valedictorian, but I gave the Class Day speech and all of that. I applied to MIT, Harvard, BU, Tufts and Mass State College [now the University of Massachusetts]. I was very unhappy. I got turned down by all of them. No college accepted me. They all said my qualifications weren't high enough. Well, when you have all As, you don't really know what to say about that.

I was just figuring, "Well, I'll work for a year and apply again." But I was very lucky. I was very, very lucky. My high school principal didn't like that nobody from the school got accepted at Mass State. The story I heard was that she went to the Massachusetts Commission of Education and said, "I have an accredited high school, and Janice Rittenburg – that's who I was at the time – has all A's at my school. And if her qualifications aren't high enough, it means my school is no good. But I have an accredited high school." So I got a letter saying they made a mistake, or whatever. I got accepted and two other girls got on the wait list. Neither one wanted to go to Mass State, by the way. One was definitely going to Simmons. The other girl was a good friend, Ruth Kaplan, who was going to kind of a good college for women. And I got accepted.

At that time – well, maybe to this day – UMass, I think, likes to have geographical diversity, so applying from Boston area was definitely a handicap. I don't think being Jewish helped. I'm not saying it hindered, but I don't think it helped. Needing financial aid wouldn't have been a help, either.

I went to Tufts for an interview. My father. My uncles. And I have an older cousin. All are Tufts. I had to apply to Jackson [Jackson College for Women, established in 1910 as a coordinate college to what was then Tufts College], and I got an interview with the dean. And she said to me, "Why do you want a major in math?" And I said, "Look, I like math." "Well, you shouldn't major in math. You'll be taking a seat a veteran could have, and he'd use the education. It'll be wasted on you." So I said, "I don't intend to waste my education." And she said, "Well, anyway, you're too sick to go to college." I said, "What do you mean?" She said, "You have allergies." So I said, "Well, I got through high school with allergies. I think I'm going to last another four years."

My best friend went with me by street car, from Mattapan to Medford, like an hour. We had to use coupons. We had reduced-fare coupons for an hour each way. Used up four coupons between the two of us. We could have had a soda. To hear that kind of nonsense. It's really an insult. My father was really annoyed.

Decades later, in 1999, my uncle died, and they said to donate a scholarship in his memory at Tufts. I loved my uncle, so I gave some money and I wrote a letter saying that my father was also an alum. And I said, "I would have been an alum also if you'd seen fit to admit a female math major in 1946." And then I signed it, "Sincerely yours, Janice Rittenburg Rossbach, BS, 1949, U of Mass, summa cum laude, MS, MIT, '51." And I mailed it. Of course, I never heard from them, but I felt better.

Anyway, I went to Mass State [now the University of Massachusetts]. Well, before I got to Mass State, the Dean of Women at Jackson was almost right, because I had a terrible cough. I had a boyfriend who was from Palestine, a Jewish boy from Palestine, whose mother was born in Palestine. This was in '46; there was no Israel. He was born here, and he was actually a year behind me. But he was very nice. Very nice fellow, and I liked him.

BERNSTEIN: Did he go to school with you at UMass?

ROSSBACH: No, no. I met him in Boston about the time I graduated from high school. But anyway, I had a boyfriend, and we were outside a lot. I started coughing, and I guess nobody realized-- I coughed and coughed, and I had X-rays. I didn't have TB. I coughed, and I couldn't eat. One doctor said I had whooping cough. Another one said I was too sick to go to school. I said, "I'm going to school anyway." They said, if you go, you have to go to bed at 9:00. But I went anyway. I coughed, and I was always drinking hot tea. It was very difficult.

My class had a hundred civilian girls, class of '50 – that's what I started with – and a hundred civilian boys. And then there were quite a few hundred veterans. Some married, even. We had married student housing on campus. And that was in September.

When I started upstairs to go to sleep at 9:00, and all the other girls were in the common room and talking to the local boys, I turned around and joined the others.

In November, Mass State became the University of Massachusetts. And shortly after that, Brandeis did also. I made friends, and one became my roommate. We

wouldn't join a sorority. There was only one Jewish sorority. I later heard an interesting story that originally the sororities had a meeting to decide how many girls to pledge. I think there were nine Jewish girls at the time, so they said every sorority could take nine. They didn't want to make it 10 because then the Jewish sorority wouldn't get their quota. They didn't want to make it eight because they didn't want to leave one girl out, so they settled on this, and then they found out that I got admitted. They had a special meeting. Somebody told me this afterwards. And they said that Sigma Delta Tau, the Jewish sorority, could admit 10 girls. And then I found out why they were so upset, when my Jewish friend and I decided we didn't want to pledge. I was first Dean's List and she was second, so they were really brokenhearted because they needed us for their average. The whole thing was ridiculously stupid.

But there I was. And I was very, very, very worried about another Depression hitting. You know, I had in my mind that after World War I there was a Depression. How would I get through school? I was seriously worried. I worried in high school to the extent I couldn't sleep. I think I was on sleeping pills, I was so worried.

That's why I like to give money for scholarships – not that I can make up for what tuition is nowadays.

I got money from the Jewish Vocational Service. I think it was a loan. I don't remember how much. My high school gave me a \$150 scholarship, when tuition was \$200 a year. That was important. But I needed to live. And I got money from the Edwards Fund of Boston. And then I got a Lotta Crabtree Scholarship. I don't know if anybody knows Lotta Crabtree these days. She started out as a dance hall girl in Texas and ended up on Broadway. Was a big hit. Never married. She left a lot of money to taking care of cats, and a scholarship fund.

So one way or another, when I went to the school, I had more money than I needed, you know. I remember I sent it home and then got it back for the second semester. I actually loaned money to my parents. And I never had money. The first prom I went to, I went to the store and said, "I want to see the cheapest evening gown." I didn't have an evening gown.

Anyway, I was so worried about not being able to finish that I decided to go to summer school. I didn't have many prospects for a job in the summer, anyway. To go and wait on tables, with my allergies, would never have worked. I couldn't do it.

Some people were at summer school and were cutting tobacco in the

Connecticut Valley tobacco farms – the UMass area, Amherst area, South Deerfield, they were known for growing shade-grown tobacco for cigar wrappers. You could see that all along the Connecticut River Valley. When you drove to New York, you could even see tobacco plants under the cheesecloth, for Cuban cigars.

I couldn't do that either, but I did get a job in the summer. Because I was first Dean's List, they made me cashier in the cafeteria. And I think I got a dollar an hour, which was a lot, so that was all right.

By third year, I was finally taking differential equations. Finally. And I had to take analytic trigonometry, and calculus. I actually used a book my father took for a night course – a refresher course in calculus. (That's another story, that he got himself a job, finally, as an engineer with Polaroid. And he worked in engineering the rest of his life, which was good. I encouraged him, I have to say.)

But anyways, I used his book, which was the wrong edition, so I used to have to make sure I had the right homework problem. So the beginning of my third year just started. I'd had something like a week or so of differential equations and I had to take the Graduate Record Exam to get into MIT.

BERNSTEIN: Yes – I wanted to ask about your getting to MIT.

ROSSBACH: I had taken the Scholastic Aptitude Test as an undergraduate, but my girls' high school did not teach college-level physics, did not teach solid geometry, so I had to be tested on those two things. I shudder to think-- I never got the scores, but I wasn't too surprised that I didn't get into MIT because I didn't see how I could have done very well on the SAT.

So now, here I was with the Graduate Record Exam, and I was very dismayed. A lot of differential equations to solve. I didn't know how to solve differential equations yet. I can remember saying, "You've got to figure out how to solve differential equations in the next hour, or you are not going to MIT." Well, they were multiple choice. I knew how to check differential equation solutions. It wasn't too hard to figure out the right answer, even though I couldn't solve them. So I went "bing-bing-bing-bing-bing" – done. Then I got to topology. Who knows that? I knew they marked it down if you got the wrong answer, so I only answered ones that seemed to make sense to me.

I was very happy. I came out in the 95th percentile in the country, and got into MIT [for my master's degree in math]. The head of the math department called

me in, and said, "Very good!" "You know," he said, "I don't know how you did this." And I lied to him, you know? I told a true lie – because it was true. I said, "Well, I've studied some on my own." Which was true, but not true. I mean not an answer to his question, not an explanation. It was a true lie. So I went to MIT. They said I flunked my first test because I didn't know how to study, so I learned how to study and ended up with a very good GPA.

And first summer there, I needed a summer job. I thought it would be nice to work at one of the labs for the summer. I was used to commuting anyway – I was commuting from Mattapan. The main lobby had a telephone, and a phone book for internal calls, and I started calling different labs, telling them who I was, and that I wanted a summer job. I got to "D" for the Dynamic Analysis and Control Lab and they had me come in. They needed computers. A computer, at that time, was generally a female who used either a Marchant or a Friden calculator. I had a Marchant, and that was good.

Everybody drank coffee in the morning, so I started drinking coffee. I really was trying to make friends and keep up with this illustrious group – it was quite a group. So I was drinking coffee, and I never wanted to eat breakfast. Pretty soon I was getting a stomach ache from the coffee, so I switched to tea. At some point, there was a crisis. "Ginny is gone on vacation. Who's going to make the coffee?" I'm still trying to make friends, so I said, "Well, I'm making tea. I can just as well make coffee." I made coffee for my father. I knew I had to keep the coffee pot clean so the oil doesn't get rancid, so they let me make the coffee, too. I was in the sink a lot, cleaning the coffee pot, and I had noticed a technician, I thought, working at the bench next to the sink. I thought he was nice.

I was telling my mother about this nice guy, and I was saying, "I don't want to be interested in a technician. They don't make enough money." You know? Then I thought, in the meantime, he had an engineer's slide rule and he had burned his name into it. It was a different color: he'd colored it with oxblood shoe polish. Character. That's the man I married. Character. L.J. Rossbach. Big letters. So I said, "Hmm. Maybe he's a student." So he was. I looked him up. And I consulted with my father about Leopold Jerome Rossbach. We decided there was a good chance he was Jewish, so my mother wouldn't have to be crying like she did when I went out with my Italian boyfriend.

One day, I was cleaning the coffee pot and I heard music. And I said to the coffee pot, "Scheherazade." And this voice said, "How'd you know that?" My husband was whistling Scheherazade, from Rimsky-Korsakov's Scheherazade. And I said to him, "I took a summer course in music. It's the Sinbad theme." So



we went sailing. That was August of 1950, and we got married in March of 1951.

I still had to do my thesis. I was done with my coursework, but I had to do my thesis, so I got a job with Project Whirlwind [project to develop one of the world's first large-scale, high-speed computers; part of a project to design a universal flight trainer] – again, MIT – and found out I can't program. I mean, I must be the world's worst programmer. They were working on the precursor to flight control, so they had a link to Hanscom Air Force Base.

I had done the computations for my husband's master's thesis, and we got married. Then, in the summer, he typed my master's thesis. It was a little bit like role reversal, because I did the computations and he did the typing. A lot of time sitting on the [Boston] esplanade, you know, in the summer. And he got his degree – two degrees. He was Course 6-A, so he got bachelor's and master's, I guess, in January, and then we got married in March (1951).

I finished my degree in September of '51. I did it: I went to MIT, like I said I would. So there we are. That's my MIT story.

BERNSTEIN: Were you close with any of the faculty?

ROSSBACH: Well, I had my physics advisor, Professor Franklin [Philip Franklin, who worked on Project Whirlwind, edited the MIT Journal of Mathematics and Physics and was known for the Franklin graph]. Yes. I did my thesis on a difference equation. I must have always had an engineering bent, because the difference equation-- I really wanted to know what it applied to in real life. Something that's moving underwater, it was a difference equation. I found some papers.

My honors work at UMass was interesting, because I worked in what they called the Peano postulates, which was interesting. It was about the basis of arithmetic and different postulates. And, well, that was interesting. Then, for my thesis, my advisor gave me a miniature geometry to develop. That was fun.

I really didn't have too much interaction with the faculty. Well, I shouldn't say that. I took a course in applied math for engineers, which was graduate level. I ended up going out with the instructor. So that was interesting. That was nice. He was a cool guy.

BERNSTEIN: Yeah?

ROSSBACH: He got married, and I took another course with him after he was married. I got an A from the course I took before he was married, and I got an A in the course I

took afterwards. And I remember, after he was married, he made a mistake in class. He said something wrong, and it really wasn't easy to go up and correct him, tell him he said something wrong. But I did, and he agreed. He said, "Yeah, you're right."

BERNSTEIN: How many women were there when you were?

ROSSBACH: Oh! That's a good question. Well, the year I started, another woman started, Evelyn Bender [SM Mathematics '50 and PhD Mathematics '54]. She graduated from Emmanuel [College, in Boston], and she was smart. She was really smarter than I was. She was a very devout Roman Catholic. She had thought of being a nun.

BERNSTEIN: Wow.

ROSSBACH: One time, my parents came with my grandfather's car to give me a ride home, so I said, "Can we give Evelyn a ride home, too?" because she also was commuting. I think her parents worked at a shoe factory or something. We got in the car, and I said, "Grandpa, you know, Evelyn's family's from Lithuania." My grandfather started speaking to her in Lithuanian. He had been born in Lithuania, grew up in Odessa, in the Ukraine, thousands of miles away. Hadn't spoken Lithuanian in maybe 40 years. Evelyn was flabbergasted. No more so than the rest of us. We didn't even know he knew Lithuanian. That was something.

Evelyn got her PhD at MIT. She stayed on – I think she taught at MIT. She might have been one of the first women to teach in MIT in the '50s. I think that they had her teach. They recognized she was brilliant. She taught at Clark for many years. She married a newspaper man from Worcester, and she taught at Clark.

As I said, she was really smarter than me. But I'll never forget one exam we took. It was calculus of variations – I think that's what the course was – and it had four problems. You had to solve the problems. It involved picking, I don't even remember what you call it, the curve? And you had to integrate along it. Then there were different theorems. They said to solve the problem, draw the arc, state the theorem, and solve them. I solved all four. I mean, it's the way I would take tests. I drew the arc, you know, the curve, and stated all the theorems, all four. I said, "I'm not good at proving theorems," so I started working on the theorems. I really didn't get very far. And then the hour ended, so I just wrote a note, "I didn't have time to do any more." I didn't say that I could finish because I wouldn't lie, you know? I think some of them I might have laid out the bones, the skeleton of how you proved them.

We came out, and Evelyn was really upset. She said, "I only had time to do two." And I can just remember this feeling. My heart sunk. I felt terrible. She only did two, she's going to get 50. I think I got 95. She was smarter than me. I felt terrible. I still do, when I think of that. I said, "Oh, Evelyn, you shouldn't have done it that way." Oh, I still feel so bad. She was so smart.

It's a little bit like taking the Graduate Record Exam. I think some people are good at taking tests, and some people are smart. I'm better at taking tests, I guess.

So I got my degree, and made sure they put my maiden name on it. There I was: married, had a degree.

BERNSTEIN: Was Evelyn the only other woman in the master's program that you remember?

ROSSBACH: There was another woman there. She went to Purdue. Violet Haas [SM Mathematics '49 and PhD Mathematics '51] – that was her name. I didn't know her too well. She was very nice. And then the year later [SIGHS], somebody else, maybe Emmanuel-- I can't say her name; I see her. Tall, thin girl. She had her own airplane.

BERNSTEIN: Oh, really?

ROSSBACH: Yeah. She was nice. She came after me.

And then Phyllis Fox [SM Electrical Engineering and Computer Science '49 and SCD Mathematics '54] came. She had been in Course 6 or 6-A, I don't know. My husband was 6-A. She was Course 6. Anyway, I don't know. She'd been a debutante in Denver. Had her own apartment with a piano. I never saw it, but I heard about it. She knew my husband from Course 6, and she came to get her PhD.

She was funny. She was a very businesslike woman. She was not that touchy-feely, but she was beaming with the two of us getting married, because she knew me, and she knew my husband. I think she was a little older. She married somebody who was big in the internet. I remember reading something about him in Time Magazine – George Sternlieb [founder of the Center for Urban Policy Research at Rutgers University and consultant]. So she was there.

But the first class I went to at MIT was a crowd of all boys. I'm 20 years old. All boys. And people looking for seats and-- I think boys, I don't know, they were all

more inhibited. There were some seats in the middle. But a lot of them were just standing around, you know, like this. And I got myself a seat – you know, sat down, and there were empty seats around me. It was so funny. Nobody wanted to sit near me. I was intimidating them. It was very funny. I paid attention. First seat that got taken was the one directly behind me. You know those desks face this way? You write over here. So I'm here. The next one got taken was over here. I couldn't see him. Next one got taken was over here. Next one that got taken was directly in front of me. He couldn't see me. Next one was next to him. Then the one over here. He still couldn't see me. The last seat that got taken was right next to me. [LAUGHS] Or maybe it was this one. I mean, it was so--

BERNSTEIN: Were you asked on dates often?

ROSSBACH: Some of the boys used to ask me out for dates. Not too many. Then my husband.

I like MIT. I like that you live on campus. Are you in a dorm?

BERNSTEIN: Yes.

ROSSBACH: My husband had a dorm. He had a friend who was born in Vienna and spent the war years in Shanghai. Jewish people got to Shanghai – he wasn't the only one.

I was walking with him – I'll never forget this – on Mass Ave., and this Chinese student coming the other way. And my friend Peter Stein said, "Hi. And the Chinese guy says, "Hi." Obviously an undergraduate. Peter is obviously a graduate student. I said, "How do you know him?" And he said, "Oh, we came over in the boat together." I thought that was so funny. In my neighborhood, growing up, if somebody knew somebody, and they said that they came over on the boat together, it was from Eastern Europe. You know, I never thought that this Chinese kid and Peter had come over on the boat together. I don't know. It just struck me so funny. I still remember it.

Peter's family was very interesting. He did well. He was in mechanical engineering. And then, when he moved to Phoenix, he used to give short courses on strain gauges, as I recall. He agreed to go back to China if they would take him to the area where he lived. They were under Japanese occupation. He said that at the end of the war the Japanese were collaborating with Hitler. They were about to start building crematoria for the Jews there and the war ended, which was lucky for him. And lucky for my husband, his father decided to leave Belgium in 1937.

BERNSTEIN: After you left the master's program at MIT—

ROSSBACH: I needed a job. My husband was working at MIT's Instrumentation Lab. My parents were in the neighborhood. We weren't about to move. At that time, they had a campaign, "Let your fingers do the walking in the Yellow Pages." And I had unlimited suburban service, which meant it didn't cost me to call, you know, metropolitan Boston. Except downtown Boston cost me. I decided I'd go in the telephone directory. Because, you know, we didn't have the internet. And I looked up consulting engineers. Well, that's what I wanted to do. I always said I wanted to do the math for engineers. You know, I wanted to work with engineers. I wouldn't apply to any all-girls schools. I wouldn't. I said I'm going to be working with men. It doesn't make sense to go to an all-girls school. So I started calling, and I think it was under "L". I called Arthur D. Little and told my story, because they were in Memorial Drive, just down the road from MIT.

They invited me in for an interview. I think this is probably why I got the job. He said to me, "Who do you know who works here?" And I said, "I don't know anybody who works here." So he said, "Well, where did you read about us?" I said, you know, "I never read about you." And he said, "Well, how do you know what we do?" I said, "I don't really know what you do." He said, "Well, how did you happen to call us?" And I said, "Well, I'm looking for a job, and I'm going through Consulting Engineers in the telephone directory, and I'm up to L. I'm calling all the numbers that don't have a charge. And if I don't get a job in this category, then I'm going to start--" He looked at me and I looked at him, and it was sort of a funny interview, because he saw where I lived. And he said, "Oh, I know somebody who lives on your street." He knew one of our neighbors, whose name I've totally forgotten. But it was a rather exotic name, maybe Hungarian or something like that. He said to me, "It's a strange name. I don't know where it came from." You know, when you're Jewish, this is a little bit of a clue that maybe people are fishing. And especially when you have a German name like Rossbach. So I said, "I don't know what kind of a name that is." And I just looked at him and said, "We aren't any of us American Indians, are we?" And that was the end of that. You know, I just said it very nicely. Anyway, they gave me a job, and it was very nice. I liked working there.

And then Arthur D. Little moved out to Acorn Park, on Route 2. I was with the first groups that moved out there, which is now a whole complex. It was one building, and then they built a second building.

Unfortunately, my boss decided he was interested in me. I guess it was my #MeToo moment. It wasn't pleasant, but it worked out for the best. I got so upset with him. I mean, he was strange-- They had a little soup kitchen. This is

not what the problem was. I mean, this I could handle. He had his soup, and then he had this mug there. And he said to me, "Wash the mug" – I don't even think he said please – "and return it." So I said, "I'm not going to wash your mug." He said, "What do you mean?" I said, "I'm not going to wash your mug. I'm not washing your mug." It was so funny. You know, the male psyche or ego, I don't know. He said "Well, what am I supposed to do with it?" So I said to him, "Well, you could throw it out and buy a new one. You could take it home, and have your wife wash it, and bring it back tomorrow. Or you can walk across the hall to the men's room and wash it yourself." He says, "But you're really not going to wash my mug?" I said, "I will not wash your mug." So, I don't know which of the three he did. He probably washed it and returned it.

But then it got to be bad, and I got very upset. I was really in tears. I went to the nurse. I went down there, had to get out of the office. And she said, "What's the matter?" So I told her. I calmed down, went back to the office. Next thing I knew, the big boss called me. The nurse had called him, and said to him, "What's the matter with your men up there?" Which was good. I guess I did the right thing.

I told him, "You know, sometimes I have to be in a dark room looking at slides. I'm with the other men. Everybody's all right." But the fact of the matter is, I think I'm right about what was behind my boss's problem.

There was a movie – it's a good movie, by the way – called Captain's Paradise, which came out at that time. And this man, my boss – here, I'm trying to choose my words. I don't want to identify anybody. He identified with the captain of Captain's Paradise. The captain in the movie had a wife in Gibraltar, an English wife, and in Morocco, he had-- Yvonne DeCarlo, a sexy actress who was a dancer in a nightclub. Well, this man's wife – my boss's wife, I met her – she was like an analogue to the English wife in a lot of respects. How I compared with Yvonne DeCarlo, really, I couldn't figure out. But I think I was his Yvonne DeCarlo, is what I think it was, in my mind. He had this fantasy from this movie. Whether that's in his defense or not, I'm just saying, to my mind that explained what happened to this man that seemed to me to go a little bit crazy. So I learned a lot from him.

But anyway, the big boss said, "What should I do about him?" It happened that we had this big, strong, burly, Israeli guy working for us. "Mike Dubitsky," I said. "Put me in an office with Mike, and tell this other guy that he's not to come into my office without my permission." So we did that. And I learned jujitsu, to the extent I threw my husband over my head one time, to my mother's horror. He ended up on the grass! I just learned a couple of things.

I told the problem guy that I'm learning jujitsu, and he said, "Huh, a little thing like you—" I said, "Well, nobody's ever going to strangle me. I know what to do." So he actually was passing in the hall, and he went at me as if to strangle me. Well, put out your arms as if you're going to strangle me. Both of them.

BERNSTEIN: Out?

ROSSBACH: Yeah. You just go like that. [Shows Bernstein what to do.] I didn't do it hard. But that's what you do. You get people--

BERNSTEIN: From the inside?

ROSSBACH: Yeah. And so I hit him, you know? And he looks up. I said, "I told you so." And I kept going. And a couple days later, he said, "You know, my arms still hurt." And I said, "I told you."

But I decided I needed to be more independent from this. At that time, for example, picture windows were the new thing. Pittsburgh Plate Glass made a lot of the picture windows, probably maybe most of them. And it was, what's the best way to tape them for a hurricane? What should you do, for the hurricane? So they gave me the job of figuring out how to tape the windows. I studied it, I don't know, from my applied math for engineers, or whatever. And unsurprisingly, we figured out the maximum stress is on the diagonals. Unsurprisingly. You know, it's the kind of thing once you've figured out, it's like "Oh, yeah. Should have seen that in the beginning." So tape on the diagonal. Now, when I see pictures of people taping on windows this way and that way, I know that you tape it on the diagonals. That's the best thing, so I did that.

Then they had me figuring out whether it was cost-effective to have gas air conditioning. I was into adiabatic expansions and isothermal-- I'd never taken thermodynamics, but I read about that.

Then they had me calculating the torques on the beams in a submarine, and that was interesting. I really wanted to go on a submarine to see what I was working on. Because I had the layout of the submarines and, you know, what were the torques – because it had to stay rigid in the water. The Navy said I couldn't go in a submarine. They said, "A submarine's no place for a woman in a skirt and high heels." And I said, "Tell them I have dungarees and sneakers." (I'm 89 now, and I still have the same kind of clothes.)

I found out somehow – I don't remember how – that Brown University had a graduate division of applied math. They said their goal was to make mathematical engineers. I liked that, so I decided I was going to go do that. By this time my husband and I had a house in Westwood. I don't know where he was working. He was still in the MIT Instrumentation Lab [later Draper Lab], I know.

I got accepted at Brown [to study for a PhD], and I got a research assistantship with the head of the math department [Erastus H. Lee, prominent researcher in applied mathematics; Professor of Applied Mathematics at Brown and then head of that department at the university]. And off I went. You know? I used to commute. They didn't have a [Route] 128 railroad station yet. They just stopped there. In the winter, you'd sit in your car, and when you saw the train coming you'd get out and run over. More just a big parking lot. And then when I got to Providence and I'd walk over and get the bus up the hill.

The department headquarters was in a nice old house at 182 George Street, and I had an office there. I had nice friends. I made a lifelong friend there, Sharon Murnick Kunoff [industrial applied mathematician, author and Professor of Mathematics at the C.W. Post campus of Long Island University; Kunoff was working on her master's in applied math at Brown when the friendship began]. She died a couple of years ago. I inherited her children [including Estelle Kunoff Epstein, PhD Physics 1985; Sharon Kunoff's brother, Daniel Murnick, Donald H. Jacobs Chair of Applied Physics at Rutgers University, also earned a PhD in Physics from MIT, in 1965]. I was with them for my birthday on May 12th, in the Bronx. I never had any children, don't have any siblings, but I made my own family, as it were. So that worked out well.

The first summer, I got a job at the MIT Instrumentation Lab, where my husband [Leopold Jerome Rossbach, SB and SM Mathematics 1951] worked. They were working on inertial navigation. I think my husband was on the first flight that was pilotless from Hanscom [Hanscom Air Force Base outside Boston] to L.A. But this was before that. That's why I know he was in the Instrumentation Lab, because I went to work there.

They were having problems. They had ball bearing gyroscopes. They had unbalanced torques that they couldn't account for. You know, they didn't know how to fix it. What to do about them? So they gave me the problem. Well, you know, it's a bad thing to be a mathematician, or an engineer, too, I guess. You can have a lot of anxiety. You get a problem, and your first feeling is, I don't have the slightest idea what to do about this, right? [LAUGHS]



You know? You got a job, and you're trying to fit in with a community. You want to do this work. What do you do with it? Well, I looked at all the vector analysis. That's what they had tried. It didn't work. And I said to myself, "I just took this course in tensor analysis." (I barely remember what it is now, I don't even really remember much about vector analysis. Too much. I mean, the one that had dot product and the cross product, I think? Something like that.)

Anyway. The thing I remember about tensor analysis is that you could have a force in one direction and the deflection could be in any one of the three directions. That was the thing. So I got to thinking about it, and I thought, "You know, if the ball bearings are rough, and if they roll, you know, it could be a force in this direction. This way. But then it could fall into a hole in the track. You know, this is rough." I'm talking about, you know, a microscopic thing. "So that would be a force this way, and the deflection that way." You know? "Or maybe it'll go this way." I started analyzing it that way, and I came up with something. Lo and behold, it matched – what they needed to fix.

I can still remember-- By this time I'm, like, 24 maybe – not too old. I got all of these big-shot men. I'm telling them my story, and they're saying, "It doesn't make sense to have a force one way and a deflection somewhere else." And I said, "Well, let me show you." So I took a pencil, actually, and I sort of balanced it on the end, you know? And then I said, "OK, I'm going to give this a little force. Like this." And, of course, the pencil fell off, landed on the floor. I said, "That was a little force, and it's a very big deflection." [LAUGHS]

So they had on TV one of the flights. I think my husband had already been on one, because he had to go and take some kind of test to see if he got sick, or I don't know what. We already had our first house, and we were watching this on PBS. It was so cute. My husband said to me, "Pay attention, they're just going to put in your coefficients." And they did.

So I wrote it up for the Instrumentation Lab, which became Draper Lab and spun off. I don't know if it still exists. But my best friend worked there after she retired. They paid me, I think, what they paid a research assistant.

I wrote it up for the Institute of Navigation, or something, which was interesting, because my uncle was a captain in what was then the Coast and Geodetic Survey, which is now part of NOAA, but he had a uniform like a Navy uniform. He was a Captain, and so I was pleased.

The funny thing is, I was at a family wedding in New York in May. And I was talking to my cousin's grandson, one of my cousins, and he was telling me that

he's got his own plane. He showed me the instrument panel, and, oh! I love to fly. So he showed me, "This is navigation." I said, "Oh, you must have gyroscopes." So he said, "Oh, yeah." So I said, "I did some work on gyroscopes years ago." But, I said, "Those were ball bearing gyroscopes, and then they had floating ones, and they had other things. So you wouldn't have those." "Yes," he said. "This is an older plane, which I take very good care of. My gyroscopes have ball bearings." So I told him about what I had done.

So last Saturday, just a week ago, we had our annual family party, and he came. He's young, a little older than you, but not a whole lot. I mean, maybe he might be 30. He came with a couple of friends, and he introduced me to one of them. It turns out I had some connection with the guy's wife, also, from sort of a family connection, which neither one of us expected. But he said, "Oh, you're the one that worked on gyroscopes!" [LAUGHS]

BERNSTEIN: Your family--

ROSSBACH: My family – a lot of them are technical, you know. We've got doctors, lawyers, and engineers. A lot of engineers. Sometimes I say my halo pinches, you know? Because when you do it, when you do what you do, you never – at least, I didn't ever feel I was doing anything unusual. You know? I just didn't.

And I guess I didn't say about my childhood-- I remember, I must have been three, at most four. We lived on a street with two-family houses, a few single-family ones up the hill. And these teenage girls were hanging around. I don't know, my father was good-looking. Maybe they liked my father. And I guess maybe I was a cute little girl. Anyway, they asked me, "What do you want to be when you grow up?" And I said, "I want to be an engineer like my daddy." And they laughed. I said to my father, "Why did they laugh? And he said, "They're silly." And I said, "Can't a girl be an engineer?" And he said, "Well, it is unusual, but girls can be engineers." I didn't care if it was usual. I mean, it didn't register. It never did. So I said, "OK, so I want to be an engineer." That's what stuck in my mind years later: the fact that my father said, "You'll probably go to Burdett College, like your mother and your aunts." My aunts, by the way, were super bookkeepers. They were all good in math. They were like business managers.

One aunt, when she left her job, she got married when she was 50. She married the widowed manager of the company she was in. And the other one, her twin widowed sister, was in her 90s and she was still working and living in Queens [New York]. She retired, and everybody in the plant got sick with flu, and the big boss was in Florida. And they called my aunt, who was 90. She took her three buses and went back and saved the business, in the middle of winter. So, you

know, they were no slouches. Everybody was either an engineer, or they were good with numbers.

Recently, within months, not even years, I was saying to myself, "Oh. I was the first woman in my family, the first blood relative female, that went to college. I was the first one that drove a car." I mean, I never noticed. And then, a number of years ago, a woman wrote a one-person play about being a female mathematician at MIT. MIT has what used to be the Central Square Theater; now it's MIT's theater. She put it on there – it used to be a movie theater. They asked me to be in the panel afterwards, and I said, "OK." So I went, and somebody asked me a question about how I dealt with sexism, or how it was to be one of the few women at MIT, and I gave her a very honest answer. I said, "I was so self-centered and just focused on what I wanted that I just never paid attention," you know? It's their problem, not mine.

BERNSTEIN: Yes!

When you were working on the ball bearing gyroscope, was that the first summer of your PhD?

ROSSBACH: I was working towards my PhD at Brown. I never got the PhD. I started something on stochastic processes and assembly lines and conveyor belts. I think maybe I got some kind of a paper out of it. It's really not my thing-- probability, stochastic processes. Not my thing, so I gave that up.

The Graduate Division of Applied Math at Brown, at that time – I think it became Computer Science – was a very interesting place to be. That was 1957 or 1956. The older Rockefeller had wanted to rescue these Jewish mathematicians from Hitler, and he gave Brown money to start this graduate division of applied math. We had these giants of European, German, mathematicians there, amongst, you know, our kids, too. They were very, very good applied mathematicians, in various fields: fluid dynamics, elasticity. It was really a privilege.

Ronald Rivlin [British-American physicist, mathematician, an expert on rubber, began teaching at Brown University in 1954; later became director of the Center for the Application of Mathematics at Lehigh University] was English. He was a bit different. I had to talk to him about something. I had him for elasticity, and he was very big in this field. And he said to me, "You're nearly brilliant." And laughed and I just said, "Nearly?" [LAUGHS]

BERNSTEIN: About the PhD program at Brown: were there any other women there?

ROSSBACH: Oh, yes. My good friend, Sharon Murnick Kunoff (who died and I got her children), was there. And there was another woman there, Elaine Heyman, who ended up being a programmer who worked at Honeywell when my father was there, and married somebody, Herb Kamowitz, who was in math – who taught at UMass, in Boston.

But I got a second thesis advisor. He gave me a problem, and I could solve it. I knew what to do about it. But I said to him, "It's just a question of grinding it out on the computer." I know that's what people do, I'm sure, to this day. But I said, "That's not my idea of what to do for a thesis. It should be something creative, you know? Something original. So I don't want this to be my thesis." So he gave me another problem. It was 1958. My husband and I had plans to go to the World's Fair and stay with his aunt in Brussels. My husband came home and said, "I won't be able to go in the fall. There was going to be a proposal at work." He was working someplace else by then, not the Instrumentation Lab. And he said, "I don't know what to do." So I said, "Well, if we go right now, it's open. It's open. Let's go right now." So we sent a telegram off to his aunt. And she answered back, "Glad to receive you." You know, we told her when we could come. We called my mother-in-law, had her go to AAA in New York and get a TripTik for us. We knew what we wanted to do. And she wanted to come to the airport to see us off, anyway. We had to go through New York.

I talked to my thesis advisor – I think I had to write him a letter, actually, because it was very fast – that I was going to be gone for six weeks. We had to go because of my husband's work. And when I came back, I'd work on this new problem that he gave me. So we went and had a great time.

When we came back, I went to Hayden Library at MIT with my problem. And what he gave me was, I think, a modified heat equation – non-linear. It had an extra  $t$  [variable for time] in it. Not easy. Well, I guess it's an old hat thing now. But I looked at it and I said, "Hmm. If I did a Laplace transform, I could get rid of the  $t$ ." So I did. And now can I solve it in a transform plane. So I did. Now, can I transform it back? I could. So I did. In two hours, I was done. OK.

I still hadn't gotten to Brown. I was just back from Europe. So I wrote a letter saying, "I've got to come and see you. I think I solved the problem." Unfortunately, I got a letter back from him. Yes, he had worked on the problem while I was gone. He'd published it as a paper at Brown. I didn't get a PhD. But I did solve the problem. I passed the exam, and everything. I passed everything.

BERNSTEIN: That's incredible.

ROSSBACH: That's OK, because when I was working at GTE there was a time when business was very bad. They were laying off people. I swear, if I'd had a PhD they would have had to lay me off. Instead, because I didn't have a PhD, they said, "Oh, they need somebody to do such and so with telephone switching. Why don't you go and see if you could help them?" So I did. I'm saying if I'd had a PhD, they'd never ask me to do it. But I did it, and it was interesting.

Speaking of which, I had a particular funny experience at GTE. They had a computer, and they had to erase a magnetic drum, because everything was classified. They came to me at one point, and they said, "We're measuring signal-to-noise ratio on this, to show that the drum is erased. NSA wants us to do--" I don't know. I don't even remember what it was. "They don't believe that's equivalent. No matter what we try to tell them, we can't convince them. We don't know what to do. See what you can do with this."

Again, here I am. I don't know about magnetic drums. I barely know what signal-to-noise ratio is. I am not an electrical engineer. But I sat there, and I said to myself, "It's a detection problem. They want to know if they can detect the message and all the data that was on the drum."

Well, my boss at the time and I had signed up for summer course at MIT, and I had a book from the course, "Detection, Estimation, and Modulation Theory." I don't think I have the book anymore. I was working; always a lot of work. Going to this class. Who had time to study? You know, I didn't have the energy. I couldn't do it. It was too much for me. I absolutely could not do it.

So I went, and then I said, "I've got to drop the course. I can't. I can't. I just can't do it." And here I have the book, maybe a couple of years later. They give me this problem, and I realize it's a detection problem. I said, "Well I got the book." I got out my book. And I don't overestimate what I can do, shall we say, I started reading, you know, the title page. That's OK. Table of contents. That's OK. And then they have the introduction. I'm on the first page of the introduction. The first page. And that's OK. The second page. I understand that. I did before, too. The third – I'm still bombing along. The fourth page. I'm reading this. I understand it. What is this on the fifth page? It's an equation that shows that signal-to-noise is equivalent to what NSA wants us to do. The equation is there. I don't have to do anything. It's there.

I went back to the guy that gave me this problem, and I said to him, "I've got good news and bad news." He said, "What do you mean?" I said, "The good news is, I got an equation that shows that signal-to-noise is identical to what

NSA wants us to do.” He said, “So what's the bad news?” I said, “It's in this book, in little iv in the introduction.” I said, “Do you want to tell NSA that what they want is in little iv introduction to this textbook?” He said “Oh--.” I said to him, “I'll have to write it up, and, you know, get it in there somehow.” So I wrote up the whole history of the magnetic drum, and what they wanted, and what we were doing, and this and that. I showed how it proves out that what we were doing was equivalent. I got it up to maybe four or five pages and I gave it to them. They sent it to NSA, and I'm saying, “Thank God.” You know, GTE's off the hook. I'm done with this.

About a few weeks later: “Janice, NSA is having a meeting on security, and they want you and Mark [Weinstein] to go down to discuss security.” Because I sent them the paper. What am I going to tell them? Oh my god! I'm telling Mark, “I don't know what's going to happen. I have nothing. I don't know anything about this, I just know little iv. Maybe I've got to read the rest of the introduction.”

There's a lesson here. They had quite a bit to discuss with Mark Weinstein. I had to get escorted to the ladies' room, and we took a plane back. They never asked me anything. It was a total waste of a trip.

I do believe they realized that their objection was ridiculous. They had a meeting on it, and they put it to bed, but they had me schlep out. Never, never said one word about signal-to-noise ratio. Not one word. Not even half a word. They didn't even say signal, let alone noise. Is that funny? But the thing is, you know, never give up the ship. Because it's like the Graduate Record Exam. You can just figure out something, you know?

I had a young woman working for me one time and we were supposed to go to a meeting. She was really feeling nervous. She was smart. She had actually been a blackjack dealer or something in Las Vegas. She said, “Oh, I don't know anything about this, you know?” I remember I said to her, “There's no trick to talking about things when you know something about it. The trick is what you say when you don't know anything.” And she was fine.

**BERNSTEIN:** You started at GTE right after Brown?

**ROSSBACH:** When I left Brown, I went to Melpar [Corporation]. I was actually trying to have a baby, even while I was at Brown, and then I went to Melpar. That was good. They were trying to detect Russian missile launches in Siberia. There is such a thing as an acoustic duct in the atmosphere – you know, like sonar is an acoustic duct in the sea. You get the waves, and that's how sonar travels and works. It gets caught in these ducts, so they thought it was the same sort of thing. I had

all the stuff about underwater sound, and I was trying to analyze how you could tell. That was one of the things I worked on, mainly. That's what I remember.

But you know, I sort of retired. I wanted to have a baby. I did various medical treatments, and I did get pregnant. Then I had what they call a missed abortion, which is basically, the baby died. I was a mess. It was not very good for me, psychologically, so I was home. I was depressed. I wasn't in good shape. And then I took stock of myself. I remember, I said, "It's either join the garden club, or get a job."

We actually got invited to a party, somebody my husband worked with. And there was a couple there, and he worked at GTE [Corporation] in Needham [Massachusetts]. The Programming and Analysis Lab, P and A. I talked to him about what they did and where they were.

I said to my husband, "You know, they have a lot of women programmers there, and everything. And it's handy, you know?" It was in Needham, we lived in Westwood. And I said, "I wonder if I could get a job there? But I said to him, "I hate to impose on somebody that I met at a party." And you know, when a woman calls a man up, he doesn't like to say no. I didn't want to put him in that position, so I said to my husband, "I don't like to do this, but would you call him, and just see what he says?" My husband called him, and he said, "Yeah, they'd like to talk to me." So I went in. I got the job, and I was there 28 years. But years and years later, I was at a cocktail party with him. A bunch of people, and he was there. I'll never forget this: he said, "When you came in for an interview, everybody was so impressed with you." You know, it makes you feel good.

So I got a job at GTE. And you know what? This has an MIT connection also. One of the first things they gave me to work on, they said, "We've got these Minuteman contracts for communication, and we have a medium-frequency radio, MF radio." (I used to have the book we put out about that system.) "But we have pressurized cables communications and we get leaks in the cable system sometime. Where is it?" They knew what the drop in pressure is. They knew what it's supposed to be. They knew what they measure. "Can you work back and find the leak?" So maybe I could tell them how to find the leak. I tried to do something with fluid mechanics and the pressures and everything. And, I don't know, I guess I did something. But I never was satisfied with it. I just read that MIT is doing research that can be applied to finding leaks in pipelines. No wonder I couldn't do more in the 1980s.

Oh! And in fact, at one point they sent us to Houston, Texas, my boss and I. They have a gas pipeline. How do they find the leaks in the gas pipeline? So off we

went to Houston, and we landed just before a hurricane's coming. And I had read about the awful hurricane and the devastating flood in Galveston in 1900. So I'm asking, "Where is Galveston? How far are we from Galveston?" I'm very practical. So we go to see this guy-- Well now, this is where I have to go into a little act. We meet this Texan. Typical Texan. And here's my boss – nice, strong, nice-looking guy – and he says, "Here's Janice Rossbach, and we're from GTE." And this man looks at me, and it goes something like this: "Well, I do declare, if that isn't the cutest little old lady engineer I ever did hope to see in my whole life." And he went on. And with my boss-- I could have killed him, you know? I could have killed him!

Well, they weren't much help. We flew home. It was the tail end of the hurricane, so I remember it was sort of not easy to take off – and then we landed in New York in a blizzard. I mean, it was really not the best flight in the world. Then I think they put us on a plane to Boston. After this experience, you take off in a hurricane, you land in a blizzard, you're on this plane that came from Puerto Rico. Everybody is speaking Spanish. It's like you're in another world. It was such a strange trip!

I don't know, these things happen to me. Do you find I don't have a boring life? Could you feel the same way?

BERNSTEIN: I hope not.

ROSSBACH: No. But what do you think? Do you feel that way, that why did these things happen to you?

BERNSTEIN: Yes.

ROSSBACH: I guess it goes with this certain kind of personality. You know, that's what you get for being a smart girl that wants to go to MIT. You're not going to have a boring life.

BERNSTEIN: Not at all!

ROSSBACH: No – and no complaints, right?

BERNSTEIN: Right!

ROSSBACH: Now, if can imagine growing up in Mattapan. My father didn't have a job, and we had a three-room apartment. We didn't even have a living room, just two bedrooms and a kitchen, a good part of my life. I got a house. I got out of the



city. I'm living here. Can you imagine the gulf? The difference? And who's living across the street? Howard Johnson, who was president of MIT.

BERNSTEIN: Oh, wow.

ROSSBACH: And who lives next door to me now? Neil Rudestine, who was president of Harvard. And who calls me "cousin" because he had a Jewish grandmother? Do you know who E.O. Wilson is? He's very famous. He specializes in ants, but he's a very famous entomologist. He's written a lot of books. He's at Harvard. He's really quite famous. And Solow [Robert Solow, MIT Emeritus Professor of Economics], the Nobel Prize winner, lives here.

BERNSTEIN: Could you tell me a little more some of the projects you were involved in at GTE?

ROSSBACH: Did I tell you about the part where somebody, the technical director in the program office, had retired, and he wanted me to be the program director?

BERNSTEIN: No, I don't think so.

ROSSBACH: That was important. Well, the ELF [Extremely Low Frequency] program got deployed, and submerged, we communicated with a low frequency. I think most of the rest of the time I was at GTE, I was staff. Just before I retired, we were working on an independent research and development that the company was doing, and sometimes we'd get called in to review something. We had a job with Egypt, and they called us in because they had to write the management plan or something like that.

I remember this. I'm sort of pleased about this, because I was so right. I said to them, when we have a contract with our government, they watch us and they monitor you when they ask for documents, and we don't like it. But it really is a help to us. I said, "The Egyptians aren't going to do that." I said, "They'll let you get into as much trouble as you want. And then they'll pull you up short and say that you've got to fix it, and they'll say that you were supposed to do something. And you didn't know you were supposed to. So you really need to write a very good management plan so you don't get into trouble."

I went away, and, I don't know, maybe it was a year later, I heard that the general manager had to go to Egypt to straighten out the contract. I told him, "I don't think they listen, anyway [to my advice to write a detailed management plan]"

And then, after I retired, I used to go back for the annual dinner that they had. I remember I was so annoyed because the man that was running the internal research and development said to me – and he thought it was cheering me up – he said “Janice, you'd like to know that the things you wanted to do, they're finally doing.”

BERNSTEIN: What went wrong in Egypt?

ROSSBACH: Well, I don't know, but the customer wasn't satisfied because they weren't monitoring what they were doing. I can only imagine that the people in Egypt would probably ask them to do things that weren't covered, and then they were complaining, and they hadn't worked it out. But I just knew they could get themselves into trouble, because if they wrote a certain kind of management plan, and had the customer sign off on it, then you can say, “It's not in the contract. It's not what we agreed.”

We used to have that on Minuteman [the Minuteman Missile project]. They would ask for something, and you had to know to say, that's not in the contract. It'll be a contract change notice, they called it, and they have to pay for it. So being an engineer is not just knowing the technical things.

BERNSTEIN: And ELF?

ROSSBACH: Another thing that happened on ELF near the end of the program was interesting. The system was being tested, and all of a sudden, I hear – too late, they should have told me sooner – that it says we have to test the receiver. They said there was a paragraph in the system specification system spec that we had to meet the requirements for ocean-going vessels, and we didn't build the receiver to that, so everybody's having a fit. What are we going to do? And my boss finally said to me, “See what you can do about this.” Well, I was really upset they hadn't come to me sooner. Because it is a system spec, but there's a contract, there's the statement of work. The Statement of Work says what work you have to do. The Statement of Work said what sections of the system spec you had to satisfy.

I went to my boss and I said, “We don't have to satisfy that paragraph. It's not in our Statement of Work. It's not an ocean-going vessel the receiver's going on, it's going on a submarine.” So there were little things like that. I think I was a little pleased with myself that I knew that and it wasn't just technical. It was just understanding.

I think it's a good idea to know something about management and law. Being legalistic is not bad. When I used to work on proposals, I would look at the request for proposals, for a proposal, and I would read a sentence, and I would say to myself, "I wonder why they phrased it that way? They could've written this way. So why did they write it that way? Well, maybe they're looking for such-and-so." I just was trying to get in their heads.

I never went to Hebrew school, but I know about Talmudic scholars that go over every word of the Bible, and this rabbi had one opinion. And I used to say to myself that I think I'm like a Talmudic scholar because I'm looking at this request for proposals, and why did they use that word? They could have used this word. Sometimes I got in their head, I think, and it worked.

The predecessor to ELF was called SEAFARER. I worked on both. MX was in between. Research and Development was just before I retired. I don't remember if I told you about my experience before we got to that particular ELF program, when the technical director for the whole thing left and he said I should have the job. But the proposal manager called me and said he wanted a man on the job.

BERNSTEIN: I don't think we covered that.

ROSSBACH: Well, that was earlier. I was so annoyed that he called in this other man too. I don't remember the exact sequence, but it must have been before we had really had the job, we were still dealing with the customer about what to do with that system. I had been in engineering, and then I was asked to join the program office. And I did, because engineering didn't seem to be paying that much attention to me. And then I was called in with this other guy and told that they wanted a man on the job – in front of a witness. I mean, that really bothered me. Like I said, I'm a good company girl. You don't put the company in that position that you say something blatantly illegal in front of a witness. Not good.

I don't remember what year it was, but it was just before Mother's Day, and I was very upset. I was really, really upset. It was so ignorant to say that. And the worst part of it was I didn't want the job. On top of it all, it was really aggravating, and I was very upset.

I came home and my mother-in-law was here from New York. The one thing I remember, the best part of it was listening to the two mothers [mine and my husband's] saying, "Can you believe he said that to Janice?" They were so mad. I mean, it was funny. They didn't necessarily see eye to eye in everything, but they were very united about this cause: me.

Anyway, I was so mad, and people were telling me to sue, and I said, "I don't do that." But that was in May. And by August, I cooled down enough that I went to Human Resources. I told the Human Resources manager what happened. I had thought about how to put this, and I said to him, "I don't think that represents GTE. GTE is not that kind of company." And I said, "So this man should be irrelevant to my career," I said to him. And I said, "I'm going to consider that I work for you." And he said to me, "Well, you can't say your supervisor's irrelevant." I just looked at him and I said, "Well, I don't think he represented GTE. But if you tell me he does, I'll have to go away and think about this some more. Because I don't think so." And he said, "No, no, no." You have to know how to scare them. Scare them a little bit." So I said, "Listen, if he's got this kind of an attitude, I'm not sure that my grade is right. I'm not sure I'm getting paid fairly." I said, "Here's a list." I gave him a list of 10 people that I considered peers and said, "I want you to assure me that I'm being treated fairly."

I said, "Salary – sometimes there's a 10% difference, so I don't need to make more than them, necessarily, but I shouldn't make too much less either." And he said to me, "Oh, there are two different divisions, because we had two that we were saying Needham Place." And he says, "It'll take me a long time to do this." I said, "I'm not going anywhere. I've been here something like 25 years."

So yeah, I guess that must've been before ELF's success in communicating with submerged subs because I just went back to my office, and I was sort of getting ignored, and then they tell me I'm not interested in management – but nobody ever asked me anything like that. So they sent me to a management class, and I just bided my time.

Then they loaned me to work on the MX missile program. I forgot about that – that was in between.

BERNSTEIN: In between?

ROSSBACH: In between working on SEAFARER and then ELF and an internal research and development. It was this big proposal. I forgot just what the sequence was, but now it's coming back to me. I'm 89, and it was a long time ago! I retired in 1990, so it goes way back.

I worked on the MX proposal also, and I did my part. Then we had to rework the software part, so I worked on that team. And then we were trying to get a survivable lithium battery power source for the missile, so I worked on that.

They said I was a utility person, I guess because I could work on all different things. And I was a key person. But we still hadn't won the job, and I was up for salary review. And they had found the male technical director, the star. I had worked for him before. He was smart, but I didn't think he was a star.

Anyway, I went to him, because I was on loan, but I worked for him, and I said to him, "I hope when I'm up for review that you take into account all the work I've done on this proposal." I thought that was fairly straightforward. Well, I was really taken aback, because he said, "Well, times are tight. Not much money for raises."

And I've never asked for a raise. You notice I didn't say I wanted a raise. I figured they'd give it to me, I had already earned it. Your salary goes like this, but your output goes like that, so by the time they give you the raise, they've already made extra money from you.

Well anyway, I was not happy. We were supposed to go on vacation, and I came home, and I was really upset. I didn't sleep well that night. The next morning, I said to my husband, "Do you mind if we go on vacation after lunch?" He said, "No. Why?" I said, "I'm going into work and I'm quitting." I said, I had a problem with these people before. Discrimination. I said now, I work so hard, and they're saying, no money for raise, and they're not even going to consider what I did. And so I can't be treated like that.

And my husband said – you know, his wife was giving up a good job. I said, "I'll get another job." And he said, "I'm so relieved." I said, "You're relieved? How come?" And he said, "I thought you were going to let them get away with it." I said, "Well, I'm not."

I went to work and found the guy on MX. The proposal was submitted, and my name was in it. And the customer knew me and liked me. I mean, it's not acceptable. So I said to the him, "I hate to tell you, but 10 o'clock I'm seeing Human Resources and I'm resigning. I'll be gone in two weeks." "Two weeks?" I said, "Yeah, I get paid every two weeks. All I have to do is give you two weeks' notice."

He said, "Why?" I said, "I've had trouble with them before, I'm not going to live like this. I don't care what it does to my pension." I said to him, "And you're not entitled to use my name in the proposal. It means something to me." And I said, "You're not entitled to use it, so you'll have to figure out what to tell the customer, because I will not be here."

I went to my office, and my appointment was at 10 o'clock. And pretty soon he appeared. He said he found the big boss, the executive program manager, in Maine, on vacation. And he said to me, "Please don't keep that appointment." He said, you keep the appointment, I can't do anything. But give me a chance to fix it. So I said, "You know, I never had a problem with you." I didn't. I worked with him on Minuteman and the proposal, and I said, "OK. I can always make another appointment with Human Resources."

So I went home, and before I left work I told a friend who had been with the Office of Secret Service in World War II. He was a tough guy. I mean, a good guy, but he was no pushover. He said to me, "You did what? They can't turn around that fast." I said, "They can if they want to. I'm going on vacation."

So I went, and I came back. The secretary said to me, "You picked such a good week to be on vacation. All the managers were here every morning, early, and yelling and screaming. I had no idea what was going on." I said that I didn't know what was going on, either. Then the manager, the one I had spoken to about quitting, appeared and said to me, "OK, there's a new department. You're the first member. You're working for me. You're getting an upgrade. You're getting 15% salary increase. And Fred wants to talk to you." (Fred was the executive program manager.) I said, "OK." So I talked to Fred, and he said to me, "When we win the job, there's going to be a new division, and you can consider yourself the first member." OK. That worked for me.

I give the company credit, because I got a letter from the old boss. He's the one who gave me the upgrade. He's the one that gave me the 15% salary increase.

BERNSTEIN: Wow. What was the new division?

ROSSBACH: Well, we won the MX [missile contract], and it was a new division for MX. It was the biggest contract the company had ever won. I don't know whether it was \$385 million or something. This is back in the '80s.

BERNSTEIN: Did you end up taking management position on that, on the new division?

ROSSBACH: Well, actually, that was another part of it, when we were working on the proposal. I went to the same guy I spoke of before and I said, "We don't have enough managers to put in the proposal. I'm not interested in being a manager. But if you want to use my name for managing a section or department or something, it's all right with me. Because we need names."

So most of my buddies in systems engineering – because that's where I was – we all ended up, I think, in sections of departments. I don't remember. It lasted for quite a while, but then my position was senior technical staff, reporting to the executive program manager.

They have never really encouraged me to be a manager, and there was no mentoring, no training. They just considered I was technical. But they needed me for the Air Force, so I was given a choice to go to this other staff position. And one of the managers who should have been a manager, he was upset with me, because he told me I should stay. He thought I shouldn't go on staff, which was very flattering to me.

I said to him, “If you're a manager and they ask you to go on staff, to my mind, you go. Because they don't give you support.” Previously, I was a project manager, much earlier, and they sent me through a course on being a project manager. So that was OK. The instructor said, “You need to have the support of upper management. And if you don't have the support of upper management, there's only one thing to do-- leave.”

BERNSTEIN: Were you generally not interested in management?

ROSSBACH: I wasn't interested in management, no. I didn't like the politics. And I like to focus on getting the problem solved, getting the system built.

BERNSTEIN: Did you find project management was a little bit different? You said you were product manager once.

ROSSBACH: Yes, I was.

BERNSTEIN: Did you enjoy that experience?

ROSSBACH: The job wasn't bad. I think it was about encrypted telephone communication. But again, we had to work with engineering, and the man who ran the engineering section didn't like the program manager – the head of the program managing section that I worked on. And it carried over to his people, so it was unpleasant.

Then one time, one of the people in finance, in our own department, came to me. I don't even remember what his gripe was. He said that he's going to throw the book at me. I think I had a document that was late. I was waiting for engineering. I told him, I said to him, “If I did anything I'm not supposed to do,

of course throw the book at me.” I don't know what that would be, but I didn't like that at all. But he went away.

And the engineers, they were bad. My secretary from the other division, from where I had worked before I became a project manager, she called me up and she said, “Did you have a problem with engineering about overtime or something?” And I said, “Yeah, how did you know?” Well, she said, “So-and-so over here carools with people from your division.” And they were laughing about this woman project manager. They were going to tell her they were having trouble getting overtime, and see what she would do – you know, like a setup. And she said, “You're the only woman project manager over there. So that's why I was wondering.”

I said, “Thank you very much.” So indeed, I got a call from Engineering that they needed people to work on the weekend to meet a deadline, and they were having trouble getting overtime authorized. So I said, “Well, who's the guy that needs to authorize it?” And he told me, and I called the man up. And I said to him, “These guys are working on my project, and they tell me they need overtime.” I didn't know what the problem was. And no problem, he authorized, it was OK. But it was a put-up job. They made it up just to be nasty. I didn't care for that.

Also, they had a locked facility. Not just anybody could go in. And at one point they told me I shouldn't go there without permission – and I was the project manager! I just said, “I've got a company badge number, I'm going to go anywhere I want. Forget about it.”

No, they weren't nice, and they did things that weren't nice. Like the customer came, and I told them, “The customer is very skittish about taking anything they're not supposed to. So don't take them any place too fancy, because they'll feel maybe it's a conflict of interest, [that] they're taking something they shouldn't.” And mind you that we were dealing with civil servants. My attitude was, I'm never going to wear anything at meetings with them that their wives couldn't afford to buy. I'm not going to come in a designer ultrasuede suit, or whatever was important then, and they look at me, and, I wish my wife could afford to buy them. Or the \$200 shoes or whatever. I just wouldn't do that. So what'd they do? They took them to the most expensive restaurant in Boston – because they wanted to go. See, they wanted to splurge, so they put the customer in a bad position. I didn't like that.

There was one guy in the engineering department that was very helpful. We needed to get government furnished equipment (GFE) for our project. It was in



the company for another job. We had to work it out with the contract people that we worked with so we could use it, too. Well, it took some little bit of doing. I mean, it wasn't a big breakthrough, but we managed to get permission to use that GFE. Well, the head of the department had another project, and he was having trouble with getting the GFE he needed. But that was a separate thing. Anyway, I went with the engineer to tell the big boss that we got it squared away. And I just said to him, "I want to talk to you about the GFE for my project." Before I could say another word, he started saying to me, "Oh, you idiot, you'll never get them to give it to you." And he went off and on like that. And the engineering guy said to me, "He didn't even let you get a word in edgewise." And I said, "Yeah, because we got it. We did it."

The one guy in Engineering that was helpful and my big boss calls me an idiot in front of him. I went to Human Resources and I said, "I want a transfer." That's when I went to work on SEAFARER. And he said to me, "Well, nobody else is complaining." And I looked at him and I said, "Maybe they don't have a choice. But I have a choice."

BERNSTEIN: Have we covered your time at GTE, do you think?

ROSSBACH: Did I tell you about the guy at Minuteman [the Minuteman Missile project]? We were supposed to make a presentation to get the manuals from Minuteman.

BERNSTEIN: When was that?

ROSSBACH: That was before ELF, before MX and before project management.

We had a kickoff meeting. A retired Air Force colonel named Hank was working for GTE – he was the honcho. He was setting up the meeting on technical manuals.

I used to operate the Minuteman demonstrator. I'd showed it at different Air Force locations. And to me it was interesting, because they didn't let women use that equipment. I used to say that the demonstrator was simulating the communication system. I'd say, "I'm simulating the combat crew commander," which was a dig, because they didn't let women do it.

So this meeting on technical manuals was supposed to take place. But what happened was I heard about another internal meeting, which was strange. And then it seemed to me that I was passing people involved and they were not looking me in the eye. Not a good sign. I finally went to one of the guys that I'm still friendly with – we belong to the same synagogue down the road – and I

said, "Joe, what's going on?" And Joe said, "Hank said you shouldn't go." (Hank was a retired USAF colonel.)

Joe said that the guy that runs the meeting tells dirty jokes, and he upset an Air Force woman that was there, so I shouldn't go.

It's ridiculous. I mean, I was the lead system engineer. This was a problem. What do I do? I went to my boss and I asked him about it. And he said, "Yeah, Hank says you shouldn't go." I said to him, "What has this woman got to do with me? How old is she? Did she go to MIT? Is she an engineer?" Nope. And I said to him, "If I have a job, I want to do the whole job. This should be part of my job. If I can't do this whole job, I said give me a different job. But a job that I can do the whole job. Because I can't work with part of a job."

I think they went to the general manager. I heard, "You're going." But it was really too late to pick up the demonstrator. I mean, I was too aggravated. Somebody else is going to do it. That's OK, he needed a chance, too. So next thing I know, Hank appeared, and said, "You can't go." I said, "Oh, I'm going." He said, "You'll cost us a million dollars in business!" I said, "I don't believe you. He said, "Well, I'm right." So I said, "Well, even if you're right, I deserve my chance. So he said, "Well, I have to do what's good for business." I said to him, "You need to do what's legal, too." So I said, "I'm going." Then another guy that I think should have known better, said, "If the Air Force doesn't want you there, you shouldn't go." I'm not sure the Air Force didn't want me. I know Hank didn't.

Anyway, I went to Human Resources and I told them what people were telling me. And I said, "Is this true?" He said, "God, no." He said, "I'm so glad you came to me." He said, "If you had picked up the phone and called the Equal Employment Opportunity Commission, he said they could have come here and shut the plant down." So I said, "I wouldn't do that. I just want to do my job." But that was funny. He said to me, "Oh, I'm so glad, I should take you out to dinner." I looked at him – you know, men – I looked at him, I said, "That wouldn't be doing something nice for me. If I went out to dinner with you I'd be doing something nice for you." I said, "I'd rather go out to dinner with my husband, thank you very much." So I left.

I went to the meeting, in California. And people came from the local office the night before. They weren't so nice to me, but I didn't care. And then I heard that Hank, this Hank, had been in the officer's club the night before ranting about this women's lib stuff, and I'm never going to work on his program again. Blah blah blah. I hadn't known until later. Next morning, we got to the office, and I couldn't figure out why everybody was standing around talking to us. Finally,

Hank came in, so I said, "Morning, Hank." Well, everybody was there to gloat that he had to say hello to me, because he'd been ranting the night before. (I didn't know that. I found out later.)

So off we went to the meeting. And I noticed that Boeing was a competitor. And they were there flipping sheets, showing off what they had done. But one of my guys said, "I looked at the books they were flipping – they're just forms. They're blank." And I said to myself, "Hmm, they don't even have any engineers here." We had three or four other engineers, not including me. So came lunchtime, and they all went off to lunch – without me. They didn't take me. They went off with the Air Force guy, and I had to get peanut butter sandwiches out of the vending machine because I didn't have a car.

It was OK. So one o'clock came. I went back to the meeting. GTE's nowhere to be seen – the rest of them and this Air Force guy. Didn't come back yet. So the Boeing guy – they're our competition – he stands up and he says, "We're ready to start, but GTE is not here." I said to myself, "Oh boy, you asked for it." So I stood up and I said, "GTE Engineering is here. You may start anytime you like." They had no engineers. They had no engineers. We got a million dollars more technical manuals than we ever got before. I don't take all the credit for it. It didn't hurt that I was there.

Hank, the boss on the Minuteman Program – he was interesting. A couple of things that happened with him-- After that, I went to be a project manager. That's when it happened. At one point, he said to me, "How are they over there? The other division. Are they as bad as I am? So I said, "What do you mean?" I said, "You're not so bad." He said, "They're worse than I am." I said, "Yeah. I said, you're trainable." He says to me--- this is a retired Colonel with an Eagle – he said, "What am I, some kind of a trained monkey?" I said, "No, but you can learn." So that was one time.

BERNSTEIN: Can you tell me a little bit more about your work on the Minuteman project?

ROSSBACH: Yes, that was interesting. They worked in teams, in what they called system requirements analysis. We had closed the critical functions like launch and maintenance, and then we had something called remote data change. That was a separate job. A couple of different programs. That's where we could change the targets remotely. I worked on that, and we got the job done. I didn't want to work on it, actually, and I don't think I was that thrilled with it when I was on it. But the team was very good. And now when I look back on it, that was some of the nicest time. We had such a good group. It was good.

And on the MX, we did basically some of the same approach. We had encrypted messages, and it was really a system engineering job. We even had to look at the requirements on the facilities and the technical manuals, and just all sorts of things.

We'd have a big auditorium full of Air Force people and associate contractors – all men, and me – and we had view graphs and we had overlays. And I mean I had critical decisions – I'm joking! What do I wear? You know, what do you wear, if you know you're going to be the only woman at this meeting? I decided my palette was going to be red, white and blue. I had a summer dress that was red, white, and blue, and I had a white pantsuit for the summer. And my overlays for my slides – I didn't have white ones, but I had red blue and gold overlays for my view graphs.

The other thing I was that I had a thread for my presentation. We had to give our view graphs to somebody else to flip. So everybody would speak to a view graph and then say, "The next one, please." I didn't like to do that. I used to talk to my view graph and I would keep talking. Then I said, "And on the next one you'll see, blah blah blah." That was the signal to flip to the next one. I'd keep talking – I never had to stop for them to flip. My presentations used to go well. I remember this because they told me this, and I thought it was a nice compliment. The Boeing program manager, our competitor, found the GTE program manager and said to him, "Janice Rossbach is the best pitchman I ever heard." And I thought, "Well, that wasn't bad. It was good for me." It just used to be like that.

And then on one of the programs, we were at Boeing. That was funny, too. I was the lead again. The only woman. And the meeting was going. Then I got a message from whoever was leading it that my voice was irritating, would I please turn off my mic? Cute. So I turned off my mic. So we went on. Then they said, "They can't hear you, would you speak up?" So I said, "First my voice is irritating, I should turn it off. And now you expect me to get laryngitis so they can hear me?" I said, "I'll turn the microphone back on." And I did. I didn't like that. Then we had a break, and there were some secretaries doing travel arrangements outside. This is Boeing, a big company, of course. So I went out, and I headed for the ladies' room. I'll never forget this. I dashed into the ladies' room, I nearly broke my neck. I had to turn on the light. I was the only woman there. I mean, I've never felt so-- Let's you know you're so isolated, alone. I mean, outside I had my buddies who were my buddies, we were a team. But in that ladies' room, pitch black. I had to turn on the light. Oh, that really hit home. I hope you never run into that.

BERNSTEIN: There are plenty more women now. Although, not everywhere.

ROSSBACH: I don't know; I think I was lucky. I think GTE was a good company.

BERNSTEIN: It sounds like they were pretty responsive, through Human Resources, even if it wasn't always the best. Were there any other women you knew who worked at GTE Engineering?

ROSSBACH: On ELF, my best friend (female) was the software manager. She had all these young kids working for her, young women, mostly female programmers, so they were there. And my friend had her own problems with the ELF customer. The COTR was a Contract Operational Technical Representative, I think it stands for. That was interesting, because he was a pain. He wasn't nice. And years later, I was in the same location, pretty much, as the contracts guy that used to be at the meeting. One time, we were walking upstairs together from the cafeteria. We went for coffee or something. And he says to me, "Oh, did you hear that this guy, the COTR, that he isn't there anymore?" And I said, "Oh, how come?" And he said to me, "You don't think you were the only one who didn't like him?" So I said, "I don't know." And then he sort of said half under his breath, "Male chauvinist pig." Which surprised me. I had no idea.

I was in a meeting with this COTR guy once, and I had to present something. I don't even remember the topic. I'm sorry this sounds like people were giving me a hard time, but I guess that's what happened, and that's what sticks in my mind. It sort of lingers, even later. I presented something with assumptions, and I said, you know, "Why?" And he said to me, "Well that's a bad assumption." And I said to him, "Well, I put that there because that's what the Navy told us." And he snapped at me, and he said, "Well it's a bad assumption." That's nasty. So I just looked down, and my boss is sitting there. I mean, nobody says anything. So I said to him, "Well, I don't know how to make any better assumptions than what the Navy tells us." Yeah.

And then another time-- This is me. It's not anybody doing anything to me. But we were having what they call a fact finding, after we had a bid. And the Navy was going over our bid, of course trying to get it down. And I went, and a lot of engineers were there. And one of the Navy guys said, "I hate to tell you, if there weren't ladies present," he said, meaning me, "I'd tell you what I think of this bid." So I stood up and I said, "There are no ladies present here. We're all engineers." And I sat down. And he started saying how rotten the bid was. And I was really mad, because the managers weren't defending the engineers. That's not right. So I spoke up. I said, "I know what went into this bid. The engineers worked very hard and tried to come up with reasonable estimates. And nobody

was trying to get away with anything. And it's not right to say that about--" I just-- That's why people liked me. The engineers liked me because I just have to stand up for people. I don't know why the managers were so wimpy. They should have said that. Wimps. Don't be wimpy!

BERNSTEIN: I have another question about your time at MIT. You mentioned that you worked in the satellite lab, for Project Whirlwind.

ROSSBACH: Yes. Well, that was my first job.

BERNSTEIN: You mentioned that you were programming there.

ROSSBACH: Yeah, I was a FLEX [Fast LEXical analyzer generator] writer, and we had to write in machine language. I was terrible at it. I don't know what I'd do today. I guess maybe if I'd started younger, I'd get the hang of it, but I wasn't a good programmer.

Actually, my father became a programmer at the age of 50, and he was very good. My father programmed the Standard and Poor index. And then they cut it back to the Standard and Poor 500. And then he worked for Honeywell. And then he worked for Digital Computer. And he did he did very well.

When I was in high school, my father used to bring home geometry originals, so we used to do these geometry originals. I still remember so plainly. My father would have a piece of paper and a pencil. He'd look at the problem, and he would go like this. Then he'd write 1, and he'd write 2. He'd write it down. And he went on, and then gets down to QED.

Now, at the same time, he wasn't that much faster than me. I had a piece of paper. And I'm writing, and I'm writing, and then I'm crossing out, and then I'm writing some more. And then I fill up the piece of paper, and I'm writing on the sides. And it's a holy mess. And then I get to the point where I go back and over here I put a 1, over here I put a 2, and then over here I put a 3. And then at the bottom I have QED. We did essentially the same thing, but his could be framed, and mine was just a holy mess. I mean, I just didn't think the same way he did. But I guess we had sort of the same mind, but it worked different ways. So he was a good programmer and I wasn't.

My best friend was a wonderful programmer and a software manager, even, of quality control. It was interesting, because we were on the ELF program together. And it was rather flattering. Our boss was sent to a management course or courses at headquarters in Stanford, and I remember he got the two

of us together. I don't know whether he had some kind of a questionnaire, or there was something he wanted us to do. I remember that one of us or both of us said to him, "Why do you want us to do this? This is for managers." It was nice. He said, "Well, I consider you two my peers," and he asked us to do it.

And then one time, this was sort of interesting too, I sort of liked this, in terms of my career. He was supposed to go to a management course. He said he couldn't go, he had a conflict, so he sent me. It was good. I don't remember what it was about. But at one point I asked a question, and I sort of realized when I asked the question that the rest of the group – of course they were all men – they seemed puzzled. Nobody said anything, but there was, like, a quiet, And I said, "You know, maybe I shouldn't have asked that question." And the teacher was interesting. He said something like, "You're probably puzzled by that question. But I have to explain." How did he put it? He said, "In an organization, there are people that are in line management. But there's a whole other group of people that have influence. Most of you, you're from line management. But Janice is from the influence side of the house."

BERNSTEIN: That's pretty cool.

ROSSBACH: That was interesting. Yeah, it was.

BERNSTEIN: And at GTE, you finally made it onto one of the submarines?

ROSSBACH: As I mentioned to you, I was the Technical Director in Engineering for this second extremely low-frequency (ELF) communication project at GTE. I did get to go on a submarine finally, which was nice – and I found the ice cream cones stashed in the submarine! I guess it was the favorite thing I did because we did get the message to the submerged submarines, and it was exciting when the message got through.

Then something interesting happened, which, in the end, reflects well on GTE. One of the project managers came to me and said they had an incident at Clam Lake – a state park in Wisconsin. It's really funny to think of a Navy site in Wisconsin, but it was a Navy site. We had all our equipment there in the building, and then our high-power antenna. It seems some telephone repairmen strung a wire to fix something with the telephone and one of them got an electric shock. This is not good. I mean, it's high-powered equipment. We had ground fault detectors and safety devices, and why would he get shocked? Well, fortunately, he didn't get killed. But people were upset when they found out about it.

It's interesting that they came and told me. They didn't do anything, and they said they were going to start the system up again, without finding out why he got shocked. Because the Navy was testing the system. Well, it didn't sit well with me. But nobody else was going to do anything about it. Well, I think if you're an engineer, you'd have to have some sense about what's legal. I mean, everybody should have.

If you're in Human Resources, you need to know about not discriminating and equal employment opportunity. If you're an engineer, and you're dealing with high-powered stuff, to my mind, you need to think about company liability. So I was not happy when this started up. I went to the company lawyer and told him I was concerned. Well, actually, I had been to him before, because I was concerned about safety. I had called the internal Safety Design Review, and we had a bunch of action items that the program manager didn't want to spend the money to address them. It bothered me, to the extent that I wasn't sleeping well.

But it was really on my mind that we needed to do this, so I went to the company lawyer and said I was really worried about the company liability, because we had these safety action items. It wasn't deployed 100%, either, so there was time to fix it.

Well, he wondered if I didn't have a gripe with the program manager, which was not the case at all. I was very objective about my work. I wasn't out to get anybody. And there it sat. Then, this business came up about the shock. So I went back to the company lawyer, and I actually said, "Have we have had a military coup? Is the Navy running the country? Because this is a GTE liability, that somebody got shocked. And they want to start the system up. And what is this?" So he marched me into the head of contracts in the front office. And I said the same thing to him. And while I was there, they were having a meeting in the program office that I had not been invited to. You know, a little bit of sex discrimination, shall we say?

BERNSTEIN: Yeah.

ROSSBACH: They tried to ignore me, which turns out to be hard to do! Anyway, this big boss picked up the telephone, got the program manager, and told him not to start up the system. "Don't do it."

Well, it turned out that the Navy had had a previous contract, and they had left 35 miles of wire in the ground. Everybody had forgotten about it. Except when the telephone guys hit it, it was like a transformer. And it was a field. I mean,



this was not my expertise. But I think I'm saying something sensible. And he got shocked. So it ended up that my boss said to me, "People don't like what you did, because it's going to cost so much money to dig up 35 miles of wire." And I said, "Well, you can't blame me. I didn't know it was there."

BERNSTEIN: [LAUGHS]

ROSSBACH: He said, "Well, anyway, they don't like what you did." Well, I didn't like what he said. And I'm sort of feisty. I just looked at him, and I said, "Hitler didn't like me either."

BERNSTEIN: [LAUGHS]

ROSSBACH: So they dug up the 35 miles of cable. And then, right after that, I was at a meeting with the man who shut down the system, the big boss. And was right after the Challenger [space shuttle] blew up. I don't know if you remember that, but there was a question of O rings. The engineers said it was too cold, and management overrode them. And so they tried to launch the Challenger, and everyone onboard got killed. It was a tragedy.

So I was sitting next to this guy, and I passed him a note. I said, "What do you think of the Challenger?" He emailed back and said, "I think it's too bad when upper management doesn't listen to the engineers." That's a nice memory. I was pleased.

And then what happened is they decided to listen to me about the safety. And I remember my boss said they were going to have a meeting on the safety action items that we had found. You know, nobody was doing anything about it.

That's another thing. We had internal policy and procedures, and somebody in my position could call for design reviews and different things, one of which was a safety review.

BERNSTEIN: Well, it's been wonderful to hear about all of this and to get to know you. Thank you so much for taking all this time to speak with me.

ROSSBACH: You're very welcome.