PROFILES OF SWE PIONEERS

ORAL HISTORY PROJECT

Stella Lawrence Daniels Interview

April 15, 2003

Reuther Library Oral History ID: LOH001952.8

Stella Lawrence Daniels

Stella Lawrence Daniels taught for a few years after graduating from New York University in 1938 with a bachelor's degree in mathematics. However, her career took a turn at the beginning of World War II, when a job as a mathematician for the British Purchasing Commission introduced her to engineering. She graduated with a master's in electrical engineering from the Polytechnic Institute of Brooklyn in 1952, began working at Bell Telephone Laboratories, and taught electrical circuits at Pratt Institute and physics at the City College of New York while at Bell. She made the full-time switch to academia in 1960, becoming an assistant professor in electrical engineering technology at Bronx Community College, from which she retired as a full professor in 1988. She maintained her ties to industry throughout her teaching career through consulting jobs, including with NASA during her summers between 1975 and 1992. Daniels was a charter member of the Society of Women Engineers; a Fellow and first female member of the Brooklyn Engineers Club; the first woman president of the Technical Society Council of New York; and a senior member of IEEE, for which she served as an executive committee member for 20 years and received its Professional Achievement Award in 1978. Daniels passed away in 2011.

In her 2003 Profiles of SWE Pioneers Oral History Project interview, Daniels discussed her experiences pursuing multiple degrees; working in industry and academia; her involvement on research projects for NASA; her involvement in SWE since its founding;

and her thoughts on the profession, gender discrimination, anti-discrimination and equal opportunity laws, and work/life integration.

- July 2016

INTERVIEW WITH STELLA DANIELS, TUESDAY, APRIL 15, 2003

LAUREN KATA: This is Tuesday, April 15th. This is an interview with Stella Lawrence Daniels for the Society of Women Engineers Oral History Project. And the interviewer is Lauren Kata for the Society of Women Engineers. Thank you, Stella.

STELLA DANIELS: You're welcome.

LK: You have something prepared that you wanted to start with.

SD: Well, I'll skip about women not having jobs and not working. And I'll just say that my mother -- and I'll tell you, the biggest impetus for women was World War II. That brought a lot of women into engineering and into the workplace. So let's say that my mother wanted me to have a career. She said that's the most important thing for a woman, because she had a career. And so she wanted me to study. And I loved to study. I really loved to study.

And so I went to a very large high school, and I had the highest marks in the school, so I got a full scholarship to New York University. I also got a scholarship to Barnard College in Columbia [University]. But in Barnard I would have had to start in September. I graduated in January. So by going to NYU, I was able to make a term in the summer. They called it the February/September Project. And so I was able to graduate in three and a half years. And I studied math. Now, when I was in high school, my mother said, "If you study math, you have to study

physics." So I studied physics. I studied math and physics.

Then when I graduated from NYU, I thought I was going to be a teacher. So I had a minor, actually, in German, and in -- because I studied German in junior high school -- and a minor in physics and a minor in education, because you have to have twenty-two or twenty-four points in education to have a license to teach in New York City and New York State.

And when I graduated -- I graduated in 1938. Actually, the Depression was in 1929. But it was much worse in 1934. In 1934, things were very bad. And in 1938, things were still bad, and it was very hard to find jobs. Actually, as a teacher, you had to get a job as a teacher in training, which paid four dollars a day, and no vacations, no holidays. And actually, at that time, a secretary got eight dollars a week. And a three-room apartment was $32 a month. Now in Las Vegas, it's $860 a month.

So I tried the teaching, and the teaching was very difficult. So I went to the NYU employment office. And they got me a job teaching in a reformatory, where I taught for a year. And I have to say that was very good for my teaching career, because it taught me how to get along with the students and how to teach. It was better than all the twenty-four points in education.

Then what happened is, I was without a job, and it was in November 1941. And my father always read the New York Times. So I picked up a New York Times Employment Section. And it said, "Technical Service Agency, mathematicians, female." So I went

down there. And it was called the British Purchasing Commission.

You see, what happened was, the war gave us all jobs, and they put all the women in engineering. It was one of the biggest impetuses -- it was the biggest impetus we had. And so I went down there, and it was a job as a gauge examiner.

Now, we had mass production. For mass production, every piece has to be very accurate, that they should all be interchangeable. And these gauges were accurate to about, say, three-thousandths of an inch, maybe even more accurate. And there I was as a gauge examiner. And we had surface plate work. It was a flat surface with a pointer on a rod. And these gauges were very irregular. It was for Rifle No. 4. And they had all women. They had women architects, women chemists, women mathematicians, women physicists. It was all women.

LK: You were all working together?

SD: Well, we each got our project, our gauge to examine. And I really didn't know what to do. I did the best I could. And the head of the laboratory came to me and they said, "You really know what you're doing. We want you to be in charge." And that's how I got to be in charge. And it was very good, because it's easier to be in charge than to do the work. I hate to say this, but it's true, you know. It's easier to be the engineer than the mechanic. So actually, being in charge involved writing fourth degree algebraic equations on trigonometry.

LK: These were things you were trained to do with your

degree?

SD: That was what I was trained to do. And actually, it was really -- if you had a major in math in high school, and I did, I took four years of math in high school, that was all you really needed to know. But most people are not that proficient in algebra and trigonometry. They weren't at home with it.

So I was there from November '41 until January '43. Now in January '43, they had a change in administration. We originally had American engineers. Now English engineers took over. And I hate to say this, but the Americans were better, and they were more accurate.

And the gentlemen in charge of the laboratory, he brought a machine to test gauges. And I didn't care for the machine. I didn't think it was accurate. And he said I got to use the machine. And I didn't want to use the machine. So it was on a Friday in January, and he fired me right there. There was an engineer there from -- we were working with Frankfurt Arsenal. And he took me out for coffee, and he bought me the Times, and he escorted me to the subway. That was a Friday afternoon.

So I came home, and my mother said, "Are going back to the Technical Service Agency?" And I did. I went back there on Monday. My mother said, "Don't take a job in Brooklyn." See, we lived in the Bronx, and Brooklyn is way to the south. It's like hour and a half from the Bronx to Brooklyn. And this job was in Brooklyn. It was with the Control Instrument Company.

Now, in those days, there were three companies: Sperry, American Bosh Arma, and Control. And Control was a very big company. They had whole big square block there in Bush Terminal on the Brooklyn Waterfront. And they worked only for the Navy.

And I told Dr. Lipman, who was the vice president in charge of engineering -- he was really the control of the company -- I told him my story, and he hired me. And he hired me as a development engineer, because you see, I had the background in math and physics. He hired me as a development engineer, and that was their best department. They had development engineering, design engineering and test engineering.

And I worked on many projects there. The first project was on salinity meters. You see, in the Navy, the ships have boilers, and the boilers must have no salt. A boiler can have no salt in the water. And the salinity meters, they tested the salinity of the water, which had to be like .0001. So I worked on the salinity meters, I worked on spin breakers.

Then we had the fire control problem. The fire control -- you know the fire control problem? The fire control problem is: Suppose you're on a moving object, and you're trying to hit a moving target. You have to know where the target is going to be when the missile reaches it. You have to know which way the missile is going to go, and you have to know how to aim it so it will hit the target at the time that it reaches the target. That's called a fire control problem, and it's a very important

problem.

LK: And these were technical projects you were working on after World War II?

SD: Excuse me?

LK: You were working on these technical projects after the war?

SD: It was during the war. Because, oh, yeah, I didn't tell you, in November of '41, I got the job with the British Purchasing Commission. And it was in January of '43 that he fired me.

LK: And the war was still going on.

SD: It was still going on. Actually, I was with Control Instruments from '43 to July or August '47. I was there three and a half years. Is that right? Yeah, three and a half years.

After I was there a year, the war in Europe ended. And the next morning, all the contracts were canceled. The sheets came down with all the cancellations. And the shop was fired. Everything was fired except the engineering and the drafting room. And there were big lines outside with people waiting to get their termination pay. It was a very bad time.

Now, at that time, they had thirteen people in development engineering. When I left, they had three people. And Dr. Livman really liked me because I still wasn't fired. We went from thirteen people to three people.

LK: Were you the only woman?

SD: I was the only woman. Then we got another woman. She

came from the Bell Telephone Labs. And she told me even though they let her go, she told me that the Bell Labs was hiring. So I went down to the Bell Telephone Laboratories, and I had an interview. And they said -- this was in September, middle of September, I think. Did I tell you August? I think it was the middle of September.

It was during the Jewish New Year's. So they told me they would give me a telephone call. And someone there said, "Don't sit by the phone." And I told him, I said, "Don't worry, I won't." I think this might have been a Thursday, I don't know. On Friday afternoon, I got a call at work, and my mother said, "I got a call from the Bell Telephone Labs, and they want you to come in on Monday."

So I started with the labs. I was there from September '43, I think--

LK: '47?

SD: '47, that's right. September '47, because I was there thirteen years, from September '47 to August 1960, thirteen years. I lost thirteen years salary. But I took a leave of absence--

LK: (Laughs) You lost thirteen years--

SD: -- because with a leave of absence, I could still buy the stock cheaper. And it was very good stock. It isn't good stock now, but it was very good stock at that time.

LK: And how many women were doing engineering work at Bell Labs when you were there?

SD: Well, what happened was, there were three women with engineering degrees that were hired at the same time that I was. One was married and the other one was engaged. And this is what I'm going to tell you, they all left.

LK: Once they got married?

SD: Yes. And not only that, I was at career conferences. And I used to run career conferences, and that was career conferences with other women. And they left immediately to go to their boyfriends. Then I was supposed to go on a trip to a SWE conference in Washington. I was supposed to go with another girl. She didn't go because she had an appointment with her boyfriend. So I'll tell you that a lot of women left promising careers because of boyfriends, and they got married.

I know one woman who was a genius in mathematics. She got married and had three children. And then when she was sixty, she decided to pursue a career in math. Well, that was too late. People don't want to hire women professors at seventy. That's when they're retiring you.

But my punch line is that actually the war helped women in engineering and in technical careers. The other thing is, they did not hire women as engineers. Women were hired as technical assistants. In fact, I went to a SWE conference upstate. They had one upstate before it became SWE. And I met a girl there who told me she was a graduate engineer, and she was working for General Electric as a technician. And she said she didn't ever

think she was going to work as an engineer. And I don't know what happened with her. I still remember her.

LK: So even knowing that all the time you were at Bell, you decided to pursue an engineering degree. Why did you decide--

SD: No, no. It wasn't at Bell. What happened was, when I was at Control Instrument Company -- the higher your position the more time you have. You know, if you're serving as a waitress in a restaurant, you can't leave for a second. But if you're the president or the chief engineer, you've got a lot of time. Because you see, an engineer is a supervisor. You have the laboratory under you, you have the shop under you, and you may have other engineers under you. So you're a supervisor. And a supervisor has a lot of time.

So I started reading books. I started reading books on organic chemistry. And along came another engineer in the development department, and he gave me a book on electric circuits. And he said, "Read this." So I started reading the books on circuits. And then in September of '46, I decided to go to Brooklyn Poly [Polytechnic Institute] and study electrical engineering, from Control. And actually, I was going to keep it a secret. But everybody in the company saw me in the lobby where we all sat, you know, so it was no secret. But that's how I got into engineering.

And actually, when I started working at the Bell Labs, I started the engineering in '46, and I got my degree in '49. But I

already had a bachelor's in math and a masters in math and physics.

LK: That's right.

SD: And what happened was, we had a room where they kept the blueprints of all the circuits. And girls there told me they were surprised they hired me, because they were firing people. See, what they were doing, they were firing people they took before and hiring people with better qualifications. They were rotating their staff.

And then I should also tell you that the Bell Labs was very discriminatory. What they did was, they wanted white Anglo-Saxon Protestants, and that's what they had. They also wanted engineers from small Midwestern colleges, because they weren't radically inclined. They were clever.

LK: How was this being expressed? You saw -- I mean, you recognized this, or people freely talked about this? What was that atmosphere like?

SD: No, nobody talked about anything. No one talked about anything. We never discussed personnel matters. But what the Bell Labs did, they said that the AT&T was very short of personnel, and they needed personnel. So we would tell our friends and our relatives and so on that come for jobs? And you see, everybody there was white Anglo-Saxon Protestant. So this is how they got white Anglo-Saxon Protestants. They weren't discriminating. They just said, "Bring your friends and

relatives." But they were discriminatory.

And then what happened was, a gentlemen called Kelly that came, he became -- this is secret. A gentlemen called Kelly became president, I think of the whole -- either of the Bell Labs or the AT&T. And then what happened is, the Catholics all got promoted. Before then, only Protestants got promoted.

LK: Interesting.

SD: Well, now everyone is getting promoted. We have Jews that are presidents of telephone companies, and we have a black woman who is the president of an exclusive white women's college. So everyone is getting promoted now. And that, by the way, is because of the anti-discrimination act. There's an act for the black people that there should be no discrimination. And that helps everyone, blacks and whites, and it helps the women.

LK: That's right.

SD: Can I digress on that?

LK: Please.

SD: Well, what happened, you see, in the United States Civil Service, they had two lists. They had a list for women and a list for men. Well, now there is no such thing. And then the women were getting lower salaries and lower jobs, and they abolished that. And then in the colleges, they weren't promoting women to full professor. And in the city university they had no women officers. Well, the women sued. They sued the AT&T, they sued the government, they sued everybody.

I went to a SWE meeting and we were all discussing that. We were singing songs and having a good time. And that's what helps the women.

LK: Are you talking about the Civil Rights Act in the 1960s, or are you talking about equal opportunity laws in the 1970s? I'm confused.

SD: I can't really say. Wait a minute, in -- actually, what happened was, in 1980 or in 1984 , Bronx Community College and all the colleges were not promoting women to full professor. So what I did, I had a friend who wanted to make trouble for the college, frankly. And she said, "If you want to get promoted you have to rock the boat." Well, I didn't want to rock the boat, but I did hire a lawyer. She knew a very good lawyer. And at the same time, the women in the university had a coalition. And the coalition sued the university.

And the upshot of all this was that all the women were promoted and they got compensation, one or two or three thousand dollars compensation.

LK: So you feel that laws are important?

SD: They're very important. This was a most important law. Because you see, when I used to apply for these scholarships and summer jobs, they were given to a couple of men before they gave it to me. But after the anti-discrimination law passed, I was first on the list. So that was very good.

LK: Well, let's take a step back and talk about the time

period where you were working at Bell Labs, but you were getting your engineering degrees.

SD: Right.

LK: You also received a masters in electrical engineering, correct?

SD: Right. I also went for the doctors. I passed the oral exam, but I never finished the doctors. But as you see, all my degrees, except my first degree, they were all at night. The masters in math was at night. The bachelor's in engineering took three years, was at night. The masters in engineering was at night. They were all at night. And by the time it came to finishing my doctor's, I had trouble at home. My mother got sick. Later, my father died. And it was difficult. I dropped it.

LK: It must have been difficult to be working full-time and then going to school full-time as well.

SD: And I was teaching at night, too.

What happened was, in 1958, well, I had a society -- I forget the name of the society. But what this society did, it ran career seminars at three colleges at once, like City College, Brooklyn College, and so on. And I got to be in charge of that. And when I went to City College, we had lunch after that, and there were two of us from SWE. So the other girl had a date with her boyfriend. And I'm telling you the truth. It killed a lot of careers.

She had a date with her boyfriend, but I didn't have a date.

And the professors there said, "We need teachers of physics." So I said I'd love to teach physics. So that's how I became a lecturer and then assistant professor in physics. I was teaching Monday, Wednesday and Friday nights.

Meanwhile, I had a professor from Brooklyn Poly, and he wrote a book. And the book wasn't too good. And he wanted somebody to teach that book at Pratt Institute. So he called me. I said, "When is the class?" He says, "It's on Tuesday." So on Tuesdays I was teaching electric circuits in Pratt, and on Monday, Wednesday and Friday, I was teaching at City.

LK: Wow. And this is while you were working toward your doctorate?

SD: I was working for Bell Telephone Labs. But I'll tell you this, that at the beginning, teaching is very difficult. Well, first of all, physics is a difficult subject. Also, the physics I studied at NYU when I was a physics minor was much easier than the physics they were teaching in the engineering school at City College. So I had to study all that. And then when you're teaching the course, you do all the problems at the end of the chapter. So the first two years I worked like a dog. See, then after that, you've done it all, so you can relax.

I used to bring in all my booklet solutions to class, if the kids asked questions. And then one day I was asked to substitute in another class, and I didn't know what topic they'd be covering. So I was able to answer the questions without looking at any book.

So after that I never brought the book. I realized I knew it.

But I was there at City College from 1958 to 1970. And during that time in '58 there was a wonderful woman in SWE. Her name is Emma Barth. Emma was a wonderful woman. She worked very hard for SWE. And she arranged for a convention in Pittsburgh.

And as I was going to the convention, I was reading the book on mechanics I was going to teach, and thinking about the convention. And we had a very good time. She took us to the steel mills, which are closed now. She took us to the coal mine. She took us to the old Economy Project, which was a group of American pioneers. You know, one of these where they did all their work themselves. So it was a wonderful convention. And I love Pittsburgh. Pittsburgh is a beautiful city.

LK: So you enjoyed the Society of Women Engineers meetings?

SD: Yes. I go to all the meetings.

LK: Can you talk about how you first became involved with the Society of Women Engineers?

SD: Well, that's what I'm going to tell you. What happened was, now, there I was teaching at night at City College, and I was working with Bell Labs. It was 1946. I think in 1946 I was still at Control Instruments.

LK: Yeah.

SD: And I got a letter from Professor Cecily Furla. She's the lady that started SWE, I believe. And she has no credit -- at least in New York and New Jersey. I got a letter from her.

She was the head of the EE [Electrical Engineering] department at City College School of Engineering. And it said we're going to have a meeting during the Christmas vacation. I forget which day, some night, you know, during the week, during the Christmas vacation. And I was afraid to go, because City College is up on a hill, and it's in Harlem. And I was afraid to go, but I went.

And there were several women there. What Professor Furla did is she wrote to all the women that were studying in the engineering schools. Now, I didn't tell you about the engineering schools, but NYU did not admit women. Brooklyn Poly did not admit women, but they opened their doors to women during the war because there weren't any men. That's what you have to do, if men can't do it, they get the women to do it. The women do it better.
(Laughter)

SD: Don't quote me. They do it better.
(Laughter)

SD: So we went to the meeting. And it turned out there were about thirteen women at City College. And most of them were in chemical engineering. And my mother said, "That's because of Marie Curie. That's why all the women are going into chemistry." Well, I don't know whether my mother was right or whether she was wrong. But she could have been right. I never went into chemistry, because chemistry is very difficult. See, I wasn't good at chem lab. I was afraid of chemistry lab. There were two other women in my chemistry class, they were wonderful at lab.

But the lab was not my high point. My high point was the theory. And I'll tell, theory plays better.

There is one woman that studied at Poly, and she worked for Burroughs Wellcome. I don't remember her name right now. I think her name was Elion [Gertrude Belle Elion] She won the Nobel Prize in chemistry. She worked for Burroughs Wellcome, and she was a very nice woman. Unfortunately she died young. She didn't die in her twenties or thirties. She must have died in her sixties or seventies. But still, she died young. And she was a very nice woman, very unassuming. And I was thrilled. She got the Nobel Prize in chemistry.

LK: That's wonderful.

SD: She went to Poly for her doctor's, but she never got it, but she got the Nobel Prize. So, I guess that was better. (Laughter)

SD: Anyhow, where -- oh, yes. So we had this meeting, and it turned out that most of the women were in City College, and most of the women were in chemistry and chemical engineering. Then we had a couple more meetings. Then we had Mary Blade. When I started to teach, I joined the American Society for Engineering Education. That's where I told you that Dean Giordano couldn't find a committee for me.

So Mary Blade went to all the meetings. And she was in charge. She was a professor of mechanical engineering, and she was a mountain climber. She and her husband were mountain

climbers. And she was in charge of that Green Engineering Camp. And so we all went for a weekend at the Green Engineering Camp.

LK: She was a professor at the Cooper Union?

SD: Yes, in mechanical engineering. She was the only woman in the American Society for Engineering Education. That was in 1947.

LK: And then you joined?

SD: Then I joined. That's a very nice society. And as I said, Eleanor Baum managed to be -- not only did she get on a committee, but she managed to be the chairman of the Middle Atlantic Section and the president of the Society. You got to hand it to her, it was not an easy accomplishment.

LK: But when you first joined, the story that you were referencing was they didn't know what committee to put you on.

SD: That's right.

LK: And what did you tell them?

SD: Well, I should have told them, "Any committee you can put a man on." But I didn't say anything. But what Dean Giordano did, he formed the committee to get women to join the American Society for Engineering Education. And we invited several women, all we could find, from SWE, to come to their convention, which was nice. I don't think any of the women joined ASEE, but several of them came.

LK: Well, you need to be teaching engineering in order to--

SD: I think so. I don't know what the requirements are.

But I mean, like for the IEEE [Institute of Electrical and Electronics Engineers], you just have to be interested in electricity and so on. You don't have to be a graduate engineer or working in engineering, even though ninety-nine percent are. So I guess that as far as ASEE is concerned, everybody there was teaching.

LK: Okay. So Mary Blade was a professor at the Cooper Union.

SD: In mechanical engineering. She was in charge of the Green Engineering Camp. And she arranged for us to have a weekend at the camp.

LK: And you had already been meeting for several years?

SD: I don't know, maybe a year or two -- maybe a year. And we also had a meeting upstate, maybe in Albany. That's where I meant the woman that had the engineering degree and didn't know if she would ever be an engineer.

LK: Do you remember her name?

SD: No. I wish I did. I don't know what happened to her, but I wish I did. Well, then what happened was, one day we were told that there was going to be a Society of Women Engineers, and Bea Hicks was going to be the president.

LK: Okay. This was at the Engineering Camp?

SD: No, no. This was later on.

LK: So the group of women in the New York area would periodically go to the Green Engineering Camp?

SD: We only went there once. But we had several meetings outside of the camp. We went there once, and I think once we went upstate.

LK: So that was 1950, correct?

SD: Well, it started in ‘46. So I don’t know when Bea Hicks was nominated. It must have been about ‘48 or something. When was she nominated president?

LK: Well, the meeting at Camp Green -- or Green Engineering Camp was May 27th, 1950.

SD: It was that late?

LK: Yes.

SD: Three years later? How do you like that?

LK: That was the founding meeting of the Society of Women Engineers. That’s the meeting that you’re talking about, that you attended, correct?

SD: I attended a meeting of the Green Engineering Camp, and only one.

LK: That has to be it.

SD: That has to be it.

LK: And so you were talking about Beatrice Hicks being the first president of SWE.

SD: But that was after that. It was announced sometime after that. So you’re saying the meeting was in ‘50.

LK: 1950.

SD: So the Society must have started in ‘51.

LK: 1950.

SD: I don't know who picked Bea Hicks. Maybe she picked herself. But she did not found it. But she was the first president. And we have to say this, that she gave a lot of money to the society. And so did Lillian Gilbreth, who also -- all of a sudden we see Lillian Gilbreth. She didn't do a thing. All of a sudden she's right there on the bandwagon. And she and Mr. Chipp [Rodney Chipp] and Bea must have given a lot of money to the society. And I'll tell you something, a society needs money.

LK: Yes, it does.

SD: Because without money -- you can't even meet without money.

LK: And how many women, approximately, at that time, were meeting?

SD: I wouldn't be surprised if there weren't between thirty and fifty. There were a lot of women. And then we did one other thing. What we did is, as I told you, we got in touch with the women in Philadelphia. And we went, during Easter vacation, we stayed in the dormitories. I think it was Skirmahorn is the name of dormitory. It's after a woman that helped Drexel, you know.

LK: Oh, this was at Drexel Institute.

SD: That was at Drexel. It was very enjoyable. We were there a week. It was a lot of fun.

LK: So how was the Philadelphia Society of Women Engineers or group of women engineers different from the New York area? Or

what was similar?

SD: Well, all I know about it is they had a group, and we agreed to meet with them in Drexel. That's all I know.

LK: How did you learn about them?

SD: Well, we have to ask Mary Blade or Professor Furla how they got in touch with them. I don't know how.

LK: Okay. So they facilitated the meeting.

SD: That's right. Now, as I said, I don't know what happened to the rest of the country. We have Chicago, we have San Francisco, we have Los Angeles, we have Denver. I don't know anything about the rest of the country. But I'm told now that the New York Section is, let's say, not the most active section in the Society. The other sections are more active.

LK: Most of your experience with SWE was spent in the New York area?

SD: Well, I also have experience in California and Las Vegas, because, you see, I spent six months -- what happened was, the National Science Foundation offered a scholarship or a fellowship to college professors to say how we can improve things for people living in the United States -- I guess life or science or whatever. So a friend of mine whom I knew from my masters at Poly was working on space, he was in charge of the space program at Poly. And he suggested to me that I write on how we could use the discoveries in space to benefit the people on earth. And that was my topic. And you know what? I got the fellowship.

I don't know how much it was, maybe $10,000. I don't know. It was in 1980. You know, when I went to JPL as part of the fellowship, they sent me the check for the whole six months. I could have taken that check and vanished. They sent me the check for the whole six months. That was dumb. But I didn't, I stayed there, because I wanted to be there.

But where are we now? What were we discussing?

LK: Well, you jumped ahead to talk about the different places that you've moved around in your career. But we started with the Society of Women Engineers, sort of the early years.

SD: Oh, yeah. I know where we were. We were with the fact that I went to California, JPL is in California. So I was there. I had a sabbatical. I took a sabbatical from Bronx Community College. Actually, you could have a sabbatical for a year at half pay or a sabbatical for a term at full pay. And the sabbaticals weren't handed out just like one, two, three. They were a little hard to get. But I got this sabbatical. And I didn't tell them, but I went to work on my fellowship at JPL. I was there from January through October, at Pasadena.

LK: This was 1980?

SD: Yes.

LK: And what does JPL stand for?

SD: Jet Propulsion Laboratory. It's part of NASA. And we were working on -- also on full tolerance, and we were working on software to see how we could prevent errors. There were various

theories, which I have now forgotten. But it was about twenty years ago. There were various theories.

But at that time I got in touch with the Society of Women Engineers. And I made a very good friend in the Society. What was her name? I forget her name. How do you like that? She died young. She had a brain aneurysm. So there were two of us.

And we went to all the meetings of SWE, and they were very good. The LA Section was very active. We went to the refineries. We went to the Claremont Colleges. We went to several places. I forget them all, but we went to several. The Society was very active.

LK: And it was important to you to remain active within SWE throughout your career.

SD: That's right.

LK: Not just when you founded--

SD: I happen to be a meeting attender. I attended the meetings of the ASEE, of the Electrical Society and of SWE. I attend all meetings, and alumni, too.

LK: In your early career, like the 1950s, 1960s, how was the Society of Women Engineers different from the technical societies? I mean, I know that's obvious, it was all women, but what was the atmosphere? How was the atmosphere--

SD: Well, it was the same as a technical society. I didn't see any difference. There was some focus on careers. There was a focus on going to visit electrical institutions, like say, RCA,

Bell Labs, various electrical institutions. And when we were in California, we visited the chemical refineries. We went all through them. And I'm not a chemist. I took chemistry, but I'm not a chemist. We went down to the bitter end. We really studied all the things. And they gave us a talk on what they do and how they refine it, and so on and so on. And then we went to the Claremont Colleges. I remember that.

We went several places. And then I went with this young lady. We went to Dallas for a meeting of the Electrical Engineering Society. She was a member of SWE and a member of the Electrical Engineering Society. And her husband was vice president or something in a big chemical engineering firm. And she was very, very good, and she was dedicated to women. She had a brain aneurysm. She died young. She left two children. But she had a lot of good ideas. She was a member of SWE.

LK: Yes. I'm sorry that you can't recall her name right now.

SD: Later on I'll ask my husband. Maybe he remembers.

LK: When you were working in the New York area still, you were still in the New York area, what prompted you to leave industry and continue in a career in teaching?

SD: Well, what happened was, the whole I was in the Bell Labs, the women there, mostly secretaries, were very nice. And they all said I ought to teach. But it was very hard to get a job in New York City in teaching. I don't know how it is now, but at

that time it was very difficult, because many were called, but few were chosen. It was considered a good job, because it had a pension, and the hours were good, and so on. And besides, women -- what I mentioned before, careers for women -- the careers that were -- when the workplace opened up to women, the careers were as nurses and taking care of children, and libraries and teaching. The women were admitted into those careers. See, when a woman is an engineer they say, "You're an engineer?" But if you're a nurse, they don't say, "You're a nurse?" It's accepted that a woman would make a good nurse.

Well, anyhow, what was your question?

LK: What prompted you to go into teaching at the college level and leave working in industry?

SD: Well, what happened was, you know, in the old days -- not now, anymore -- but in the old days, if you had a job with a company like the AT&T or the Bell Labs, or Con Edison, or various companies, you know, various elevator companies and so on, those were considered life jobs. If you had a job at Con Edison, that was a job for life. Well, what happened was, first of all, in 1958, I went to this -- I used to run these career conferences. And we used to hold them in three colleges. And this one was in City College, and they asked me to teach physics. So in 1958, I started teaching physics, Monday, Wednesday and Friday. And Tuesday I started teaching electrical circuits. So I was teaching from '58 until I left the college -- I mean, I left the Bell Labs

in 1960.

So what happened was, the government of the United States said that it's not good to have all your technical and scientific work concentrated in one place. They were ahead of President Bush. They said, "You have to have it scattered." So what the Bell Labs did, they opened a branch in -- not Cleveland -- in Columbus, Ohio, they opened a branch. They opened a branch in Denver. They opened a branch near Chicago at Indian Hill. And then it turned out they had a big -- several large laboratories and engineering offices in New York City. In West Street, they had a whole square block. And the main building, I think, it was eleven floors. And the head of -- I was in switching. The head of the switching was the vice president of the Bell Labs.

You see, the telephone -- the dial telephone replaced the operators. And what the dial telephone has to do, it has to know what your location is and your central office, it has to know what office you want to go to, and it has to know where that office is and how to connect you to that office, and it has to know how to time the call and charge. So that's called the switching system, and it's very complicated. And then the mathematics, the fee, that was called the Automatic Message Accounting, AMA.

And they had various switching systems. The switching system paralleled the development of electrical engineering. The first switching system was step-by-step, one step after the other. The second switching system was the power age, to find the lines --

the things were driven by little motors. And the third one, I was on, the crossbar, the crossbar switches. And your line is on a switch, you see. That was called No. 5 Crossbar.

LK: Did you enjoy that work?

SD: I liked it. Well, you see, I did the same work as the engineers. But they were engineers, and I -- what happened was, after the act passed, they sued the Bell Labs. And we all became technical associates. From technical assistants, we became technical associates, because they had several women engineers, and several are members of SWE. One that was a member of SWE is Jean Bertels. She's in Florida. The rest of them I don't remember. Then there was a girl, Ruth Harlem who went to Poly. She got married. I don't know her name, but she's a member of SWE.

LK: Now, you were not working with the title 'engineer'?

SD: No. As a matter of fact, I went to the vice president, Mr. Bush, and I said, "I'd like to be promoted." And you know, I used to think when people leave a company and you say to them, "What were you?" You say, "I was the chief engineer" -- when people say, "I was the chief engineer, I was the chief hocus pocus," and so on -- so Mr. Bush said to me, "Tell them you're an engineer." He was willing for me to say anything, but he didn't want to give me more money.

So that shows if you leave a company, and you tell them you're the chief engineer, the company will never say, "She's

lying." You can tell them whatever you want.

LK: That's interesting.

SD: But I used to wonder about that. People would say, "I was this and that." The company will never contradict you. They don't give a hoot, as long as they don't have to pay you.

LK: Wow. Were other issues like this coming up within the Society of Women Engineers?

SD: Well, what happened was we all got promoted because the women sued the AT&T. Well, what happened was, there I was teaching, and all of a sudden I got transferred from crossbar to panel, because the crossbar group moved to Columbus, Ohio. We moved to Columbus, Ohio. And then I was told that the whole laboratory would move to Homeville, New Jersey. And it did. It moved to Homeville.

LK: And they were going to transfer you?

SD: Well, I would have been transferred. Actually, when the group moved to Columbus, I met the boss on two levels above my boss, and he winked at me. I met him outside the elevator. And the next day I was transferred to the panel group, which did not go to Columbus -- because I didn't want to go to Columbus. I was very devoted to my family. I couldn't leave them for a day.

So then what happened, we were supposed to move to Homeville. So I went to driving school, I started taking driving lessons. I thought I would live in Brooklyn with my family and commute to Homeville. That would be like a two or three-hour commute. So

what happened was, I got a letter from Bronx Community College. See, I was teaching at City College. And I got a letter from Bronx Community College saying they were looking for a professor of electrical technology.

So the day I was supposed to go up was a very bad day. It snowed, and I had a very bad cold. I lost my voice. And my father said to me, "Call them up and tell them you'll come another day." But I didn't do that. I came that day. And to make a short story long, I got the job. But I found out later, a couple years later, that the president of the college gave a talk, you know, to the assembled professors at a meeting. And he told them that he was never late and never absent. See, so my coming with such a terrible cold, I made a good impression on him.

I did the right thing. If I would have said, "No, I can't come, I have a bad cold," maybe I wouldn't have gotten the job. But I got the job. And I took a leave of absence from the Bell Labs for a year so I could buy the stock at a cheaper price.

It turned out to be very good stock. I don't know if I should tell you, but I paid $20,000 for the stock. I sold $80,000 worth of AT&T. The stock went up to $400,000. Now it's $125,000. So I lost $275,000. But I don't feel badly, because I never used the 400,000. I mean, it was just -- but you see, that's what happens with stock.

My father was very hard hit in the Depression. The bank he was working for closed. It was a good bank, but it closed. And

it was solvent, it turned out. And he lost his money in the stock market. My mother told him, "Go and sell the stock." He went in the bank and they all told him, "It's wonderful stock. Keep it." So he had it when it went to zero in '34.

LK: Stella, can you talk a little bit about your early childhood, what it was like growing up, how your parents influenced you? You were just mentioning your father.

SD: Well, I was dedicated to my parents. I couldn't be away from home for a day. It was just my mother and father and me, because I was an only child. And my mother wanted me to study. And I'll tell you, I loved to study. I loved school. I went to very nice schools. We had Rapid Advanced. You can make the seventh and eighth grade and the first year of high school in two years, so I gained a year.

LK: And this was in New York?

SD: In New York. It was called Rapid Advance. It was RA, RB, RC and RD.

LK: Wow. What school was this?

SD: This was in junior high school, PS-61. Junior high school. Then it became PS-78. And I transferred to Evander [Evander Childs High School]. And you know, our courses were so good in junior high school that I studied German. I was very good in German. I still am. And when I went to Evander Childs High School, on the first test I got a two out of ten. That's how good our education was in junior high school. It was much harder in

Evander. But I recouped. I recouped. But high school is harder than junior high, no doubt about it. It was a very good high school. I took four years of math, and I took a year of physics and a year of chemistry.

LK: Do you remember always enjoying science and math when you were in school?

SD: I liked math. I used to do math in advance during the summers by myself. And my father still remembered his math. He studied engineering. And sometimes he helped me. But I loved math.

LK: So your father studied engineering?

SD: Yeah.

LK: And what was your mother's background?

SD: She was a dentist.

LK: Can you talk a little bit more--

SD: And she didn't like math. She said her brothers used to help her. And you know how brothers are. It's like Bert, you know, when I ask him to help me, they told her she was dumb and no good, and so on. They weren't flattering. Brothers are not flattering.

LK: Yeah. Well, the fact that she was a professional, did that have an impact on you?

SD: Sure, it did, because you said, "You have to have a career." And as I said, she didn't teach me housekeeping. She didn't teach me cooking. She didn't teach me anything. All she

wanted was for me to go to school and study. And I loved to study, I loved it.

And I didn't know -- like when I was in high school, I didn't know that Saturday was date night, and you're supposed to go out with boys on Friday and Saturday. I never knew that, so I didn't do it.

LK: So how did your parents feel when you made the decision that you were to become a professor at Bronx Community College?

SD: Oh, they accepted it. They liked it. Well, what happened was, after I was a professor for four years, my father died. We were on an Alaska cruise. He had a heart attack, and he was dead in five minutes.

LK: Oh, I'm sorry.

SD: That kind of ruined the cruise.

LK: Well, yeah.

SD: That was very sad.

LK: And you needed to come right back and start teaching again?

SD: I took my mother to all my classes. I took her to my classes in City College at night, and I took her to my classes at Bronx Community. And when I married Bert, he said, "Didn't the school object?" The school didn't say a thing. The kids liked my mother. They liked her.

LK: What courses did you teach as a professor at Bronx?

SD: Well, at City College I taught physics seven and eight,

that's first year physics. And then I taught atomic physics, and I taught engineering mechanics. Now, I never studied engineering mechanics, because when I went to Brooklyn Poly, he gave me credit for my physics, so I never took a lot of the engineering courses. I took drafting, but I didn't take a lot of the civil engineering courses.

And so I had to teach engineering mechanics. And they give you a book with that that gives you a help. And I will tell you, it was very, very, very difficult. I'll tell you that the physics in seven and eight in City College was very difficult. It was much harder. The first year or two that I taught physics were very hard on me. I worked harder than the kids, because I had to do all the problems in every chapter and so on. It was very hard on me, but I enjoyed it. It was a challenge. And engineering mechanics, even though they kind have outlined solutions for it, it was very difficult. I taught it for many years. After a while it wasn't difficult.

LK: Were you teaching all male students, or were there some female students?

SD: No. These were engineering -- no, they were all men.

LK: And were you the only female faculty member -- or instructor at that time?

SD: There was one other woman that was a professor in physics. And I'll tell you, they weren't very good to her. Actually, for one, the time she got married she had to leave, and

it took a couple years before they rehired her. And you know when I was there at City College, they put out an ad for physics teachers. And the men they hired as assistant professors; the women they hired as instructors.

LK: Was that your experience?

SD: Well, there was only one rank at night.

LK: And that was instructor?

SD: I forget what that rank was. It wasn't instructor and it wasn't professor, it was another rank. And then the last year or two we became assistant professors.

LK: And so what about at Bronx Community College--

SD: So actually, coming back to engineering mechanics, I had a wonderful class. Those kids, they would put the problems on the board, they would discuss them, and they were very good. And on the final exam they had some very hard problems that I couldn't do. They all did them. It was the most wonderful class I ever had. Every one of those kids was a genius.

Now, at Bronx Community, the kids were not clever. They were very nice. I liked them. And I was very lucky, I had all boys. Because if you have a mixed class -- I had a mixed class at City College once. It was physics for pre-medical students. And they were terrible. The boys and girls were flirting all the time. You couldn't teach them. So I said to them, "Well, I'm going to have to drop the marks." Those that would get an "A" will get a "B." Those that will get a "B" will get a "C." Those that will

get a "C" will get a "D." And those that would get a "D" will get an "F." Well, I came in class next time, they brought me a beautiful necklace, and they gave me a card. And they said, "We love you. You're our kind of teacher." And they said, "Well, why don't you just separate the boys and girls?" That was impossible.

Then I had another class. I left City College in 1970, because what happened is, in City College they hired assistant professors to teach full-time at night. And I forget what our title was. How do you like how good my memory is? We had a title that I forget what it was. And what happened was, we had to teach the 8:00 o'clock classes. And that was in a difficult neighborhood. So to teach the 8:00 o'clock class, you had to come at 6:00 o'clock and stay there until 8:00.

Now, by this time I was an associate professor at Bronx Community. And I was just getting assistant professor's salary in City. So I left City College in 1970, and I went to teach math in Bronx Community. It was easier, too. It was nearer my house.
(INTERRUPTION IN RECORDING)

LK: This is tape two for our interview with Stella Lawrence Daniels for the Society of Women Engineers Oral History Project. We ended tape one talking about when you became -- an associate professor or assistant professor Bronx Community College?

SD: Assistant professor.

LK: One you decided to completely leave industry and concentrate on engineering education.

SD: Well, let's not put it that way. Let's not say I decided to leave industry. Let's just say that I lost the job at the Bell Telephone Labs, because I wouldn't have been able to go to New Jersey. I was too attached to my parents to leave them and go live by myself. So when I got the job at Bronx Community College -- and I liked to teach, I had originally intended to be a teacher -- I took the job. It was a godsend. And I stayed there for twenty-eight years. In 1970, it was a law that you had to retire at seventy. And I said, "I'm not going to tell them I'm seventy." But they knew.

But I stayed with NASA in the summer until '92, when I was seventy-four. And then we moved out of New York City, so I couldn't work for NASA anymore, because all my references were in New York. I had no references in Las Vegas, so I retired. I'll tell you, I love retirement. When Bert retired, he said it was the happiest day of his life.

LK: While you were at Bronx Community College, you took a lot of summer fellowships doing different types of engineering.

SD: Right.

LK: Can you talk about those experiences?

SD: Well, my first job was with Aerospace in 1978. I worked with Ivan Beckey. And he was working with applications of space to the earth, you know. He was thinking about wristwatch, radios, and all kinds of things. So I worked for him at Aerospace. Then the next summer, I worked -- and the next summer after Aerospace -

- I think I worked for Ampex. Aerospace was '78 -- I think I worked for Ampex in '79. And then in '80, I was a professor in the summer at Bronx Community College. And then in '81, I worked again at the Argonne National Laboratory on nuclear reactors. And then after that, 1977, I was at NASA, at NASA Marshall. That's in Huntsville, Alabama. And two years before that I was in another NASA, I think in Virginia. In Virginia there's a NASA.

LK: Were these summer jobs experiences to help you on your tenure track, or were these things that you were working on just because you were working on them as an engineer when you weren't teaching?

SD: Well, I didn't need them for tenure. I did that because I liked engineering and I liked NASA, and I liked the other companies, too, and I wanted a summer job. I was a workaholic. Even when I was at Bronx Community, I taught in the daytime and I taught at night.

LK: And you mentioned this earlier, but you really credit the equal opportunity laws for allowing you to do some of this work?

SD: Well, wouldn't say that, because I got the job before the equal opportunity laws. But what I'm saying is that they opened a lot of jobs for women. And they made it easier for women that were looking for jobs. Because there was one job in Virginia, at Virginia Tech, and I applied for the summer job, and they approached six men before they approached me. Fortunately,

the six men didn't want the job. Now, with the Equal Opportunity Act, they would approach the women first. And to tell you the truth, they approached the black women. It was a great thing for black women. It was a great thing for women. Because in 1984 -- or 1983, I worked for -- I was in Wright-Patterson for the Air Force. And they were terribly against women. They were against women, didn't like women.

LK: Can you expand on that a little bit?

SD: Well, they just didn't like women. They gave me a lot of work and made me do a lot of hard things, which was very good for me, because I wrote a book. It was very good for me that they worked me like a dog.

(Laughter)

SD: I had a boss who I was told had a certain rank, and he did something wrong, so he wasn't promoted. I guess he was taking it out on all of us.

LK: What were some of the most interesting projects you worked on at NASA during these summers when you weren't teaching?

SD: Well, the field I got into was full tolerance. Full tolerance means if a mechanism or a project or an airplane or something, if they have a problem, the problem corrects itself. And that's very expensive. Because I told you, if you want the satellite to correct itself you have to put up another satellite, and that just doubles your expense. And putting up a satellite is no joke. So I worked in full tolerance.

Then later on, I worked in software reliability. And that's really a very important thing. Because we had one project where the airplane followed another airplane and corrected itself, and so on. And we said, "What happens if it doesn't work?" And the answer is, it depends on the software. If there's something wrong with the software, then the project will not work. So therefore you have to look through the software.

And there are all kinds of theories as to how to test the software and when the software will be okay. And that involves getting the number of mistakes or errors, and plotting it versus time. And after a certain time, the errors should go down and the software should be reliable. Well, the problem with that was that people didn't want to admit that they made mistakes.

LK: And so were these experiences research projects that eventually led to publications that you presented at technical conferences?

SD: Well, not really. I did present one or two things at technical conferences, but I don't know whether it was from those experiences.

LK: Okay. Well, can you talk about your experience and your activity in technical societies during your career?

SD: Yes. I was a member of the Institute of Electrical -- first of all, it was American Institute of Electrical Engineers, and Institute of Radio Engineers. And then they merged: the IEEE. Well, I was, for twenty years, a member of the Executive Committee

of the New York Section of the IEEE.

LK: You were the first woman?

SD: They had one or two other women. They had Thelma Estrin, who was very good, very good. So actually what I did is, they had a magazine, the *Monitor*. And for a long time I wrote an article on student activities, because I was the faculty advisor for the Bronx Community College IEEE Student Branch. And then what happened was, another young man came along, a very ambitious young man, and he took my column away from me. So then I wrote a column as Editor at Large.

And then there was a gentleman who really liked me, and he was the director of the Executive Committee of Region I, the IEEE. So for ten years I was on the Executive Committee of Region I. And that was a lot of fun.

LK: What types of activities did the regional IEEE address in that time?

SD: Well, I think they were in charge of dispensing money, and they were in charge of looking at what the branches are doing and making suggestions as to what they should do, and so on. Then I joined -- I don't know whether I should tell you this or not -- but I came here ten years -- in '92, and I joined the ASEE. But they meet in Phoenix, so I never go to any of their meetings.

And I joined the IEEE. And the IEEE was very, very nasty, extremely nasty. I was a member of the IEEE from 1947 or 1946. That's fifty-seven years or something. And they had one skunk

there who said, "Oh, you're not an engineer." I happened to be a PE, but I forgot to tell him that. And they were very bad. So I got very angry about it. And my husband said, "Write a letter." So I did. Because, you know, the IEEE is trying to get women to join and be active in engineering. You know that.

LK: So when you moved to Las Vegas in '92, this is when this experience happened?

SD: That's right. It happened for about ten years. So finally, I wrote a letter to the president of the IEEE. I thought it was a woman. They told me it was not a woman. But you know what? It was a woman. So I wrote to them, and you know what? They gave -- I don't want to say "hell," but they gave it to the section. The section was very unhappy after -- I said, "I'm afraid to go to the meetings because I'm afraid they're going to kill me."

LK: Did you ever encounter any kind of similar experience in your career, where because you were--

SD: Not really.

LK: -- because you were a woman and you--

SD: Not really. They were really very bad. There were two or three of them that were very bad. Actually, it turns out that the people in Las Vegas are very backward. Aren't they? They're backward.

So right now I stopped going to the meetings because the meetings are at night, and I think I deserve a rest. But we had

an active branch of the women engineers here, with Marnie Magner (phonetic). Marnie Magner worked very hard, and she founded this branch, and we were meeting for two or three years.

LK: Is this Martha Munger?

SD: No. You're thinking of Martha Munzer.

LK: Oh, okay.

SD: I knew her, too. This is Marnie Magner. Her father was a professor of physics in the university in Seattle. And she's working for this -- we have here a test site. I forget what it's called at the moment. But we have a test site here. I don't know how many miles from Las Vegas. And she's working there all the time as a physicist. And she founded the SWE branch. And we had about twenty-five women members. And we went for about two, three years. And we had very nice meetings. We went places, and we had talks, and so on.

But what happened was, we had a very nice woman. She was divorced and had a little boy three or four years old. And she got married, so she moved to Oklahoma City. And then we had another woman who was a marine engineer, and she got married, and she moved to Columbus, Ohio. Then we had a third woman -- I shouldn't tell you this -- but she had a girlfriend. And her girlfriend was in San Diego, so she moved to San Diego. So we lost those three women, so the society fell apart.

Then Ms. Brown wrote us a letter after a year or so, and she wanted us to come together at a meeting, a dinner or a lunch or

something. And I said, "I must go." And you know what? Within about a week I forgot all about it. So then I wrote her a letter and said how sorry I was. But the Society never recouped. But we had about twenty-five girls.

Well, the trouble was that the girls either had jobs -- and these girls that got married, they left good jobs. Women leave opportunities on account of boyfriends. It's true.

LK: Do you think that that has changed a little bit since--

SD: I don't think so.

LK: Really? You think it's still that way?

SD: I think women still think that a woman's got to get married.

LK: Do you think that women -- this is in general -- are more likely to relocate for their husbands?

SD: Yes, they do.

LK: Why was it important to you to be active in technical professional societies, as an engineer?

SD: Well, I just like to go to meetings. Actually, it's very important to be active in technical societies, because it leads to jobs and it leads to opportunities. SWE once said you have to have a mentor. Well, if you go to technical meetings you'll have a mentor.

LK: Did you have a mentor during your career?

SD: Not really. Professor Vitrican liked me, he gave me the teaching job.

LK: Do you feel that you were a mentor to anyone in their careers?

SD: Maybe. I tried. There were one or two girls in my classes. Now there are more. But I think engineering is a very good job for a woman. Because you know, you think of women that if they're engineers, they're like automobile mechanics. They have to get their hands dirty and work with the equipment. You don't have to do that.

LK: Do you think that the public has kind of a stereotyped view of what an engineer does?

SD: They have what?

LK: A stereotyped view of what an engineer does?

SD: I really don't know.

LK: Well, I guess--

SD: I'll tell you, frankly, I didn't know what an engineer did myself.

LK: Can you expand on that a little bit?

SD: Well, I really never thought of it. I got into engineering through the mathematical aspect. There are a lot of mathematics in engineering.

LK: You mentioned your father had some engineering background.

SD: That's right.

LK: How did he become involved in engineering? And did that affect you?

SD: Well, he went to engineering school. But then when he came to Canada, he got a job working with the electric company. And someone working there had lost their hand or something, so my mother said she didn't want him to be an engineer anymore. So he went into banking.

LK: But other than his background in engineering, when you were growing up, you--

SD: You know, this is something I wanted to tell you right at the beginning: I find that most women engineers have had engineers in the family, either brothers or fathers or maybe uncles. That's very true.

And then about women in marriage: The Institute of Electrical and Electronics Engineers, in January they have a Winter Power Meeting in New York City, usually in the Statler Hotel. And there I met a girl, and she told me that she was offered a job with a company. And I think they asked her whether she would stay with the company or not. Now, how she brought it up, I don't know. But she was very dumb. She said, well, she would want to get married, and if she got married, she would leave the company. She never should have said that. That shows you the mindset of women. If they said, "Are you going to stay with the company," you say, "Yes, I will." They're not going to take you to court if you leave.

LK: Was there ever any type of discussion, maybe within SWE or in general, about making the work environment easier for women

so that it would be easier to balance a family with a career?

SD: I don't know about that. But it's very hard to balance a family with a career. Because you see, you go to work, and you worry whether the child is sick or the child has a cough. Your mind is divided.

But of course, I had my problems, because my mother lived to eighty-nine. And when she got to be eighty-four, she became senile. Actually, you see, we always spoke Russian. When I was four years old, my father taught me to read and write Russian. And I know Russian very well. I also know German. And at home, we always spoke Russian. And of course, my mother, since she went to college and so on, she was very good in English. She read all the latest books, you know, Aldous Huxley and -- I forget whom all the writers were, but she read all of them. And she was very proficient in English, going to college and everything.

Well, when my mother got to be about eighty-three or eighty-four, people told me that she doesn't understand English. Because you see, when you get Alzheimer's, you regress. You start at age eighty-five, then you're age eighty, then you're age seventy, then you're age forty. And if you live long enough, you go back to where you're a baby at age zero. See, and she was going back. She went back to where she was like fifteen, and she was crazy about men. And it was very difficult. And I couldn't leave her alone.

LK: And you were working.

SD: Well, my problem was to keep my job, which was a very good job, and to take care of my mother who couldn't be alone. So I had to hire people to stay with her. And that was very hard. In fact, there was one lady that advertised on a lamppost that she took care of people, and I hired her. She was very good. That shows you the references I needed. And if you hired young women, twenty and twenty-five, they didn't stay on the job.

So there was a big Catholic church a block from me, St. Brendan's, a very big Catholic church, with a school and everything. And I went down to St. Brendan's and they found me a woman. They were very good. And then when I was in Huntsville, my mother was very sick. She died. She got cancer. She died that December. Everybody was very good to me in Huntsville.

And you see, I had rented a room in a motel -- and when I was in California, I had a motel where they had a kitchen with utensils and everything. And I had a maid. And at that time I paid $90 to this woman. She was a wonder. And she took care of Mother and she cooked our dinner. She was very good, a wonderful woman.

So when I came to this motel in Alabama, it was a dump. So there was a guy in our group who was a professor of physics and he was also a part-time minister. So he drove me around to find me an apartment. And the head of the project, he moved me, you know. And then I found a big box, and it had sheets and pillowcases, and dishes and forks and knives, and it was given to me by the church.

I think it was a Protestant church. I didn't ask them for anything, but they were wonderful. The people in Huntsville were wonderful.

LK: So do you feel like you had a support network for the time that you were taking care of your mother while you were working?

SD: Well, there wasn't anyone supporting me. Who helped me was the Catholic Church when I went to them. And the church in Huntsville helped me. I didn't even go to them.

LK: Were you a member of the Catholic Church?

SD: No, I wasn't a member. I'm not a member of any church. And I wasn't a member of the church in Huntsville. The people were very nice. There was a lady there that said she has a car, maybe my mother would like to go for a ride. But my mother was too sick to go for a ride. But everybody was very nice.

And when I left, I gave $50 to the church, and they didn't want to take it. I should have given them more. So the Bank of Alabama, or whatever it's called, every month they took money off. So I wrote them a letter. And I said, "I meant this check for the church. The church didn't take it, but you're taking it." They gave me back the money.

That was very nice of them. That was very nice of them, because I didn't even think of it. We're in this apartment, and they gave me sheets and pillowcases and dishes and knives and forks. And of course, I hired people to stay with my mother.

They couldn't take it. They stayed with her four days. And the fifth day their friends stayed with her. And Saturday and Sunday I stayed with her.

LK: Do you think that that life would have been possible if you didn't have people to hire -- if you weren't able to take -- to have--

SD: No, it really wouldn't be possible. The only other option would have been to put her in a nursing home. And nursing homes are no good. Actually, she got very sick. One morning I got up, and she was lying down on the floor about six o'clock, unconscious. So I called the -- well, whatever you call it. I called the hospital, and they sent an ambulance. And she was in the hospital for about two weeks, and she got better. Actually, she had cancer. She got better. And then I put her in a nursing home. And when she was there -- I came every day. And when she was there about a week or two, they sent her to another hospital. And they told me in the hospital that she has cancer.

But actually, you could put people in a nursing home, but I would say this: If at all possible, don't do that. Because it's better -- I have a cousin who -- I shouldn't tell you the whole story. But this guy was an orphan. His mother died at five, his father died at seven. He came to Canada and worked on a farm just for his room and board. And you know, he worked for a firm and he became very wealthy. He was very, very devout, and he lived to ninety-seven. His wife lived to ninety-four. This was in Ottawa.

And you know what? She got a Russian immigrant girl to stay with him, you know, and take care of him. So actually, I think rather than going to a nursing home, you're much better getting someone to stay with a person. Because usually they don't need medical help. Usually they need someone to take care of them.

LK: Do you feel like your coworkers or your supervisors were flexible during this time?

SD: No, they were not. They were not. And of course, Bert said, "How come you could take your mother to all the classes?" No one bothered me. But I didn't ask anyone's permission. Of course, at night school, there's really very few people to supervise you.

LK: Right, right. But during the time that you were trying to balance the projects that you were working on and your teaching with taking care of your mother, was there any type of flexibility available?

SD: There was no flexibility. I didn't ask them for a thing, not a thing. Because I was lucky. I had ladies staying with her. I had ladies staying in the daytime and ladies staying at night.

One of the ladies kept her money in her shoe. I found this lady. She advertised on the lamppost. And she was very good. And she had a companion, so there were two of them. And she had a dog. When the dog died, she spent $100 burying it and taking care of it. And I felt terrible, because this poor woman was taking

care of people at night to make money, and here she spent so much money on the dog.

But she was very good. Well, I was desperate. I couldn't ask for references. It was very hard to find people. And then the Catholic Church was very good, because one year during Thanksgiving, I went down the hill to McDonald's. And McDonald's is closed during Thanksgiving. So I went back upstairs. I used to make Spaghettios. Do you know Spaghettios?

LK: Uh-huh.

SD: And all of a sudden the bell rang, and it was the Catholic Church. They brought us dinner. There were one or two Catholic ladies where I lived, and I think one of them must have sent them.

LK: Was this in Brooklyn?

SD: That was in the Bronx, where I was a block from the church. So that was very nice of them. And I will say this, and I'm not a Catholic, if you have any problems, you have to appeal to Catholic charities. They will help you. The other people won't. They also have charities, but they're not effective. The Catholic charities do help.

LK: So throughout this time, you--

SD: And I'm not a Catholic.

LK: Throughout this time you still were staying involved in the technical societies?

SD: Oh, yes, all the time. All the time. Well, what

happened was, after my mother passed away and I married Bert, I took Bert to the meetings. And they were very nice. They used to have like parties, and I didn't take Bert because he's not a member. And the head of the -- chairman of the section, he said, "Take Bert." They insisted. Bert went to all the meetings with me.

And then when I married Bert, the Region I Executive Committee, they had a meeting in Boston at MIT [Massachusetts Institute of Technology]. And Bert had a terrible cold, so I left him home. And I went up there, and I told them I got married. Oh, they made some celebration for me. It was a very happy day. I left the poor thing alone in the house. But it was very nice. They were very good.

They were exactly the opposite of the Las Vegas Section. I don't know what's wrong with the Las Vegas Section. There's something wrong with them. They're anti-woman.

LK: So then it is true that the experience will vary depending on what geographic location you're at.

SD: I think so. And I think I forgot to tell you -- I was going to open with that. I think that SWE is a wonderful society. I think it's just terrific. And you know, when all these skunks weren't happy with me and told me I'm not an engineer, SWE had an article all about women -- it had an article about those murders in Canada. You know, several women were killed in Canada at one time. Do you know about that?

LK: Uh-huh.

SD: I was going to show it to my friends at the IEEE in Las Vegas, but I didn't show it to them. That was a terrible thing.

LK: Can you talk a little bit more about SWE's role in your career?

SD: Well, I would just say that what SWE did have, is they had career conferences, you know, and we went around all over, talking. And when I went to the Career Conference at City College, they asked me to teach there. So that was good.

I think SWE does a lot for women. I think it's very important. Because even now, as I told you here in Las Vegas, there are certain -- what shall we say -- backwaters -- there are certain backwaters and places where the river is muddy and so on, where women really need help.

LK: How do you see specifically that SWE can help professional women?

SD: Well, what SWE did to help women, is they had career conferences. And then they have branches in the colleges. I think we have a branch here at UNLV -- I'm not sure. You see, here at the University of Nevada, Las Vegas, that's a big university, and you know, we now have a woman president.

LK: I guess I'll rephrase the question. Do you--

SD: Well, what SWE does is first of all, they have the magazine, which is excellent. And you know, when you read the magazine, you find out what women are doing. And it's right to

the point. Like when I read this article about how women were killed in Montreal, that would have been a good article to show to the skunks here of the IEEE.

LK: So it's the information about women that SWE provides that you think is one of the most important--

SD: I think it's very good. And I think the career conferences are good, and I think the conventions are good. I think a person needs support. Even if you're a male engineer you need support. But I think that women are doing much better now, because now it's accepted that a woman work. I wouldn't say that it's accepted a hundred percent all over, but it's getting to be the thing. Everyone knows that if you're a married woman, you're working part time as a librarian, or you're working part time as a secretary, it's accepted.

I know one case where there was a physician and his wife was a physician, and he treated her like dirt. He didn't treat her right. But there was nothing I could do about it. She was a in a bad position. She was in the same position I was with our IEEE branch here.

LK: Yeah. Do you think there's a role for SWE to help with those types of situations?

SD: Oh, I think it's very good. First of all, the magazine comes out with all this added ammunition, right?

And then, of course, you have the support of other women. When you go to the meetings, you have the support of other women.

Like in the IEEE there was a young man there, and he was very active, you know. He organized a student branch at New York City Community College and so on. And there was a gentleman who was the president of our chapter of IEEE. And he was the leading engineer for the Port of New York Authority. See, New York and New Jersey have a Port of Authority. You know, there's the airports and the shipping lines and everything.

So he got this guy, and he's in charge of all the maintenance and everything at, I think, LaGuardia and Kennedy Airport. So he got a good job by belonging into the society. So the society says you need a mentor. Well, if the women belong to the society, they meet other women who can help them, as well as meeting men who can help them. Not all men are anti-women. I knew a lot of men who were not anti-women.

LK: Do you feel that -- you say that you think today it's accepted that women work. And the example you used was if they're married they can work part time. Do you think that it's accepted for women to work full time if they're married?

SD: I think it's accepted, but it's very hard, especially if your children are young. See, as I said, I knew this girl from high school, and she was very brilliant. She was a terrific mathematician. So she got married to an accountant and had three children. That was the end of her brilliance. I think she ruined herself. I think she should have gone on with a career and then gotten married and had the children. A lot of women do that.

They get married and have children later.

That's one of the problems that they had on the TV, whether career women should have children, or should have children at age thirty, or all that kind of stuff. Women are in a difficult position.

LK: Do you think men have to deal with some of these issues as fathers?

SD: Well, the men have a problem if their women are working, because the women may want to rely on them to take care of the child at night if they're going to night school, to help with the child in the daytime if they have a job that they can stay home while the kid is sick. But actually, I think that the men prefer a stay-at-home wife. That's my personal opinion. I think they prefer a stay-at-home wife. I think there are very few men that tell their wives, "Go ahead and have a career." That's just my opinion. I think that still the thing among the men is that they prefer their women to stay home.

Of course, there's one other problem. If they're not making a living, then the woman has to work. I know one case in my apartment house where the man and woman were both working, and the kids had a key. They were very good kids. They came home, they had their milk and cookies at 3:00 o'clock. They were very well behaved kids. But not all kids are that way. And then, of course, suppose you're working and your kid has the flu. How can you possibly work, you know? Or you're leaving for work, and your

kid all of a sudden is sick, what do you do?

I have a friend, and this friend of mine is fifty years old, and she has a very good job with Sprint. And she wants to retire, she's counting it. "In four years and five months I'll be able to retire." So she has a daughter, an only daughter. She's divorced. And her daughter has asthma. And about a month ago -- she lives with a roommate, she's twenty-eight years old -- she had an asthma attack. She couldn't breathe. I don't know how they took her to the hospital. Maybe the roommate called the 911. But she was on the respirator for eight days. Eight days she couldn't breathe. So now she's better. And one day after seven days she was critical. We were all afraid she was going to die that night, but she made it. That's her third attack. And I think she was smoking. "Oh," she says, "I didn't smoke all that much." Well, smoking is not the thing for asthma. So now we hope that she's going to be okay. But you see, she's divorced. But suppose you're married and have a crisis with your child. What happens then?

Well, in the Bell Labs they had personal leave. They gave you a week's personal leave. And she gets five weeks vacation at Sprint.

That's very -- I never got five weeks vacation, except when I started to teach, when I had plenty of vacation. Teaching is very good. Bert says it's terrific, because in January there's no college. And the first week in May, you have exams, the college

is over until about the second or third week in September. And you only teach -- we were teaching four days a week. Some were teaching three days.

But they open the college here -- you see, in Las Vegas you have Las Vegas and Henderson. Henderson is as big as Reno. It's the second largest city here. And they opened the college. And it's in all the papers, "The professor is only teaching one hour a week, or they're not teaching at all." I don't know how they do that. Because in a city university, at first we have to teach fifteen hours. Then we taught fifteen hours one semester and twelve hours the next semester.

And actually, when you start to teach, it's very difficult, because -- especially in electrical, because you have to make up the labs. You have to run the labs and write them up, you know. And the labs have to work. Sometimes they don't work. And then you have to do all the problems. And the beginning was very hard, because I never took such hard physics myself. And I had to do all the problems. I worked like a dog. But after you've been teaching for four or five years, you know it all. Then you can just skate a long. You just skate along.

LK: Stella, what do you think is your greatest contribution to engineering?

SD: My contribution to engineering? Well, we can say first of all that I was active in the Electrical Engineering Society. Second, I wasn't really active in SWE, but I went to every

meeting. I never skipped a meeting. I could have been more active, but I never skipped a meeting. And I went to the career conferences, you know, where you send people to talk to colleges and high schools. I was active in that.

And the other contribution is that I did some research for NASA. I did research. They weren't very happy with my field of research, because it was a very expensive field, the field of full tolerance is expensive, because it means extra equipment.

LK: Can you talk a little bit more about the research you did? I know you mentioned it earlier.

SD: Well, the research I did -- first of all, there are ways of sending signals and seeing if the signals are correct or not. And there were mathematical ways of monitoring these signals and seeing if they were correct. I've forgotten all about that. Then there's a question of computers. If you wanted your computers to be full tolerance, then you have to have three. And two of the three have to agree. This nearly killed a NASA project, because what happened was, the monitoring computer was wrong. The other computers were okay. That nearly killed a NASA project.

Now, the other thing is, if they would have had full tolerance on this last flight, and they would have watched that wing that the tiles weren't there, we wouldn't have had that tragedy. I think they were cutting corners. You can't cut corners.

LK: So full tolerance is still an issue today.

SD: There's another field, reliability. Full tolerance and reliability. It's an issue all the time with every piece of equipment.

I remember there was one project for the Navy where one instrument was watching the other instruments. And the gentlemen in charge of the project -- that was in Philadelphia -- he says, "How do you know it'll always work?" Well, the answer is that whether it works or not depends on the software. And I didn't realize at the time that the software has to be correct. And that was my last project for JPL, software reliability. There have been theorems made now to say how you can test it. And then you test the software. You see how many mistakes are made each day, and how the mistakes are going down. And you make graphs of how the mistakes are going down. So software reliability is very important.

And I think full tolerance is very important, because if you -- it's very expensive. But you see, it's my opinion -- and some people knew that -- that if they were to watch that shuttle and see that it was shipshape, we wouldn't have had that tragedy. But they were cutting corners, because everything is very expensive. And then you can say, how expensive are human lives? And not only that, if you have a tragedy like that, it can kill the whole NASA.

And then the other thing is, I first started in 1977 in Huntsville. That was a project on application of space to the earth. And you know, they showed us -- they gave us lectures, and

they showed us how people are working in space and this and that. And you see, to go up in space, you have to go to a geosynchronous orbit. And that's very high. In a geosynchronous orbit, the satellite moves at the same pace as the earth, so it's always in the same position with respect to the earth.

Well, we have never gotten to a geosynchronous orbit. We are in low Earth orbit. So that satellite is moving. And to go from low-earth to synchronous, you need another piece of equipment. You need another instrument or piece of equipment to take -- I forget that they call it -- to take you from low Earth orbit to high Earth orbit. And they don't have that. They never worked on that project. They never got further than the space shuttle.

And I can see where the space shuttle needs a lot of improvement. If you go up in that space shuttle, you are risking your life. You have no certainty that you're coming back. That's the way I feel about it. Well, first of all, the whole thing -- you have to have a terrific explosion to get that rocket to go up. That's the first point of danger. Then there are other points of danger. You can meet things in space that will throw you off your course and collide with you. And then the space shuttle itself can be faulty. And then you never know whether you'll be able to leave the earth station. You know this guy that went on the earth trip and paid so many million dollars? I would pay all those millions not to go.

LK: So as a professional engineer, do you feel that there

are engineering solutions to those problems?

SD: There's a solution to everything. It just depends how much time, energy and money you want to put into it. Because you know, you take Einstein, he found out that mass is energy. That took a long time. And then there's Newton, with his Laws of Motion, you know, that if an object is going it will keep going at the same speed in the same direction. It took a long time for people to formulate Newton's Laws. And then there's the question of astronomy -- a person that said that the earth doesn't go -- that the sun doesn't go around the earth, but the earth goes around the sun. And then the thing is that you have a thermonuclear reaction in the sun. All those things took a lot of time.

LK: And those are all examples of individual pioneer research.

SD: That's right.

LK: Engineering is more of a team project, I think.

SD: Not really.

LK: Okay. Can you--

SD: Not really. They say that. They say it's a team working together. But if you want my personal opinion, you've got to have a clever person. You've got to have a clever person. It's the clever person that does the spark. I mean, you can't say there was a team working with the Wright brothers. SWE had an article about their sister that she worked very hard at it. I liked that

article.

But usually, a person gets an idea and he works on it. And these ideas are very hard to get. You see, before Newton found the Laws of Motion, it took a long time. There's Newton and Kepler, and the guy that in – Leeuwenhoek, who invented the telescope and all that, or saw that the germs are germs. It takes a long time. And the same thing with antibiotics. I still believe you've got to have a clever person. I think you have a team of twenty people and they're all dopes -- the thing is only as good as the cleverest person. There's a real demand for clever people.

LK: In?

SD: In everything. In medicine, in engineering, even in law. There's a real demand for a guiding light in the clever person. And it's very hard to be clever.

LK: Do you remember how you personally felt being a part of the space program during the time--

SD: I liked it.

LK: -- right before the Shuttle launch?

SD: I liked it. I remember when the thing landed on the moon. I was in Virginia at that time, and I really was thrilled. I think the space program is very good, and I think it should stay. But it's terribly, terribly expensive -- and dangerous. You wouldn't get me to go on that Space Shuttle for a billion dollars, not a million.

LK: Why do you think it's important?

SD: Bert and I have to be content to be poor.

LK: Why do you think it's important to continue the space program?

SD: Well, you see, we have a great mystery. And I'll tell you, all our religions are wrong. Not a single one of them is right. The mystery is: How did it all start, and is there a God? We never solved that mystery. Now, actually, they found out that all the galaxies and so on, they're going outward, you know, they're spreading out. So that's why they think there's a big bang. See, with a big bang, in that respect, the Bible is right. I think the theory in the Bible is correct. I don't think the people that wrote the Bible knew a thing, but they were correct. They were standing in the dark, and I think they're correct.

But still, we don't know what God is, we don't know if there is a God. I have a friend who's very clever. He said, "People make God in the image of man." Because you know, you go to God, and you light candles, and you give offerings and so on to please God. And you tell God, "You're so wonderful, you're terrific, you're wonderful. Make my life happy."

Well, God is not a person. We don't know if any of this affects God. Because you know, when you look at it, you have the Law of Gravity. You have electricity, lightning and thunder. You have the atomic forces. You see, according to quantum mechanics, everything here is moving. This is all consisting of moving

particles. It's not solid. Who would ever think that? You would never think that. I still don't believe it now, even after quantum mechanics.

(Laughter)

SD: So actually, we don't know about God, and we don't know how the world started, and we don't know where it's going. Of course, the way it's going now, it's a wonder it isn't all over, but we hope for the best. I think the world is going ahead. My father said he never wants to go to Europe because that's where all the trouble started. Well, now we don't want to go to the Arabs, because they're causing all the trouble. Men are their own worst enemies. No two men agree.

LK: When you were working on projects for NASA, were there technical applications outside of space?

SD: Well, that's what they're looking for. That's what they're looking for. And they also say if you go up, there's no gravity there, so you can see what happens to things when they're not under the force of gravity. So they're always looking for applications because they want to have money. I can tell you that so far I really don't see too many applications. Of course, I can say this: I'm not the greatest genius on this, you know, but I don't see too many applications.

The first time I went to NASA was at Marshall Space Flight Center. And they gave us a series of lectures. And they showed us everything happening, you know. People were up in space and

they're building and they're walking, and just -- well, that isn't so. You can't build and walk in space.

So actually, what they showed us there in 1977 hasn't come to bear in 2003. It may take 2100 before we get anywhere near there. But I do think that we have to go out in space. I do think so. And the greatest thing I've learned from space is we better take care of the earth, because there is no other place. If there is another place, only God knows where it is.

We don't know. We're looking. NASA is looking all the time to find, you know, life outside of the earth. But so far the only place is the earth. And if you want to make the moon habitable, it'll be very hard. They've been thinking about that. I don't think we have enough money and technique to do it. We better stay here.

LK: Is there anything that you would do differently, if you could, in your career?

SD: Well, I can say one thing, I got all my degrees -- I got my masters in math, my bachelor's in EE my masters in EE, then I tried for the doctor's in EE, I got them all at night. I don't think that's the thing to do. I mean, you ought to get your degrees while you're young, right away. But I had no choice, because I had to make a living.

As a matter of fact, when I was in high school, there was a young lady there whose father was a window washer and he got killed. And the whole class, you know, there are about thirty-

five in the class, we all felt terrible for her. Then I met her in the subway one day, and she was going to night school. Well, I see now that you can go to night school, and you can make a very good career. But it's better if you go to day school, because you're younger. When you go to night school, you run out of time. You're better off when you're younger. So my advice to you is: If you're in school, stay in school.

Of course, there are very few people that can afford to stay in school. I mean, it's enough to stay in school for your bachelor's, but then you got your masters and your doctor's. That's a long time to stay in school.

LK: Do you have any final thoughts about SWE or the engineering profession that you want to share?

SD: Well, I would say that I think SWE is very important, because it does have career conferences, it does have scholarships. The magazine is very good. You know, you read about women in Antarctica, and women here and women there, that you didn't even dream they're there. So that's very good, and gives the women hope. And those that are already here feel very happy about it. No one feels unhappy about it. So I think it's very necessary. It's really necessary, because not only women, but to help anyone get -- there's something about a mentor -- you need all the help you can get. And you never know who's going to influence you. You know, you may meet a pharmacist and decide to go for pharmacy when you never would have done it before. So it's

important to be exposed to influences.

And SWE is an excellent influence. It's really very important. I think that women need a lot of help because it still isn't a hundred percent accepted that a woman is entitled to career and she should work for her career. It's still accepted that women have to find a husband and get married, their first project is to get married.

You know, I was supposed to go -- as I told you, to the SWE meeting in Washington. This girl was going to go with me. She didn't go because she had a date with her boyfriend, and then she married him. Then there was a second woman, when I gave those talks at City College. I went to have lunch with the professors, and I got the job teaching physics. She went home to her boyfriend. So you see, women have given up a lot of opportunities by planning to get married first. And who knows? Maybe marriage is the thing for women.

LK: Or maybe there's room for diversity.

SD: I think there's room for diversity, because nowadays it's so hard to make a living. And people have so many desires, you know, vacations, television, automobiles, fur coats. People have a lot of desires. And the way you can fix those desires is for two people to work, especially if you have children.

If you have three or four children, and they say, "Well, we need $50,000 to send our children to college." You don't need $50,000. There's nothing wrong with going to Nevada Community

College, or all the colleges in California that are community colleges. I can tell you that we've had students in our community college that became college professors. We've had a lot of people that went to community college and had very good careers. My thesis is: You don't have to go to Harvard, you don't have to go to Yale.

And you know, they publish the list of all the wonderful colleges. Well, if you're an ordinary person, having ordinary teachers is good enough. It's very rare that you have a genius who has to be guided by an Einstein. Besides, if you're a genius, you'll guide yourself. Because right now, let's say if you study calculus, calculus is the same at Harvard and the same at Bronx Community, and the same at Las Vegas Community. And chemistry is the same. It's only when you have the more advanced subjects -- and how many people go into such advanced subjects that they need a genius to guide them? It's true, if you are a real genius and you really need guidance, then maybe Harvard or Yale or CalTech can help you. But how many of us are such geniuses? Very few, very few.

LK: As a founding member of the Society of Women Engineers, are you satisfied with the current state of engineering and the current state of SWE?

SD: Well, I think SWE is doing very well, because they have a beautiful magazine. I don't know how much that costs. And they have beautiful pictures of all the women, white and black, who are

making careers. And I'll tell you, it's still not that easy for women. So that's a very good example. They look and they say, "Well, Ms. Jones made it."

I remember I went to the Brooklyn Navy Yard. I took my student branch to the Brooklyn Navy Yard. And they had a black woman there, engineer. And they told me she was the best engineer they had. She was very good. So first of all, you have examples. Examples are very important. And they tell you things you never dreamt of, like there are women in Antarctica. There are women in medicine. There are women all over. So you realize that actually women have great potential. And I think if women had all the opportunities that men have they'd be just as good, maybe even better. Because my opinion, women are just as clever as men. That's my opinion.

LK: And do you feel that goal, that same purpose, was what SWE was founded for back in 1950 when you attended that meeting?

SD: Well, I think what Professor Furla did is, she wanted to get all the women together that they should work on their careers and become engineers. She wanted to help women in engineering careers get ahead. And you know, women need -- they need support, because the fact that my mother was a dentist and the fact that she wanted me to have a career was very important. Now, if your mother is a housewife, she may or might not tell you to have a career, because women are brought up that you have to have a date on Friday on Saturday. I didn't know you had to have dates.

Actually, when I was in high school, we had a math team. And the cleverest boy on the math team wanted to have a date with me. I didn't know what to do. I really didn't know what to do, but I didn't want to have the date. I changed my mind later in life.

Actually, what happened was, my mother passed away. And I was married to my mother. In the full sense of the word, we were married. And when my mother died, I got under the influence of my girlfriends. They were all divorced or widows in their sixties. I was sixty years old when my mother died. And they got me married. They said, "Go to dances, go to parties," and so on.

And I went to a dance. I went with a friend of mine. This dance was in the neighborhood. You know, all the churches and synagogues and Y's, they all had dances for seniors. It was called Thirty-Eight Plus.

And this particular dance was on Pelham Parkway in the Bronx. And the dance is until 12:00, 1:00 o'clock at night. And in those days -- that was in the 1980s -- it wasn't dangerous. Now it is. But in those days, you could stay in the park all night and no one would hurt you. But you had to go out at 12:00, 1:00 o'clock, into the park at night, and it was cold. And at 12:00 o'clock the buses come every half hour or every forty-five minutes. They don't come every five and ten minutes like in the daytime.

So my friend and I, we decided that the people that went to this dance were all from the Bronx. They were like local people.

So we decided to ask people for lifts. And one day we asked Bert for a lift. And it turned out that Bert only lived two blocks from me. So that's how I met Bert. It was very good.

LK: That's a great story.

SD: So that's what I tell young ladies that aren't married, I say you have to go to dances. Yes, because you know, if you go to lectures, that's no good. People listen to the lecture and then go home.

You have to go somewhere where people participate. See, if you go to a dance -- that's what I tell my friends that are not married -- if you go to a dance, you don't have to dance. You can just speak to the men. They'll be very happy to tell you their troubles. And before you know it, they'll like you and want to marry you. That's the truth.

LK: And so you feel like now you are enjoying your retirement?

SD: I'm doing what?

LK: Enjoying your retirement.

SD: Oh, yes. Bert said the day he retired was the happiest day of his life.

LK: And do you feel that way?

SD: Well, I tell you, I always wanted to work. I said, "I'm never going to stop working." And the minute I retired, I never -- well, I worked for NASA for four years, in the summer. But I never wanted to work again. I didn't want to go back and teach.

As a matter of fact, when I came here -- we came in September. And September is the time to find jobs in the colleges, because that's when they're looking for people to start the classes. So I could have applied, but I didn't. I said, "I don't want to teach. I just want to take life easy." And I'm enjoying--

END OF INTERVIEW