Computing Educators Oral History Project

An Interview with *Lillian (Boots) Cassel*

Conducted Wednesday, March 4, 2009
At Chattanooga, Tennessee
Interview conducted by Vicki L. Almstrum

CONTEXT FOR INTERVIEW: Conducted in a hotel room at the conference hotel during SIGCSE 2009. There were a pair of interruptions, one by a roommate returning to the room (approximately one hour in) and the other, near the end, of a telephone ringing. Both of these incidents have been edited out. For the full recorded interview, only the interviewee and interviewer were in the room.

[0:00]

Vicki Almstrum: This is an interview with Lillian Cassel, who goes by Boots. She is from Villanova University. This interview is being conducted by Vicki Almstrum on March 4, 2009, at Chattanooga, Tennessee. It is part of the Computing Educators Oral History Project.

Did we give and pronounce your name correctly?

Boots Cassel: Absolutely!

V: Good! Well, I'm so pleased that we can be with you here today and get this interview to find out about some of the influences in your life. What I'd like to do is start pretty far back. I'd like to know about your parents. You can tell me about their education, their work life, those types of things.

B: Okay. My parents were 47 years old when I was born, so I have a somewhat different relationship with my parents than some other people do. My mother was born in 1898, my father was born in 1899. He was slightly younger. My mother finished high school and started in a 2-year secretarial program, at a college where I later taught, as a matter of fact. She did not finish.

My father's education I really don't know very much about. He left my family when I was two, so I really didn't know him very well. But he was … he worked for a newspaper. He did ads, he wrote ads. And sold ads. And I don't know a lot other than that about him.

V: So it was your mother who was your primary parent?

B: Absolutely. Yeah, Mom and I were a team.

V: You said that she had graduated from high school. Was she also working outside of the home? She had done secretarial school.

B: She had done secretarial school. She worked all the time that I was around, when … All right, let's go back up a little bit. I said that they were 47, both of them were 47, when I was born. They already had five children, who ranged in age from 13 to 24. So they had already raised a family when I arrived. And I've heard lots of stories about those times. We don't need to go into all those. Mom worked sometimes, was at home with the children sometimes. Her great desire was always to be at home with the children. That wasn't always practical. We're talking about the Great Depression. They raised children in the 1930s and 1940s, before I was born. So money was a difficult thing. They struggled. They moved a lot. My brothers and sisters were born in several different cities. It's kind of a … a patchwork [chuckles] kind of existence.

But from the time I was born … As I said, my father left when I was two. And after that it was absolutely necessary, my mother had to work and she did. My oldest sister and her husband and … Well, my oldest sister and her husband moved in with us at some point.

As long back as I can remember. I can't remember a time when they weren't there. I also don't remember my middle sister being home. She was married when I was three. So, I don't remember her at home. I remember only the youngest but me, my brother Chuck, being home, but he died when I was five. So, I didn't know him very well either. So, mostly, the family that I grew up in the very earliest days was my mother, my sister and her husband, their two children — their older son, Skip, was a year younger than me and his sister was 15 months younger than him, so the three of us were pretty close — and so we sort of formed a family unit like brothers and sisters, only I happened to be their aunt, not their sister. We went to the same school, knew each other, played together. When I was nine, Mom and I

moved to a separate place and from then on it was just the two of us. And my sister had several other children. The house was just getting too small for that many people. And by that time it was quite possible for us to separate … support separate households. So that worked out fine.

V: So as you were growing up, did you find that you were encouraged towards mathematics or science? What … I'm curious, especially from the point of view of your parents, and maybe your older sister was even a parental figure, given her proximity. [5:06]

B: Somewhat. None of them were particularly mathematical. My mother was a firm believer in education and she read to us incessantly. I have fond memories of my mother still reading to me even after I learned to read. And I still have some of the books she read to me and I read them to my grandchildren now. But education was very, very important and doing well in school was always considered … not a pressure thing, but something that was recognized and you were lauded for. We were never hounded about it, but I liked school from Day One. I loved school and did very, very well. I was always one of the top students in my class so … and I got a lot of positive reinforcement for that. I was always the top math student in my class. Without question, that was my first love. I enjoyed math, mathematics tremendously and did it very well through elementary and high school. I also read a lot and enjoyed reading. And I wrote a lot and enjoyed writing. So it was kind of an odd mix, because there was the reading and writing on one hand and mathematics on the other. And I enjoyed them equally.

V: Where was it that you grew up primarily?

B: In Wilmington, Delaware. And I went to Catholic elementary and high schools. I went to high school on a full scholarship, which was nice and appreciated. Very large classes when in elementary school. You've heard the stories of the Catholic schools, the parochial schools, with 80 kids in the class? I was in one of them [laughs]. And it worked. It was fine.

V: With a single teacher?

B: Single teacher. Yeah. I heard many years later that our first grade teacher — apparently, I think we were her first class; I had no way of knowing that at the time — I heard years later that she used to go out in the hallway and cry. I can understand it [laughs].

So, looking back, all I remember is long rows of perfectly orderly kids. And you sat in your class, in your seat. And you raised your hand when you wanted to speak. And you did what you were told. And it all worked out fine … for me. I don't know if it worked for everybody else, but it worked for me. I liked order; that was a nice thing.

V: So you've already talked about the kind of student you were – that you always did well, that you loved school. [Murmur of agreement from Boots.] So it was a lot of fun.

So as you moved up into middle school or junior school and high school, did you tend to take a lot of courses in math and science?

B: All right, so I went to parochial schools in Wilmington, Delaware, which meant that you went through grades one through eight in elementary school and nine through twelve in high school. There were no significant choices of courses. In elementary school — which, by the way, was referred to as a "grammar school," and with good reason — we learned to write and that was the primary focus: to make sure that we were literate, we could read and write. But on the other hand, we had finished algebra in eighth grade and that was in 1960. So, it was a pretty strong school there, too.

In high school, the school that I went to had been an all girls secretarial school and not too many awfully years earlier had become co-educational and had added a college prep track. That's the track that I was in, but it wasn't large enough that there were choices. So we had algebra I — which I'd already had some algebra in eighth grade, but there was a lot more there — and geometry and algebra 2. There was no chance of trigonometry or calculus or any of things that we take for granted now. In fact, in my junior year, there was no math class available at all. And so I went to a night class at a public high school and took trig just because I had to have a math class. And that worked and that was fine. We did biology and chemistry; never had physics in high school. Took what was there. I was required to take shorthand for two years and typing for two years, which … the shorthand actually … probably did more harm than good in some ways because I was an excellent speller until I took shorthand. When you take shorthand, the first thing you do is to get rid of all the unnecessary letters and spelling was always a challenge after that [laughs]. I still spell all right but I have to work at it, where before I was a good speller. The typing, of course, has been invaluable, so I am glad I had that.

[10:06]

V: Yes, very important. Did you have any teachers that were especially instrumental in helping guide you toward your eventual path?

B: The two that I remember that stand out most, I think, were high school … the high school science teacher, The Science Teacher, who taught all the science, and the high school math teacher. And they were both Benedictine nuns: Sister John Marie and … no, Sister Jean Marie (the reason I do that is because I know a Sister John Marie, also, and I have interchanged their names more than once!) and Sister Marie Consulata. Sister Marie Consulata was the math teacher and Sister Jean Marie was the science teacher.

V: And so when did you begin to know that you would go on to college?

B: I think I assumed that from the time I knew there was such a thing. It was … school was what I did. I intended to keep going to school as long as I could [laughs].

V: Interesting.

B: It just seemed like … you just did that. You went to the next thing and the next thing and the next thing. It never occurred to me to stop until I was finished.

V: Did any of your siblings go to college?

B: Two of my brothers went briefly to the University of Delaware, but neither stayed very long. My oldest brother was the smart one in the family. He graduated from Salesianum High School in Wilmington, Delaware. That's a boys' school that's known for college prep and very high academic standards. The year he graduated, he won every award there was. He was top of the class in everything and the following year he enlisted to go respond to Pearl Harbor. And he spent the next I don't know how many years in the Army. Army? There was no Air Force at that point so it was the Air Corps, I guess. I think it was part of the Army. But he was an Army air … he was whatever became the Air Force. He was in that. And when he came out he tried college but it … I guess, with what he'd been through, who knows? It didn't take and he didn't have the patience for it. So part of me, I think, was always doing what Joe didn't have a chance to do. Because I was the only one who really had a chance.

V: Yeah.

B: And none of the others did.

V: Right.

B: They had the Depression. They had the War. I missed all that and I had … I had an easy life by comparison.

V: So Joe was the oldest. And then two sisters?

B: Joe was the oldest, then my sister Pat, Mary Pat — that's another long story, which I'll mention at least some of. Then my brother Tom. Then my sister Anne Marie. Then my brother Chuck. And then me. So we alternated boy / girl.

V: And Chuck passed very early, then?

B: Chuck died when he was 17, in 1951, of Hodgkin's disease.

V: Oh my.

B: And four years later my brother Tom was killed in airplane crash. He was a test pilot. And Joe died a few years ago. He had a stroke at the age of seventy something or another, whatever he was by then. He must have been 80. Yeah, he must have been in his 80's.

V: Okay.

B: But the three girls are all still going.

V: And going strong.

B: Going strong. Well, my oldest sister is 85, so she's slowing down. She has COPD (chronic obstructive pulmonary disease). She has an interesting history, too. She dropped out of high

school, joined the Army in World War II, drove an ambulance. Eventually went to work as a keypunch operator. Pretty bright person; picked up the stuff she was punching; learned to program. Eventually retired from Digital as a programmer. She had a GED (general equivalency diploma) and that was the whole extent of her education. And I've seen an annual review for her, written by the person at Digital, that comes very close to saying "walks on water." He thought the world of her. She was absolutely brilliant at reading core dumps and doing machine-level coding. She just took to it perfectly and had no sophisticated education. She could just see it.

V: That's so interesting.

B: Yeah.

V: What a talent!

B: She's quite a character; she's quite a person. Another whole story.
[15:00]
V: [laughs] Lots of good stories along the way.

B: Oh, yeah. And she's quite a storyteller too.

V: How fun. So, as it came to the time that you were finishing up high school and needing to think about where to go to university, how did that process come about?

B: Well, there really wasn't much in the way of a choice. I didn't have to make a lot of choices growing up, which is fine. The options were the University of Delaware: was in state, very, very, very inexpensive, and it's a very fine school with a lot of good programs. So it was a very natural option. One of my teachers — typing teacher, actually — desperately wanted me to go to a Catholic college and requested that I apply to Cabrini. And I applied just because she asked me to, but I never followed up on the application [laughs]. Was admitted to Delaware as a math major.

There was an intervening experience, though. I actually am the product of an NSF outreach program. When I was in high school, there was a program, I don't know what it was called, but it got high school students to work with faculty — research faculty on research projects during the summer. And for the most part they were rising seniors, between junior and senior year. And I'm not sure exactly how I ended up in it, but I had graduated. But they got me in it anyway. And so I was assigned to work in a laboratory of mechanical engineering with a PhD student. And he had a lab. And he had a wind tunnel. And he had a project that was related to testing materials for suitability for nose cones for re-entry into the atmosphere. This was in 1964, so space was a big deal. We were on the way to the moon, remember? No, you wouldn't remember, but I remember. We were on the way to the moon! [laughs]. And it was very exciting to be part of that. And he had this wind tunnel. And his thesis was that a porous material would be good because it would not provide as much resistance and would not overheat as much. And so he was experimenting with various kinds of porous material for re-entry. And so he had samples of these materials and he had a wind tunnel and he

would conduct these experiments. But one part of the experiment involved — and you won't be able to see this [gesturing to illustrate the ideas] — but a tube like so and in this tube there was a soap … some soap. And there was something you put down on the soap that made a soap bubble and got it started. And then you blew air through a sample of this material and measured how fast the soap bubble went up the tube and where it broke. That was my job. I made soap bubbles go up the tube [laughs], measured where it broke, recorded it. So I did all the data recording. And then he would take it from there and do other things; run it on the wind tunnel. And I'd get to watch the wind tunnel, but I was really involved in watching soap bubbles going up this tube. But, in addition, I had to do these calculations with the numbers that I got to — I forget what the calculations were, what we were trying to get — but there was a Monro-Matic calculator and I had these calculations to do and I was doing these things. But one of the calculations involved the square root and there was no square root on the Monro-Matic calculator. And it did all these other wonderful things, I was sure there must be a way to do a square root. So I started asking. Apparently, nobody had asked that before. So, finally somebody dug out an instruction book for this old Monro-Matic calculator. And in fact there was a way to do it. And I didn't know it at the time, but I was doing a Newton-Raphson approximation to the square root function. I had no idea; I just routinely did what I was supposed to do.

But I had a great time that summer. It was a lot of fun. There were a bunch of kids. We had a good time. And it just felt exciting to be part of it. It was funny, the atmosphere. We got to the point where we kind of looked down on the undergraduates as, you know, "Oh, them! [laughs]. We're only connected with the PhD people." It was silly, but it was fun. But that got me very interested in engineering. And during that summer, because I didn't have a terribly strong set of courses for mathematics, I took an integrated algebra / trig course during the summer, because I was a math major and I would be in the math major's calculus course in the Fall. I had always loved mathematics — every math course I ever took — my absolute favorite ever was geometry. But I loved them all — until that course. I hated it. It was the first course I ever didn't like. But um … okay. And I started in … I guess before I even started the calculus course in the Fall I had already changed my major from mathematics to mechanical engineering. Because it just … it seemed like the engineers used the math to do interesting things and I was more interested in that than in the mathematics itself.
[20:49]
And so I started my freshman year officially as a mechanical engineering major. And that was fine. I had a good time, but I was not the best student in the class. I was good enough. I was doing quite well and most of my colleagues would have been happy with my grades. There were two, by the way, women engineers in that class — two of us in the class of 1968. And I felt kind of guilty when I left the other one alone, 'cause it was clear that if you were going to be a woman engineer you had to be head and shoulders better than any man. You had to be or you wouldn't be considered. It was just the way it was in the early 1960s and mid 1960s. And that first semester there was an Introduction to Engineering class. It was one of the most awful classes I've ever seen and I knew the guy who was teaching it. I had known him during the summer and I felt really bad. But he came in every day and droned on and on and on and filled the blackboard with formulas, which we sat there and dutifully copied into our notebooks. And that was the entire class. However, there was a little segment on FORTRAN programming and that just clicked. That was such fun.

Oh, I should back up. Sorry. During that summer, there was a computer that we could program. It was a Bendix G15 and the coding was in machine code. And I got introduced to it, I guess we all did. And I understood it and I could do it. I thought it was pretty dumb, because you had to take these big things and break them down into these miniscule parts and I didn't like it at all. And in fact I actually had an arrangement with my fellow students, high school students, to warn me when the person who was doing that segment appeared. Because he was always looking for me and trying to pull me in to do more and I didn't like it so I hid from him.

So that had been my computing experience. And now here was FORTRAN — FORTRAN II, of course — and this was neat. I mean, it was so much more advanced than the machine programming. And it was a 1620, an IBM 1620. And I thought this was great fun and I could do it and most of the people in the class couldn't. They had troubles with it and I couldn't understand why they did. But, in any event, I ended up teaching the other kids in the class how to do this stuff. And at the end of the semester we had to write a report, which really meant regurgitating all the stuff the teacher had written on the board. But there was a programming assignment. And so I did the programming assignment; that was fun. Turned in the report. Did fine. The following semester, the guy I had worked for in the lab the previous summer came with my report in his hand and saw me and he said, "Did you know what you were doing when you did this?" And I'm thinking of all those equations and I said "Well, uh, uh." And he said "No, no, no I mean the programming." And I said, "Oh those, yes, sure, I know how to do that!" There were at that point almost no people in the College of Engineering who could write a program. I had a job for as long as I wanted it [laughs]. So, because they had … they just had simple data reduction problems that they needed done. And I could write programs, so I started being a part-time helper in the engineering school writing programs on the 1620 in FORTRAN II. And that was fun.

V: And really the only programming that you were taught was in that dreadful engineering class.

[24:45]

B: Yeah, yeah. It was Dan McCracken's little black FORTRAN II book, the paperback one that you see in all the history places. I probably still have it someplace. But I stayed an engineering major for a year and a half. And in the middle of my sophomore year, they announced the computer science program had started. And my friend, who had been my lab guy, was still there. He was a Ph.D. student, he was teaching, he had, I don't know, I guess an assistantship that involved some teaching while he was working on his dissertation. And he told me about it and suggested that I look into it. And I can still remember, he said, "There's only one problem with it. They've called it computer science and that's terrible. They shouldn't have called it that. People will think it's about computers." And he was so right. You know, we've had so many discussions about that since. And I've always remembered that Tony Laganella said that, that very thing. He said, "That's the only problem with it. It's a great program. It's going to be really big, really important. I think it would really suit you." And I changed my major and never looked back.

V: And so at that point, you began to get to take computer courses …

B: Well, such as they were.

V: … a la Curriculum '68.

B: Oh, it was before 1968. I graduated in 1968!

V: Yeah, right, but it was some of what went into the formulation maybe?

B; Well, I think everybody was kind of making it up as they went along.

V: Okay.

B: They didn't really know, so … There was a class (and I've been knocking myself … lately, I've been trying to think of that professor's name. And I can see him, but I can't remember his name. I'll have to look it up.) But I remember there was a course in digital logic and I just thought that was … that was just wonderful. That's where I learned DeMorgan's laws and truth tables and all these kinds of things. And it was such fun. And, you know, we sat out there with problems of, you know, how many light switches there were and how many ups and ons positions and what was the simplified version of the logic that would control it the way you wanted to. Or any other kind of problem. And I had such fun. And I remember … again it was something that I liked, so it clicked with me and I did really well in it. There were other courses I didn't like, so I didn't do as well. But that one I really did. And one day before class, I was at the board showing my classmates how to do a problem. And the teacher walked in. And I thought [cutting sound]. He said "It's alright. It's alright. Go right ahead. Keep going." [laughs]. So I was teaching. Because I understood it and they didn't. But it was fun.

V: So did you end up doing a lot of group study and teaching from that point onward, or had you already gotten into it?

B: Yes! [laughs] I'll tell you another story.

V: Okay!

B: This is the 1960s. The guiding principle in the 1960s on college campuses, or at least all the ones that I knew of, was *in loco parentis*: "We are here in place of parents." How do you make it nice and safe? You lock up the girls. So I had hours. I had hours. I had to be back in my dorm. So even when I was an engineering major, I was the only girl in the class. My other engineering major was in another major, so she wasn't in the same classes as me usually. But, you know, the guys would get together and have study sessions, I had to go back to the room. Because I was locked up, you know. The guys had no hours. Only the girls had hours. If you can lock up the girls, there's nothing to worry about right? That was the prevailing idea. The library closed on women's hours. But, you know, so the guys could have their study sessions, but I couldn't go.

V: So how did you end up doing your studying; primarily on your own?

B: Well, I'd meet with some of the guys during the day. From time to time we would have some study sessions. And yeah, other than that, I'd do it on my own. It's funny. My roommate was a sociology major. Sorry, I'm getting off track …

V: No, no, no. You're doing great. I'm just trying to …

B: My roommate was a sociology major. And I can remember one time she had this big shelf full of books and I had a much smaller shelf full of books. I had my chemistry, my biology — no, I never took biology — chemistry, physics, calculus, you know, all those sorts of things. And she would have books that she'd sit and read. And I can remember saying, "Oh, I wish I could just sit and read once in a while." Because everything was doing problems. You'd figured out how to do something. You'd do some more problems. You know, everything was doing problems. And that was nice, but I would have liked to just have a book to read. And she said "But all I do is read. I wish I could have a problem to work sometimes!" [laughs]

V: The grass is greener on the other side?

B: Exactly. Exactly.

V: That's funny. So were there any of your university professors from your undergraduate years that you particularly were influenced by?

[29:57]

B: Well, this one … like whose name I can't remember.

V: Right, you mentioned him.

B: And as it turned out … I remember many of my faculty members fairly well. But partly because I graduated, went away and worked for a year, came back to the same department and got a master's degree. So I saw many of the same people. And after I got my master's degree, I worked in the department. So once I started there, I was in that program … in that department, with one year out, for … 16, 17 years.

V: **Oh my goodness!**

B: [chuckles] So, they turned over. You know, I saw the turn-over. But I was in touch with those people for a long time. In fact, at least one I'm still in touch with.

V: So the year that you were elsewhere, what were you doing?

B: I was a programmer. I had graduated. I knew how to program in FORTRAN. Knew some things about machine language because I had done that. The degree really was kind of a hodgepodge. I actually have a Bachelor of Arts in Computer Science. I signed up originally for the Bachelor of Science. But for Bachelor of Science, you had to have a minor and the

minor … the only one that made sense, since I was already a year and a half into engineering, was engineering. But you had to have it in a particular engineering and there were so many prerequisites, it was going to consume every one of my electives to meet this requirement. I decided I didn't want to do that. I wanted more flexibility than that. So I switched to the Arts degree, which meant that I didn't have to have a minor and I could … I had more flexibility about other things. So I could take the anthropology that I wanted and the Shakespeare and the various and sundry other things. So I have this Bachelor of Arts degree. We took a lot of math. We took all the sciences. We took whatever computing courses they could come up with at the time. But they were all first time offered. I mean, this was a brand new program, so …

In any event, when I started work, I wasn't actually sure what it was I could do. I mean, I could program, but what was that? And of course, that's what I ended up doing, was programming. But the job that I got was in a business data processing department. And the language of choice there was COBOL. So the first thing I did was learn COBOL. So I became a COBOL expert fairly quickly. COBOL is quite an interesting language. I don't knock COBOL. I learned a lot from COBOL because COBOL — I don't know if you know it, but one part of the language is you lay out memory. And in that part you actually saw byte-by-byte where everything was. All your variables, you laid them out. And you really got a good sense of what memory was about. Of course, that's also where I got to do lots of core dumps and read lots of core dumps, which I enjoyed as much as my sister did, though she hadn't seen them yet. So I did that and there was also a fondness for assembly language, IBM Basic Assembly Language, BAL, in that department, so I learned that too. So I spent a little over a year there.

And then … actually, I was away from the department for two years. Because I worked for a little over a year. Then I got married between my junior and senior years. And I had my first son after I'd been working for about a year. And … hey, I grew up with the ideal is you stay home and take care of your children. This is what my mother wanted to do. She wasn't able to, but it was what she wanted to do. The sister that I saw the most and who was my model, that's what she did. This is what you do. This is good. So I tried it. I went crazy. [chuckles] Didn't work at all. I had an absolute angel of a child who ate and slept and played. Was never any fuss, no problems. He was just so easy there was nothing to do. I was bored out of my mind! So, fortunately, I had a very understanding husband who said, "You need to do something!" And so we decided I would get a master's degree. So I worked for a year, stayed home with the baby for a year, then enrolled in the master's program. And got a teaching assistantship. And the first thing they did is put me in a classroom. I've never left. Never left. [34:57]

V: So you were responsible for developing your own course notes and lectures and assignments? Or …?

B: Somewhat. That first year when I was a teaching assistant, I worked with a brand new faculty member. Her name was Sandra Carberry. She's two years older than me, something like that, a year or two older than me. And she was in charge of the massive introductory course. These were the days when everybody wanted to learn to program and so they were taught in, you know, massive sections. And then you broke into recitation sections. So I had recitation

sections. And so I was responsible for my recitation sections. But it was reviewing and building on what had been in the lecture sections.

V: Okay. And so the studies that you did there, you were taking classes. Was the degree towards computer science?

B: It was computer science; Master of Science in Computer Science. And that was nice, because by that time it was much more settled what computer science was. So that really did fill in a lot of gaps for me. And … it was good. It was a good program. And, again, I knew some of the people, because they had been there when I was there before. And there were some new people. And I was teaching. I actually had a funny experience there once. The department was the Department of Statistics and Computer Science, which seems like a strange combination. And one of the faculty members said, "That just goes to show that any two disciplines can share a common secretary." [laughs]

V: Oh, that's cute.

B: So, it was the department of Statistics and Computer Science. So one of the statisticians, his name is Art Hoerl, said, "I heard you have done some machine or assembly language programming." I said, "Yeah, I've done that." And he said, "Could you write a program for me?" And I said, "I guess. I mean this is a different computer. I haven't done assembly language programming on this one, but I assume I can learn it." And he said, "Fine." So he described what he wanted done and it had to be in this machine language. And I said "Okay, fine." So meanwhile, I'm doing my other things, my teaching assignment, my studies, and I'm, in between, trying to help him. And it was going a bit slowly. And I came across him one day. And he said "How's it going?" And I said, "Well, it's coming slowly, but, you know, finding how to get into this machine … because it's locked up. You don't have it on your desk. And getting … If I could do it in FORTRAN, it would be trivial." He said, "What?" I said, "If I could do it in FORTRAN, it would be trivial. I could do it in an hour, but since you want it …" He said "I was told it couldn't be done in FORTRAN." [laughs] He was doing a random number generator that he had invented and he wanted to take bits out of the middle of a number. Which is trivial to do in FORTRAN if you know FORTRAN well enough and I did. But he had been told you had to be using machine language to be able to get to the individual bits. [laughs] After that, it was finished quickly.

V: Understanding user needs.

B: Exactly. Communicate. Communicate what the real question is.

V: So how long was your program of study for your master's?

B: Year and a half, sort of. Two years, I guess, more like it. I chose to do a thesis. I had a choice between a thesis or a comprehensive examination. And by that time I was figuring I'd probably get a Ph.D. at some point. So I figured the thesis would be a nice practice run at a dissertation. So I did a thesis. And in the meantime was pregnant again. So my son David was born on the day my master's thesis was due. And I wrote a thesis that involved two

distinct sections because my advisor wanted me to do one thing and I wanted to do something else, so I ended up doing both. And part of it involved a lot of test running and evaluating, etcetera. You know, as usual, it was a slow process. Everything was on paper tape. I had to wait to get to the one machine that had a paper tape reader, read it, fix it when the tape broke. You know, it was a slow process. And the night of May 3, 1972, just about midnight, I finally got it all done. All the tests were done. Everything was finished. Thesis was due the next day. Typed up, ready. And I knew I couldn't do it. And I'm not one to admit I can't do something. But I just knew I couldn't do it. So, I wrote a note and put it on my advisor's door and said, "Sorry I give up. I'll finish it and graduate next time." And at 9:04 that morning, David was born. He was 10 days early. He's never been early before in his life. He was never early again in his life. He, by the way, is the computer scientist in the family.

[40:27]

V: **Ah hah!**

B: But it was fine.

V: And so you finished?

B: So I finished. I was all finished but didn't actually have the degree quite yet. I had to go through the … Oh, of course you type the thesis and they won't let you type it on erasable paper. And, of course, there is no word processor, so that was part I couldn't do. I couldn't finish the typing. So I finished it during the summer and got the degree the next time.

But, they asked me since I was finished now with my tuition … my assistantship, they asked me if I would teach part-time during the summer and teach a course. And I didn't really want to. David was born May 4th. I didn't really want to start teaching in June. But I really liked teaching and it was a kind of a cool part-time job to have. I thought, "Well, if I pull it off and do it, then I'll be there. And when they need somebody for the Fall, they'll hire me." So I did. I taught the course in the summer. And I guess my mother (God bless her) came and helped take care of the kids. She was always rescuing me. So the summer went by and nothing was said about the Fall. And I was getting a little bit anxious. And the department chair, his name was David Lamb, always had a gathering for everybody in the department at his place Labor Day weekend. We didn't start classes until after Labor Day in those days. And so I was there with the kids. And there was a picnic and everybody's having fun. And I happened to see David. And I said, "Um, who is teaching CS100 this semester?" And he said "Would you like to?" That was Saturday of Memorial … of Labor Day weekend. Classes started Tuesday night. [laughs] Okay! So I did.

And from then on I taught regularly for them. And I would teach mostly the introductory courses. There was a non-majors programming course. And then the majors programming courses. But eventually I taught whatever. You know, if somebody was on sabbatical, I taught their course. I learned a lot [laughs], as you do when you teach a course. But it was nice. I actually taught a course in differential equations once. That was fun because the department had brought it in to our department. They weren't happy with the math

department and (theme you've heard before?) and so we brought it in to the department and taught it there. And I taught it. Think I still have my notes.

V: So, as you're teaching, you're pondering perhaps when to start the PhD?

B: Not immediately because the kids were little. I had three children in four years. In fact, when the third one was born was the following Fall. And I thought this was actually pretty progressive of that department because here I was expecting and in the middle of the Fall semester. And I figured, "Well, they won't want me!" And in fact they worked around that. And what we did is we actually doubled up classes. We had extra classes before the baby was born so that we could take some time off after the baby was born. So, on October 3, 1973, I taught my class in the morning and that night Eric was born. And the next morning, it was a Thursday, I called the department office and said "Would you put a note on my door?" She said "Sure, what's it say?" And I said, "It's a boy. See you on the 20th." Twenty days I took off.

V: Wow!!

B: [laughs]

V: **But we do what we have to do.**

B: You do what you do. I didn't think about it. I just did it.

V: Yes. Yep. So you continued to teach and started then your Ph.D. …?

B: Much later.

V: Much later.

[44:46]

B: Yeah. I taught part-time. And then … at some point I ended up teaching part-time and working in the Computing Center part-time. In the Computing Center, they had a whole area called Academic Services that provided consulting services for people in any department who had various kinds of computing work to be done. So you helped them set up the card decks to run their programs and did various kinds of advice. So I ended up teaching part-time and working down there part-time. So I was really working full-time. But I wouldn't work in the summer. And then at some point I also was teaching in the Honors program. So, eventually I got to the point where I was more or less time and a half.

[several minutes of outside interruption edited out]

V: After a pause, do you have a sense of where you would like to start over again?

B: [laughs] Where were we?

V: We were talking about working towards your … getting ready to start your Ph.D.

B: No. We hadn't gotten there yet.

V: We hadn't quite gotten there.

B: Because I spent …

V: But we were working in that direction so …

B: I spent ten years as a part-time temporary instructor at the University of Delaware.

V: Okay.

B: And during that time I also worked in Academic Services, in the Computing Center, …

V: That's what you were talking about, yes.

B: … and then also got a position with the Honors program to teach the first two courses in Computer Science. Um, more than that, several courses in Computer Science in the Honors program. The Honors program at Delaware is very, very strong and was a very excellent program.

I had one semester that was particularly interesting. I had the same group of students for two courses. And I think one of them was a programming course and one of them was discrete structures or something. But we had … they were scheduled in the middle of the day. And in those days, if you wanted to have lunch, you had to put it in your schedule when you signed up for classes. Because the cafeterias were only open certain times. And the way these courses were scheduled all these students, being in both these classes, had no lunch. So what we did was we moved the class to a room that we found that was near where their … because they were all in the same dorm, they were all the same age, etcetera. We moved the class to a dorm … to a room that was near where their lunch hall was, their dining hall was. And we rescheduled so it was a Tuesday / Thursday class. So the 15-minute breaks were adjacent to each other. So they got half an hour off. So they would run and have their lunch in the half-hour. And I didn't get any lunch, so they brought me back ice cream bars. [laughs] I actually heard from one of those students not very long ago. I forget what it was he mentioned. He said " I hadn't thought about that since you taught to us in nineteen-whatever-it-was." It's funny.

V: That is funny.

B: But we had a good time. And I learned a lot in the Computing Center, helping people largely with statistical problems, running SPSS programs, but other things as well. And kept that up for a goodly number of years.

And then an opportunity arose. There was a small business college. It was actually a merged … merger of two colleges, Goldey and Beacom, which had become Goldey-Beacom

College. They had been competitors. They were secretarial schools. Both … they had been two-year schools. They had merged and then eventually had become a four-year college. I think it was Goldey that my mother had attended. They were looking to start a computing program. They had never had any computing instruction at all. And my department chair recommended me. So in the end I was hired. And it was the first official kind of full-time job I had, because my employment with the University of Delaware had always been kind of ad hoc. But by now the kids were in school and things were a little more settled and it was easier to do that sort of thing. So I took the position.

But by that time I had decided that I was going to get a PhD. So, I was starting to take classes, because I needed a certain number … a certain amount of course work. And I was taking courses for the Ph.D. I felt really guilty about leaving the poor guy in the Honors program because it came up kind of late. So I agreed to teach a course for him and an outrageous teaching load at Goldey-Beacom. It was supposed to be five courses there. I talked them out of that and told them it was ridiculous, but I think I did teach four besides the one I was taking and the one I taught for the Honors programs. And, oh by the way, the position included creating and directing the Academic Computing Center, because they had never had one. And I can remember waking up some mornings and saying, "I can't. I can't do it. I just can't do it. I can't get through the day." And my husband saying, "It'll end. You'll get through it. It'll pass." On a given day I might have scheduled four or five classes to teach plus one I was taking. It was crazy. That was a rough year. But actually…

[50:20]

V: And how old were your kids at that time?

B: They were in elementary school. Let's see. This would be about 1980, so Kevin turned 11 in the Fall of 1980. And so if he was 11, the youngest was 7. But that … somewhere during that year, I got some information about this conference for computer science educators that looked like it would be really very useful to me. So I went and that was my first SIGCSE. I had actually been to one SIGCSE, an odd one that was a summer meeting held at Williamsburg. And I did that once while I was at the University of Delaware, but didn't really connect to it. It was just an interesting thing to do. But this was a different matter. Um, that was my first SIGCSE. It was in 1981. And I keep forgetting whether that was Indianapolis or St. Louis, but I …

V: It wasn't in St. Louis.

B: Okay, it was Indianapolis then. And I remember. I took the train from Philadelphia, which was kind of novel. And it was an overnight train trip and it felt so good to have hours of quiet. It was just incredible. It was amazing.

And I came to this because I was just desperate. I was just so desperate. I was the only computer scientist in the entire college. I had responsibility for the Computing Center and the program. I had hired a couple of people that could help, but the responsibility was mine. And because I was the only one with a computer science degree, anything that was really a computing course was kind of my responsibility. I was also pretty much responsible for mathematics too because it was a business school. It didn't have a mathematics department.

So I was … I was scared. I was really scared. And I remember there was a Birds-of-a-Feather session on new programs and I thought, "That sounds good!" So I went and it was interesting, I actually met somebody from another college near us who I would not have met at all. But, there were a number of us. I don't know, eight or ten people or something, maybe more. But nobody was in charge. There was no presentation or anything. It was just a meeting of people with a common interest. But nobody had anything to give to anybody else. Everybody was there looking for help.

And somebody came in, I don't know who, and said, "There's a session on four-year programs down the hall and it's real lively!" So we all left. [laughs] We went to that one. And when we walked in — it was a big room and there were a lot of people there and … By the way, at this whole meeting, I had hardly opened my mouth at all. It just felt so good not to talk. I didn't know anybody. I didn't know a soul. And I just sat there and listened. I went to all the sessions. There was one session where something triggered something and I had spoken up a little bit. But other than that, I was just not talking at all. So, in this big room I sat there quietly listening again. And Larry Jehn was holding court. And I don't know if you know or remember Larry Jehn, but lots of people would. And Larry was a great guy. And he was trying to help and comparing notes. And this is 1981, still pretty early days. And they were going on about how to … you know, finding faculty and getting the resources needed to run four-year programs. And they were discussing whether you needed continuing education credits for summer courses and things. And because I had said a little something in one session and had gotten positive feedback, I guess I was emboldened. So there's this huge room of people I had never seen and Larry Jehn. And I finally said … put a hand up. I said "I don't need credit. I'm the only computer scientist in my whole university … college, I need help. I need to know how to teach, what to teach. I need to know how to put a program together. I've got credits. I don't need credits. I just need to know. I need to help to do this thing." And several people said, "Yes, yes, yes." And at that moment, Dick Austing walked in and Larry Jehn said "You should know him." And that's how I met Dick.

And he came over after. After that … the session went on and that kind of changed the direction. And there was more talk etcetera, etcetera. And he came and he said, "The place you should be is in the reception, which is just about to start." And he took me to my first SIGCSE reception, which, of course, in those days was held in the suite of the conference chair. And we walked in and Charlie … Charlie Shub was there. And Dick took me over and said, "She needs help." And left. I don't remember ever seeing him again. And Charlie said, "What do you need?" And I said "Well I've got to teach all these courses and I don't know what textbooks or how to write exams." And he said, "What do you need?" And I said, "Well, operating systems." And he started dictating operating systems books. And people started gathering around, desperately writing it down. We just so desperately needed help because, you know, we had … we just had large number of students. We had all these things to do and just no experience to draw on. And, you know, I had taught in the program at the University of Delaware, but it was a well-organized program with lots of experienced people. And I'd be assigned a course to teach. And I would be given a textbook. And it … I had some choice in some books, but … you know, I had plenty of resources and people I could talk to and get help. Here I was all alone. And there turned out to be lots of people like that. And that was my first SIGCSE.

And somewhere along the line, Dick showed up again. Because he ended up coming as a consultant to Goldey-Beacom. And he was doing a lot of that in those days. He would come in and he would talk to everybody and he'd go around and see what the situation was. And then he'd write a report that told the college administration what was what and what they should reasonably expect and what they were doing that was unreasonable. And he did that two years in a row for us. He came and gave a consulting report. Really helped. Really helped a lot.

And then, not very long after that, he … Well, I guess I saw him at another SIGCSE, I guess. And he asked me if I'd like to be program co-chair for the SIGCSE conference in Philadelphia in 1984. I said, "I've never done that." And he said, "Well, neither had I — the first time." I said. "Well, okay." So, he paired me with Joyce Currie Little. And she and I were the program co-chairs of SIGCSE in Philadelphia in 1984. I literally had no clue of what it took to run a program. And the conference was a lot smaller then, but still, it was a lot to do. And, of course, in those days you didn't have all the stuff you have now. I mean, when people said "paper," it was paper. And you sent it out to reviewers. And it was paper you sent out to reviewers. And you got paper back. And you communicated with the authors whose papers had been accepted. And they had to get the final version of their paper on this special form, special paper that could then be printed to make the proceedings. And you had to put the program together. And I remember going down to Joyce's house in Towson and sitting there for a day — the day everything was due — because, of course, just as now, nothing comes early. Everything came the day it was due. So I sat there at her house, answering the door over and over again as the Federal Express, or whatever the current one at the time (I think it was Federal Express), kept delivering these packets. And then we'd take them out and we had to lay them out and we had to produce page numbers. So we made a little program that printed out numbers, and cut them out, and pasted them on these pages to make the program, to make the master for the proceedings. And we made the program and, you know, when you say "cut and paste," we're talking literally cut and paste. It was funny. But we did it and it worked out fine.

[59:44]

And at that conference, which went fine, Harriet Taylor, riding in on the bus from the airport, met Della Bonnette. And Della had already been chosen to be the chair of the next year's conference and Harriet was … Della asked Harriet to be the program chair for the next year's conference. She was program chair and, I think, local arrangements also. I think the two of them ran the entire conference. That was the entire committee. Joyce and Harriet … no, Joyce and Dick and I were three; the three of us did the conference in 1984. I guess I also communicated with the Computer Science Conference that we overlapped with about some local arrangements things. But that was it. That's the size of the committees in those days. But in any event, I met Harriet because since I had been program chair… co-chair that year and she was program chair the next year, there were things to hand off. We literally had a box of stuff that we handed off. I don't know whatever happened to it. It eventually disappeared. But it was, you know, all the records and formats and schedules of "this is what you do when" and binders and things. So we handed that off to Harriet and talked to her about what was required. And that's how I met Harriet.

V: Cool story.

B: Yeah.

V: So … if we put aside the …

B: Still no Ph.D., by the way

V: That's right, so if we put aside the SIGCSE stuff for a while, let's go through the rest of your degree process.

B: Okay. So I had decided to get the Ph.D. Was taking courses at the same time that I was running things at Goldey-Beacom. Got through classes. Got through the qualifying exams …

V: You were studying at University of Delaware.

B: Yes, and I had some qualms about that, because I already had two degrees from there. But I looked … I couldn't move. You know, I didn't have the freedom just to go someplace else. The Philadelphia area is pretty rich in educational opportunities, so I looked around at some other possibilities. But nothing really worked out as well. And by that time the faculty at Delaware had turned over pretty much completely since my master's degree. And it was good faculty and good programs, so I thought, "Let's just do it there."

So I actually dabbled with the idea of doing Computer Engineering for a little while, just to do something different. But there were these huge long lines of undergraduate prerequisite engineering courses that I had to take that just … there really was no point in that, so I stayed with the computer science.

And went through the exams, passed the qualifying exam. Not the first time, but did get it. It was a two-part exam, I got through one part fine, the other part, the … response I got was that the committee had decided it would be good for me to work some more on that and do it again. So I did and I passed it the next time. With flying colors, actually.

So there I was and I had now been at Goldey-Beacom for five years. And things were pretty well established there, but weren't fun any more. Things were happening that weren't fun. And I had decided when I went there that I would stay five years, no matter what. And I had stayed my five years. I had got one whole class through and another most of the way through. (Still in touch with some of those students.) And so I quit.

Quit my job and went to … back to Delaware. And found Paul Amer, who was one of the faculty that I had known for a while. He had a grant. He had an assistantship available. He gave me the assistantship and I worked with him. And I told him I had two years, was going to do a dissertation and be done. And he said, "Yeah, sure." And two years later, I was finished [laughs].

He, um … we had an interesting time. Paul is younger than me and I was his first Ph.D. student so we had an interesting time. And we had known each other for years. But after I had talked to him about the assistantship, we had talked about my plans, agreed that I would work with him, he would be my committee chair, all this stuff. He then went to France for a year. I was not thrilled. And we … we did the first year of work kind of by distance. And the problem with that is that the only Internet link to France then was a dial-up connection that was connected once overnight. So it would accumulate whatever you had and dial it up and send it. Then he would get it the next day and respond, hopefully, the same day. Or maybe not. And eventually it would be dialed up and I'd get it back. And that's the way we got through the first year of my full-time doctoral work.

[64:58]

I had a committee. As it turned out, I didn't know this, but the Ph.D. at Delaware was not at that time a Ph.D. in Computer Science. It was … they had been giving a Ph.D., what I thought was a Ph.D. in computer science, for almost twenty years. They had one of the oldest programs. And the first guy who got one was the department chair while I was there, Hatem Khalil. But it was not actually a Ph.D. in computer science, it was a Ph.D. in applied science with a major in computer science. The significant thing about that was that you had a major, but you had to have two minors. So, okay, now what do I do for my minors? So I did statistics and I guess the computer engineering because it was close enough and I had done a few engineering courses before I decided not to do that. And so the committee that I had included a computer engineer, who was Dave Farber of Internet fame, and Art Hoerl, a statistician, also a very, very well known, very highly regarded statistician. And the interesting thing about … And Adarsh Sethi and Paul Amer were on my committee. And they were all very fine people. But the two most prominent and best known, most famous, were Dave Farber and Art Hoerl, neither of whom had a Ph. D. Which I thought was kind of interesting and cool. So I had to pass qualifying exams from both of them as well as in computer science. So that was fun [laughs]. But I did.

And I worked on my dissertation. And I got it done. And the last … so I was there for two full years. And it was in the Spring of 1987, getting finished. And that was, you know, working on the final stages of the dissertation. And somebody else told me, he didn't, that Paul was going to China for the summer. And he did. I was not pleased, but we did it anyway. He went off and did his thing and I finished the dissertation. And we agreed on a schedule. And meanwhile I had started interviewing for jobs. He didn't … he just never believed I would do it in two years. I said, "I have two years. I quit my job. I can't live on an assistantship forever. I have to have a job." You know? And so I said, "You know, I will be working in the Fall."

And so I had started interviewing. And I had a couple of opportunities and one of them was Villanova. And Villanova offered to give me credit for my work at Goldey-Beacom, so they would hire me as an associate professor, I had that rank in my other job, based on lots of years at this point of teaching experience. So they offered me a position … I think I can still remember some of the words of the letter. It said *if* I had successfully defended my dissertation, the offer was for a particular salary and the rank of associate professor. If I had *not* successfully defended the dissertation, then the rank would be assistant professor and

there was a different salary. I had a *lot* of motivation for succeeding in the defense. And I did. I defended late August and less than a week later was on campus at Villanova.

The defense was interesting because … everybody … you know, my committee was all there. Dave Farber was quite … *is!* (I haven't seen him for a while, but he's hale and hearty as far as I know) … quite a character. And there's no question that he had never read my dissertation. I would have been flabbergasted if he had. But he came, dutifully, and listened to my presentation. And I can still remember him walking around the room. And he was just sort of looking up in the air. He said, "Hmm, now that's interesting. Now, what do you suppose would happen if you had this, say, in outer space?" No bearing whatsoever to what … Now, fortunately, I had at this point some fifteen or more years of teaching experience. I could stand in front of a group of people and talk. And I knew he had nothing against me, he wasn't out to get me. He was just exploring. And so I entered into the conversation with him. And we talked about what the implications would be and it …. The dissertation included a networking protocol for measuring characteristics and behavior within a network. And so he was looking for an extreme case of where there'd be a lot of failures and difficulties in communication. And so we just talked about, "Ah that would be interesting!! Well maybe you could do this. And, you know, I think this would work, but I don't think that would." And he was perfectly happy [laughs]. So, I passed.

[70:18]

And when I went out — they kick you out of the room, of course, and they sit and talk — and when I went out, the person that I was TA for, when I very first started with the master's degree, was waiting for me. She was on the faculty at Delaware still. And she was waiting for me outside and she had meant to come to the defense, but she got there late and she didn't want to interrupt me. So she waited out in the hall. And she had a bottle of champagne [laughs]. She was quite confident. And it was okay. And then I got back to my lab and checked on the computer and there was an e-mail message from Dick Austing that said, "Congratulations, Dr. Cassel!" And, of course, he didn't know anything, he was just making the assumption. So it's a good thing it was all right.

V: Absolutely! All of that on your shoulders.

B: Yeah. And, like I said, a week later I was teaching at Villanova.

V: So you had to pack up the family and move …

B: Oh, no! Oh, no, no, no!

V: No, you moved … you went without …

B: No, I didn't go at all!

V: So you didn't need to … I see.

B: No, at that point we were living in Newark. I guess at that point … My oldest son was at the University of Delaware. In fact, it was kind of funny, because he and I were p … he and I

were students at the same time at Delaware. He was a freshman and I was a Ph.D. student. And he got the student directory. First thing you do is, of course, you look up your name. And Cassel's an unusual name. So he said "Oh, wow, there's … oh, that's my mother."

So he was at Delaware, which means the other two were in high school. Because the other two were a year apart in school and Kevin was four years ahead of his next brother in school, because of the time of year they were born. And Kevin skipped a year and the others didn't. So he was in college, the other two were in high school. So we wanted them to continue where they were in high school. My husband had changed jobs a few years before and was working 40-some miles away from home. Maybe 50, 53 miles, I think it was. So he had a long commute. And we were just kind of waiting to see what would happen with me and keeping the boys in the high school. It was the same high school my brothers went to, a boy's high school that produces such good results.

So I looked … I had interviews and opportunities and possibilities in several directions, but decided it would be best to go in the same general direction that my husband was going so that we had a chance of moving out that way eventually. So that was one of the things in Villanova's favor, though there were some other opportunities. So we stayed in Newark so the boys could finish high school and I started. So I was commuting 40 miles and Bill was, I think, 53, something like that. It was a lot of driving. And then, we eventually moved. We actually moved while my youngest son was a senior in high school. A house that suited us perfectly came up … that's another whole story. So we moved and Eric did the commute for his last year. And David, the middle one, had gone to Villanova. And he lived on campus his freshman year. Didn't really like that. He's a serious student and found it too noisy and distracting. And by the time … so after we moved, we were half a mile from the campus. So he just moved back into the house and that was fine. And his friends could come down there and study there. He was a computer science major.

And Kevin had finished Delaware by that time. Maybe a … no. actually he had another year. He did a fifth year. He got an English and history degree. And then he moved back, too, after a bit. So we had all three of them in the house, which pleased me very much. I didn't want to be in a house that none of … that any one of them had not lived in. So it was nice to have them all three in the house.

V: **That worked out really well.**

B: Yeah, it really did. So … and that's where we've been. So, I've been at Villanova, I guess this is twenty second year I think. And we've been in the house nineteen years. I think that's right.

V: Yeah. So the department that you came to was fairly well established?

B: Yep.

[74:59]

V: So, you weren't having to deal with what you had done before …

B: No. And I was just a faculty member. I wasn't in charge of anything, which was a nice change. It was in the department of mathematical sciences, they had a computer science major. The computer science major was actually very new. It had been started in 1985 and this was 1987, so it was a new program, relatively new program. But they had a master's degree program that had been around for a good bit longer. The master's program was co-founded by somebody from mathematical sciences and somebody from electrical engineering. And they had founded the masters program. And it was housed in mathematical sciences. But it was sort of a joint program initially.

V: So you had done a technical computer science Ph.D. dissertation related to networking. Did you continue that type of research after you began at Villanova? After you completed your degree?

B: A bit, for a while. I was in … active in the SIGCOMM community for a bit. Had a few papers there. Remember getting an interesting phone call from Craig Partridge, who is part of the SIGCOMM community. And he had an idea for a paper and would I like to be part of it? And I said sure. And so we wrote that and that was nice. And I was turning out a few things from my dissertation, as you do at the beginning.

But also about that time, I'd been active in SIGCSE and had gotten introduced to the Education Board. So I was kind of doing some minor ACM things, nothing terribly big. And the whole idea of accreditation had come up and there were multiple points of view about it. Some thought it would to be too … too much … forcing a young and flexible program … kind of program … into too solid a definition too soon. So there were people who objected to it on that basis. And others who thought it would be a way of really helping, especially programs that were struggling to have some direction and get started. And I didn't really know which way I felt. I could see both sides of the argument.

When I went to Villanova, they had applied that previous year for accreditation and had been turned down. And they'd been turned down for the simple reason that it was too new. They'd only been in existence for the undergraduate program for a year or two. It was simply too soon. But I can remember that Gerry Engel, I think, was head of CSAB, I guess, at the time, because he … When I was hired they sent my resume in, because … to supplement their response. And Gerry told me he said "Oh! They hired Boots, OK!" [laughs], that was a good thing. But it was still too soon to have the program.

But the program, the people at the program, were interested in accreditation. And I had these kind of mixed feelings about it. So I decided the best thing to do was to find out what it was like and how it worked and view it up close to see if I liked the idea. So somebody offered me a recommendation to be a program evaluator and I said "Yeah, okay. I'll do that." So I did. And I think I served twice as a program evaluator and then became a team chair and have been doing that ever since. And I truly believe that every program that I was part of the visit to was better off for having gone through the experience. Not because I or my group or anything was involved, but because the process really worked, the most important part of it being the self study. And this, you know, deep introspection that helped people there identify their strengths and weaknesses. By the time they had done that the visit was almost an

afterthought. You had to have it coming or they wouldn't have done the program investigation in the first place. But they already knew the answers by the time we got there. And in the earliest days, it was still pretty new. And there'd be some surprises, but not too much. And over the years, I occasionally had somebody that would argue and, you know, try to convince me that something they were doing was right when it was clearly not. But those were the exceptions. Most of the time they knew by the time when we got there what we were going to say. And they were very happy to have the feedback, you know, "the outside expert" that comes in and tells you what you already know. Because now they had a document that they could take to their university or their college and say, "Look, this is what it takes to do this right. If we're going to do it right, we have to do this." You know, and teaching loads got reduced and people got travel support to go to meetings so they could keep up-to-date. And just lots and lots of good things happened. They got equipment, you know, because you saw these documented expectations. And the schools that had decided they wanted accreditation would do it. And everyone I ever saw did. So I have to say it was a good thing.

[81:17]

And we at Villanova applied as soon as we had had enough time to graduate somebody and were accredited quickly and have been accredited ever since. And, you know, so I've seen it on that side too, of developing the self study and reviewing what you're doing. It's really a very useful and a very valuable experience. It's a good thing.

V: Interesting. Let's talk specifically about the teaching aspects of your career. We may want to focus on Villanova since that's where you've been. So first of all, what was your course load like there?

B: At Villanova?

V: Uh huh.

B: I guess when I first went there, the nominal teaching load is four courses a semester. The accreditation visit soon put a stop to that. We had an automatic exemption and were allowed three courses a semester. That was the only department in the whole university but it was accreditation criteria, three courses or … at that time it actually said three courses was the maximum, so we got it. And now that's standard for anybody with any kind of scholarship at all. And it's possible to get down below that if you're very active. But at that time that was an exception, it was made specifically to meet the accreditation criteria. CSAB was not part of ABET. It was a totally separate thing. CSAB had their own rules. And that's what we did. So, I guess … I can't remember ever teaching four courses. If I did it was only for the first year. But I did teach three for a long time.

Villanova has an undergraduate program and a master's program. I can remember when I went for the first visit and interview, sitting with Don Goelman, who was director of the graduate program at the time. And his first question of any candidate is, "Here's my list of courses, which ones could you teach?" Well, given my experience, I said, "Yes, yes, yes, yes, yes. Mmm, I'd have to work at that one, yes …," because I had done a lot. A lot of different things. And so he was happy. He was happy.

By the way, I'd first heard of Villanova and got connected at Villanova because when I was … I went to the um … SIGCSE meeting in Orlando .. and I should know what year that was …

V: About 1979 maybe?

B: No, much later than that. I think that was in the spring of … yes, it must have been … in the spring of … well winter/spring of 1987.

V: Okay.

B: And I had a paper there and … it just doesn't seem the right timing … but in any event I had a paper there and Don Goelman heard me give that paper. And he was happy with what he heard and he introduced himself afterwards. And it must have been then, because he found out that I was finishing my Ph.D. and I was about to start looking for a job and he said, "Be sure to come see us." And that's how I got any connection, so SIGCSE got me my current job, too. Yeah. So anyway, I taught graduate and undergraduate courses. We don't have a Ph.D. program, never did. So it was undergraduate and master's level courses.
[85:08]

V: And the master's level courses included thesis?

B: We have a thesis, it's optional. I've never directed a thesis at Villanova. We have a required independent study, which is a smaller kind of thing. And the way that works is a student finds a subject they're interested in, finds a faculty member with a compatible interest. Faculty member agrees to guide the independent study. And that works. And since it's required of all our students, in those days we had a lot of master's students. Close to 200, maybe over 200 master's students in those days. There were a lot of students and so, you know, distributing them among the faculty, that … you know, some number of them on a regular basis. And we had a very nice, and still have, a nice method of compensation. So after you directed ten independent studies, you got credit for one course. So you could take it as a course off or you could get paid for an extra course, whichever you chose.

V: That was a good deal.

B: Yeah, so, that was nice. And, you know, you work with interesting students and they vary all over the place. Some of them need a lot of hand holding, some of them do it all on their own and you just check it at the end. So it's a big variety of how that works.

V: So I'm curious to hear about your teaching philosophy and sort of what drives you in the classroom.

B: Well, when I was growing up, my mother would talk about what possible things I might do. And one of the things she thought would be nice would be teacher. And I said, "No way. NO WAY. Never going to be a teacher, don't want to do that." She was a little disappointed, but okay. So, when I got the teaching assistantship and they put me in a classroom, I was quite

surprised that I really, really liked it. And as I said, from the time I had a teaching assistantship … pretty much have never stopped teaching since. There was the two years at NSF, but that's another story.

So in the early days, like most of us, I taught the way I had been taught. You prepared your notes, you wrote a lot of stuff on the board. When I was a teaching assistant, I taught classes of 25 or so, the break-out classes from the big lecture. Once I got hired as a part time teacher I was teaching the lectures. So I had as many as 375 students in the lecture. And it became a challenge to me to make the class an active thing, not just stand up and write things on boards. So I remember working real hard to call on people and looking out over the sea of faces — not all of them were *that* big, but they were big lecture halls and lots of students — looking out and, you know, looking for the body language that said somebody got it. And calling on them to get an answer, because I knew they knew it and they wouldn't be embarrassed. And their response would be encouraging to somebody else to respond. And tried not to call on somebody who looked like they would have a problem, but recognizing when somebody … you know, recognizing the face that showed this wasn't clear, this was a problem. And then backing off and redoing and repeating and, you know, doing another example, etcetera.

A lot of it was programming. I did a lot of programming on the fly. I'd say here's what we're going to do and we, jointly, would write the program on … you know, I'd write it on the board, students would tell me the next step. I tried really hard to make as interactive an experience as I could. Which works, more or less, depending on the situation. I remember one semester there, we did an experimental course, it was while I was part-time or at Delaware. And it was a … because we were the Department of Statistics and Computer Science, somebody decided we should have a course that united these two. So we had a course that was half programming and half statistics. And a professor, a statistics faculty member, Henry Tingey — he was a big guy, real big guy — he and I were to teach this course. And Henry used to deny it, but it was pretty clear that he didn't think I could handle this huge class. Because we did, we had over 300 students in that class. And so we took turns and each of us acted as TA for the other. So when he was teaching statistics, I was his assistant. When I was teaching programming he was my assistant. It was interesting, because he was a professor and he would come to my office to check to make sure he understood what he was going to be doing in the break-out session that day. It was kind of funny. But I would be teaching this — and I was young — and he would come in to that big lecture hall and sit right dead center in the room. And he was just physically present there, because he thought I needed it. I knew I didn't, but he thought I did. But we managed.
[90:50]
So, you know, teaching philosophy, I … I always loved school and I love to learn. I want to learn anything and everything. And I make the assumption that my students want to learn. I'm a pragmatist, I understand this isn't true, but I pretend that it is. And because somewhere, sometimes, you're going to find one for whom it is. And that's the one I want to reach, that's the one I want to serve. And if I can inspire some of the others along the way, I hope so, that's great. So I try to push reasonably hard without pushing too hard. But like I said, I assume that people want to know this, that they really want to learn this, and that it's my job to help them learn.

And I've been teaching for a long time now. My oldest son, God love him, is 39 years old and dreading his next birthday. And I started teaching as a teaching assistant when he was not quite a year old. So we're talking close to 40 years that I've been teaching. I've lots and lots and lots of experiences. And big classes and small classes, non-majors and majors. Teaching at Goldey-Beacom was interesting because that was a school that was only recently a four-year college. Most of the students were first-generation college. They really appreciated what they were getting. And it was a joy to teach them and I miss them, I still miss them, because they cared and they wanted as much as I could give them. And they just sucked it up. And it was just … it's like I said, I'm still in touch with some of those students. And a couple of others I'd like to know what happened to them, where they went. First-generation students, most of whom could not have been admitted to Delaware or any of … a named university. And we sent a fair number of our first set of graduates off to graduate school and I was very very pleased with that. And they were just wonderful.

Villanova's great. It's a wonderful place. Great faculty. It's a medium-size university, so it's not overwhelmingly large, but it's not a small school like Goldey-Beacom was. At Goldey-Beacom you knew everybody. I could come in the front door and be greeted by the president or the janitor with equal likelihood. By the way, the janitor's name was Boots, so he would always say, "Hi, Boots! Hi Boots!" But, you know, it's very small … there are challenges in a very small institution. And so Goldey-Beacom … or Villanova is not so small and it's not huge, it's a very nice, comfortable size, about 10,000 students all together. A decent library, but it's not a primary research institution. It's not a, you know, first-level research library. But it's a good library and there are good resources. It doesn't have what Delaware has, but it has good things. It's fine. It's a very nice place to be.

The students are lovely. They take for granted the fact that they're in college. And that's a difference. And that's not their fault. You know, they grew up with expectations that this is what you did, you know, you went from high school to college, you just did. And it was nothing special to them, or nothing that they particularly value. I mean they do at some level, but they take it for granted. They're just not like the Goldey-Beacom kids.

V: Right.

[94:37]

B: So with them you have to do some more. You know, you have to do some more motivation. And, you know, they're more likely to be distracted by other things, their athletics, their fraternities and sororities, there are all sorts of activities, all of which are fine, but there's just a lot of things that … You know, they're 18 years old. They're out of their parents' house for the … you know, it's just the time of their life. And because this is not something they view as a special privilege, it's just the next thing you do, it's harder to keep their attention. Not all of them of course, some of them are wonderful. But a lot of them you have to work really hard to keep their attention. And you try to make them … you know, the idea of the change from the, you know, "the sage on the stage' to the "the guide on the side" kind of thing — I talked about that in my presentation in SIGCSE in 2001, you know, where it's more about learning than about teaching — and, you know, I talk to the students sometimes. I say, you know, "We're here for you to learn, not for me to teach. It's … it's about what you know.

And you know, we're not just going to say, 'We covered this.' We're going to see what you can do." And they don't like it. They want to come and passively sit and just have something poured into their head. And of course we know it doesn't work. So getting them involved and exercised — that's a bit of a challenge. And I work at it, sometimes more successfully than others. But that's what I try to do.

V: So it sounds like you've been in somewhat of a mentoring role for many students over the years and have maintained contacts.

B: With some, yeah.

V: Yeah. So as far as your supervising and advising is concerned, what role has that played in your career?

B: Well, various ones, I guess, at different times. You'd have students with special circumstances of one sort or another that you need to relate to in different ways. That happened at Delaware, it certainly happened at Goldey-Beacom a lot! And it happens some at Villanova.

Oh, how long ago? About 2000 approximately. About 2000. I had a project called Web Host Access Tools. We were working on — which comes out to WHAT — we were working on improving search results by having a context distinguished and made part of the search. So it was a tool that would run on your own computer that would keep a history of your prior searches and learn about context, which was the key word for the thing. But we had some ideas, but we had no Ph.D. students. This interferes with research plans. And I was working with Ursula Wolz at The College of New Jersey, Trenton State as it was then, and we were … we had some ideas, we had a lot of talks, etcetera. But we were having trouble getting anything working, because we would have a student do a little piece and then disappear. And we'd have this piece that doesn't connect to any other piece.

So one day two students, who were sophomores at the time, came to see me. And they said, "I understand you've got a project and you might like some help with it." I said, "Yes." And we talked a bit and I came and drew pictures and they thought it sounded pretty interesting. And I said, "Great, this is good. So here's what we need to do. This is a big project. It's got lots of pieces. You go think about what piece of it really interests you, that you'd like to focus on. And we'll get you to do that. Whatever part really interests you." And they said "Okay, alright." And so they went away. And a couple of weeks later they came back. And I said, "Well, did you think about it?" And they said, "Mm hmm, it's done." I said, "What part did you do?" And they said. "All of it." I said, "Excuse me?" [laughs]

These two guys, they were roommates and good friends. And they just … they just thought it was so cool and so exciting. Now what they did was somewhat skeletal, because they hadn't had a lot of time. But it worked. And we built on that. They worked with me for the next couple of years. And we built from that out and we had a wonderful time. And it was … they were very special … and they did a poster presentation at one of the ACM poster competitions. And so they came to SIGCSE. And they graduated, unfortunately, as these

people do. And I hadn't heard about them, or even thought about them, for quite a while. I have a picture of them with their poster and a couple of other pictures of students with their … that I've worked with closely, with their posters. So one day I get a … a message on LinkedIn that says, "Jason Dobies would like to add you as a contact." My goodness, it's Jay! Told him, "Sure!" So the next thing I know I'm in conversation with Jay and he's telling me that John, his friend, has recently married. Jay has been married for a few years, has a baby, is very excited, everything is going …
[100:41]
And so I ended up with this three-way conversation with the three of us, getting caught up on these guys, who's …. it's now been … I think they graduated in — I don't know, 2002, something like that, something like that, I forget — but it had been a while since I'd heard from them. Jay is now working for … Red Hat. Which is really funny, because when he was at Villanova he was famous for objecting to the concept of open source, and now he works for Red Hat. And his friend is working for …. Akama? Akama is the name of it. And so I actually got an invitation to John to talk about what he's doing at one of our department colloquia.

Jay says, "Oh, by the way, I've always thought I'd like to teach sometime. How do you get to teach part-time, like at a community college or something?" I said, "Well, you know, those things usually aren't advertised. You go where you think you'd like to teach and introduce yourself and say what your background is." I said, "Do you by chance have a master's degree by now?" He said, "Yes, I have a master's degree in Software Engineering." I said, "Fine. That usually will help. So, you know, just introduce yourself, and tell what your background is, and, you know, then when something comes up they'll remember you." A week later, there's an e-mail message, "Does anybody know somebody that could teach 1040? We need … [1020, I guess it was (Computing on the Web)]. We need somebody to teach it." [Whooshing sound of relief.] Contact Jay Dobies. And he teaches for us now. [laughs]

V: That's fun!

B: And it is fun. And at Red Hat, he works from home. So he lives down by the Washington beltway, which is a distance from us. But since he works from home, what he does is he teaches on Tuesday / Thursday. He comes to us in the morning, he sits in a room someplace and does Red Hat work all day, teaches his course, and goes home. And does that twice a week. And he is the same bundle of energy and enthusiasm and so excited about what he does that he always was. And you can't imagine a better person to have in a classroom. Because he so desperately loves what he does, you know this is this has got to reflect. So he's one of my favorite mentoring stories.

V: That's a wonderful story. I love it.

At this point, often what we do in the interview is start talking about involvement in the professional community, but that's permeated already. What I'd like … I know that we could spend a lot of time on all of the many things that you've done with ACM and SIGCSE. but I'd like to just pick some highlights that you'd like to share so that their part of the interview if there are any that occur to you.

B: Well, shortly after I started at Villanova I actually got a phone call from Frank Friedman at Temple. And he asked me to chair what was then called, I guess, the Computer Science Conference (CSC) committee. Which … the Computer Science Conference at that time was … initially it had been a very important conference because there weren't computer science conferences. So this was one place where people could send computer science work.

Times had changed and there were lots of SIGs and lots of specialized places to talk about research in operating systems, or networks, or whatever. But this conference still existed and it was kind of a general place, it was a place where you could talk about things that didn't have a SIG home yet or things that, sort of, you know, straddled some boundaries or something. And SIGCSE overlapped with CSC one day.
[104:42]
So I ended up doing that and that was an interesting experience and it … it really had a big impact. Because I got so involved in that that I did not do as much research as I would otherwise have done. It sort of … at that point, I took a turn to service more than research. And it was an interesting experience. And I did it for some number of years, I forget how many. Frank himself was actually appointed to succeed me at some point. And of course the computer science conference eventually stopped to exist because there really wasn't the reason for it to exist that there used to be. But there was a time when that's where the Turing Lecture was given. And it was a place where there were just all sorts of things happening.

I took my son to it a time or two, the one who turned into a computer scientist. And he really liked it. Because there … there was — and I took other students to it, too — because you could hear bits and pieces of a lot of different things. You could kind of get an overview of the field. But that consumed a lot of my time for a lot years.

And then I, at some point, was on the SIGCSE Board, and then went through the SIGCSE offices and was chair of SIGCSE. And as chair of SIGCSE, I succeeded Nell, and as chair of SIGCSE … Well, there were a couple of things I did in SIGCSE. One of them, I don't know if you know this, but I started the SIGCSE list. Because we used to have the business meetings and I passed — I don't know why, what, I guess I was just on the Board — but anyway, I passed an attendance list around and asked people for their e-mail addresses. And we set up a distribution list through Villanova with those and everything had to be forwarded out. And eventually that became, you know, headquartered at ACM, became the SIGCSE list.

And when I was chair, we decided that we wanted to start another conference. Because the SIGCSE Symposium was very, very successful, as it still is. But a lot of conferences, because ACM is an international organization, a lot of conferences were starting to hold their meetings outside the United States. So they'd hold one in Europe, one in the United States, one in Asia, one in various programs. But we were afraid to do that. Because, for one thing, the SIGCSE Symposium was fabulously successful. There's a group of people that really depend on this community. It's not just a conference, it's a community that gathers. It's a symposium, it's a community that gathers. And we were afraid to risk it. We did not want to do it, to do anything that might break that. And because most of the attendance is faculty,

who are frequently not supported by research grants, the possibility of traveling long distances … it would … it would … there would be people who couldn't do it. And we just didn't want to risk it.

So we decided to start another conference. And so that was a risk, because it might fail and it's expensive to run a conference. So we talked to the chair of the SIG on Computer Uses in Education (SIGCUE). And we decided to have a joint conference on integrating technology into computer science education. And the reason for that title was that it merged the interests of the two groups. So it was not computer science education, but it was about using technology. So it brought both of us together. And we had the first one in Barcelona and it went very nicely. And we followed that up with one in Uppsala and that went very well.

After a few years the SIGCUE kind of faded and went away, and SIGCSE became the sole sponsor. And over time the conference name was changed from "integrating technology" into "innovations and technology in computer science education," Of course, that's ITiCSE, which is still held in … it's always been in Europe so far. But we decided that that was an accessible place to go. We had a few people from Europe who were coming to the SIGCSE symposium anyway, so we had some contacts there. And we built on those. And I think it's worked out very well. It's a nice conference. It's about 200 people, plus or minus a bit; it's been pretty steady. And I remember one time somebody saying to me that, "This is what SIGCSE used to be." And I thought that was interesting, because I wasn't there at the beginnings of SIGCSE. But it's nice because everybody talks to everybody because it's small enough.

So those … those are the things that I'm pleased with. I chaired or co-chaired the first two ITiCSEs and then very deliberately backed away from it to make sure that it could go on its own. And it's been doing fine.

[110:03]

V: That's a wise strategy.

B: Yeah.

V: Alright so …

B: By the way, of course … I've been on the ACM Education Board now for a fair number of years. And I've had various projects within the Education Board. And five or six years ago I … I'd had a concern for quite a long time, that as the computing disciplines were growing they were splintering and we were seeing these separations into sub-disciplines. And that's fine, as it allows people to put more focus on a specific area and allows that area to grow. So software engineering and the others … that's fine. But I was concerned that they'd split totally and each be small and not have as much strength and voice as the combined group could have. And so I wanted something that would help keep the connections there.

And so I proposed a couple of times to create an ontology of all of computing. And the first couple of times people seemed kind of interested, but it … nothing happened. And eventually I did get some interest and I put a proposal into NSF and got some funding to start it. And so

we've been working on it. And one of the things I wanted to do was to have this representation of the entirety of the computing-related disciplines such that you could easily map the various sub-disciplines and see where they touch, where they're different, what overlaps. So I've always had this mental image of kind of lots of bubbles or something in three dimensions. And if somebody said, "Well, what is this software engineering thing anyway?" you could kind of push a button and all the things that are related to software engineering would light up and "Oh! That's what it is! Well how does that compare to computer science?" We'd push another button and all the computer science things would light up and you could see where they overlap and where they are separate. And in theory you could push lots of buttons and see lots of things light up. And you could see where the overlaps are. And you could see, as because this has to be a growing, living thing, you could see where things aren't being covered at all. And so you might say "Hmm, that's an interesting place to explore."

So I envision two purposes for this. One is a … is to … redo the way we do curriculum recommendations. Because this once-every-ten-years massive project is just … it's not practical. It just isn't going to work. I mean, the last one didn't last even close to ten years and it just isn't … you know, too expensive, both in terms of money and, more importantly, of people. We just don't have the resources to keep doing that. We need something that can be more incremental. So what I wanted was this … and I was also concerned that no matter how wonderful the committees are — how well chosen, how hard they work — the things they think of to put into a curriculum recommendation reflect the experiences and the interests of the people who are there. And you do the best you can to be as diverse and as comprehensive as possible, but you can't be sure you've got everything. And a good case in point: Curriculum 2001 has virtually nothing in it about security. It just didn't come up before 2001. Obviously it's a major issue now. So what I wanted is a representation that's very objective and very solid that we could build on and you could make conscious choices: "Yes this is in,", "No, this is not important for an undergraduate curriculum." Whatever works out, but you make conscious choices about what you keep and what you leave, you don't just forget something. And again, because you can see where the various programs touch and overlap, you can see if something's being neglected or something's being covered in everything. Not that there's anything wrong with it being covered in everything, but you could see it. So that was one motivation, was to do something about curriculum.
[114:36]
And the other was to do something about the ACM Computing Classification System, which is broken. And I talked to the Pubs Board a long time ago, now, and had some interest there also, to get a revision, something that more accurately reflects the field. And again I kind of had this mental image of sort of being able to walk among all these bubbles and touch something and see what it's connected to and who's doing what and what papers have been doing and see areas that are very well worked and areas that are only a little bit worked. An interesting thing about that was my middle son — the computer scientist / software engineer, has a computer science degree, he is a software engineer. He wanted to get a Ph.D., he's not doing it now, but he did get involved in … he did the courses, took the exams, passed the exams, was on the point of defining his dissertation topic. His 32-year old advisor died. A brain hemorrhage or something. Really shook David. And he took a leave of absence to straighten out and figure out what to do. And he got involved in other things and didn't go

back. But while he was interested in a Ph.D., he said, "You know what I need, Mom?" and I had not talked to him about this. "You know what I need, Mom? I need this representation so I can just sort of … kind of … meander through the topic areas and see who's doing what and what …" He's describing what I set out to do! So that's a major issue with me. It continues. Every time I write a proposal, there's money for the ontology in it. I got two proposals funded this year; we're back in business! And the … there is talk, at least, in the Education Board that the next iteration of curriculum recommendations will be built on the ontology and they will attempt to do this. Now I think Andrew's a little scared of it, because it's such a radical change, so I'm not sure exactly what we will do. There may be an intermediate step first, but at least there's something happening. It's … it's in pretty good shape. So that's an exciting thing.

V: It's a very exciting project. A very impressive project.

You've talked about challenges in various ways throughout your career that you've faced. Are there any particular challenges that you can think of that we might want to explore a little bit? How you met it, how you overcame it, how it affected your career?

B: Hmmm. Not sure that I can think of anything that we haven't talked about.

V: Okay. That's fine.

B: Growing up as essentially the only child of a single mother is an interesting experience. And my mother was, as I said, much older than most people's mothers are. And she … she did whatever she had to do to take care of everything, but she was not mechanically inclined. So it was kind of my job to make things work around the house. And I think that was … that was a useful thing, because it got me interested in how things work and making things work and keeping things working. So that was kind of a fun thing.

V: All right …

B: She would … she would call my brother and he would come. But we first tried to fix it ourselves and that was usually me.

V: That's fun. I like that.

So I'm curious, do you have any strong outside interests that would help us understand you a little better?

B: Well, I sometimes say my three principal interests are family, mystery, and history. These are things I'm very, very interested in. I read lots and lots of mystery books. I read lots and lots of history books. Non-fiction, fiction. Sometimes I combine them, historical fiction. But the ultimate combination of the three, of course, is genealogy, because that combines all three of those.

So genealogy is the hobby that I wish I had more time for. I remember thinking at one point, if I live long enough to retire I would do that. And I would have a particular interest in tracing a mother's line — my mother, her mother, her mother, her mother, her mother, her mother — which is, of course, hard, because they change names in every generation.

And one day I decided you don't really have to retire to do this, you know, you can do a little bit. And I went on-line and I typed the name of my mother's grandmother, because she was somebody I was particularly interested in. And I immediately got a hit and a whole tree. And I said, "Wait a minute! Wait a minute! This isn't this easy!" But the thing that was interesting about it was it was her name, her parents, siblings, and several generations back, but not her husband, not her children, nothing below her. So I couldn't be sure it was the right person. It was the right name, but names repeat. So I couldn't be sure it was the right person. So it actually took two years of research to confirm that it was the right person. It was. But I couldn't be sure until I'd done a lot of work.
[120:14]
So … I still do some work with it when I can, but I don't have nearly enough time. But more and more resources being on-line means, you know, if you've got an hour sometime and you just want a distraction, it's something to play with.

V: Yes.

B: So that's the big hobby. And some gardening and that sort of stuff.

V: Yes. Would you care to talk more about your family? You've mentioned your boys a lot …

B: Sure!

V: … you've mentioned Bill a little bit.

B: My husband … we were married, as I said, between my junior year and senior year. Bill had graduated and he's a year older than me (ten months to be exact) and two years ahead of me in school (because he had skipped a year or so). He had graduated from Delaware, an electrical engineer. Went to work. And we got married and then I finished my senior year. It's interesting, actually, the first time I ever made Dean's List was the semester I planned my wedding. I was so intensely conscious of the fact that I needed to be careful, that I could so easily be distracted, that I put more time and effort, so I made Dean's List for the first time. And made it, Dean's List, both semesters of my senior year.

And he's still an electrical engineer. And he works in electric power systems. He worked for … I guess this is just the third company he's ever worked for. He worked for a company called Leeds and Northrup for a while. And then we moved back … we'd lived in Pennsylvania for a little a bit, then moved back to Delaware, where we spent all our time anyway. And so he left that job and went to DelMarva Power, which is what it was called then. Or maybe it was Delaware Power and Light then. Worked there for a while. And then went to a consulting company that only hires senior people. And he's been with them since

1984, so a long time. And with them he's had a lot of interesting experiences. Because he became an expert on electric … energy control systems. And if you ever see some of those big display boards with lots of blinking lights, that's what he was working on. The systems that produce those boards and keep them running and make sense out of them. And everything behind them. Because those are just … that's just the interface to the operators, that tell them when something is down or needs work. So he's an expert in that … one of the world's experts in that stuff.

And … but you don't do that over and over again. So he would have a client. And then they'd solve the problem and fix the system. And then he'd have to move on to another client. So he had clients in … first … Taiwan was his first big client. And then he worked in Australia for a lot of years. And New Zealand. And various and sundry places around the world. Nowadays his assignments have all been domestic. He was actually in Chattanooga for three and a half years. He stayed in this hotel for three and a half years.

V: My word!

B: Four nights a week.

V: Wow!

B: Four nights a week for three and a half years. Yeah. So he's got a list of restaurants for …

So, anyway, he has a master's degree in engineering. And he's very, very bright. He was an Eagle Scout growing up. And all our boys were Scouts. Kevin is an Eagle. David and Eric both stopped at Life Scouts. Interesting, I always thought David made a conscious choice to stop. But he told me later that he didn't, he just never got around to it and that he always kicked himself for it. And Eric tried but didn't finish. But Kevin's an Eagle.

And so I have the three boys. The oldest was not quite four when I brought the youngest one home [chuckles]. The middle one had serious medical problems. Was in and out of the hospital constantly for the first eleven years of his life. Urinary tract problems. It was actually quite … it wasn't interesting then — it was terrifying — but he is not … he does not have middle child syndrome. Because he was a different middle child, since I spent so much time with him. Whenever he was in the hospital I stayed with him and never left him. The only time I was not beside him was when he was undergoing a sterile procedure in surgery. But he had … I used to be able to recite all his operations, but I don't … can't do that anymore.

[125:02]

But one of the interesting things was he was … I guess he was eleven … ten … ten when his doctor died. And his doctor was the only pediatric urologist in the city of Wilmington. So we had to go someplace else. And his doctor had consulted with a doctor from Johns Hopkins about David's case. David's case actually went to national conferences for presentations because they couldn't figure it out. And so David was ten when we went to see Dr. Jeffs at Johns Hopkins. Had to take all of his x-rays — and in those days there was a load of stuff. And I can still remember Dr. Jeffs with the lightboard. Puts the x-rays up on the lightboard.

And David is standing there, ten years old. Dr. Jeffs looks at the pictures, looks at David, looks at the pictures. And he says, "Same kid?" "Yes, same kid." Looks, looks. "No pain?" "Ask him." They never could figure it out because all the tests and x-rays said that he was a very sick child. But he wasn't. He was running around, a perfectly healthy, happy kid, played soccer, the whole deal. So the doctor couldn't believe that, so he did some exploratory surgery to check him out. And then later that spring he did some surgery to do something he thought would help.

The important thing about that is that David was eleven then, turned eleven that spring. And in our family, a boy turns eleven, that means he's going to Scout camp that summer. But David couldn't go to Scout camp, because he'd had abdominal surgery and couldn't go. So we had looked around for something else for him to do and found him a computer camp.

V: And the rest, as they say, is history!

B: Indeed. He was just enthralled. And he went back to school that fall — I've learned a lot about teaching from my children, of course. He went back to school that fall filled with self-confidence. Because he had learned LOGO and a little bit of Pascal and knew how to operate a computer. Taught his teachers at school, because they now had a new computer lab. He'd put things together. He taught them things. I've got a picture of him teaching them stuff. And he came home that day … back from the camp and said — he was eleven years old — "I'm going to have a Ph.D. in artificial intelligence." And he almost got there, didn't quite. But, you know … so it made a big difference.

The other thing I learned from him. When he started high school, he's now set. He knows where he's going. And when David is set, he is *set*. This is a single-minded … you know the words "persistent" and "stubborn" are the same thing from two different perspectives? He is whichever one is appropriate for the moment. But when he headed for high school, he knew where he was going. And I can remember sitting around the dinner table and his older brother, who was four years ahead of him in school, telling him, "Now, you've gotta take this, that, or the other course." And David said, "Why?" Because they had lots of choices in high school. And David said, "Why?" And he said, "Well, then you get the science out of the way and then you'll have lots of time for music." And David said, "No." No, that wasn't his thing.

But somehow in this conversation, math had come up. And I said, "Well, you know, David, mathematics is really important for computer science." And he said, "It is?" And I said, "Uh, yeah, it is, it's really important." He said, "Oh." The next day, he went in to school and requested move from his math class to the next higher level one. And the teacher wasn't sure he … his score on the placement test was borderline and they had chosen to put him in the lower class. He had requested to go into the higher one. But they said if he's requesting it, they'd put him in. And he really struggled. But he worked hard. He struggled.

And then, the thing that was interesting was … At some point they got to word problems. David can read. He read the problem, extracted the actual problem, realized the actual problem was easy. You know, you just had to get these words out of the way. And, you

know, he was blossoming. He was one kid … he could do this. This was not a problem at all. And the teacher was just amazed! Because here is this kid who had really been struggling, was suddenly just blooming. And God bless the teacher. He just … he just built on it. And encouraged. And made up … you know, told David how wonderful he was doing, asked him for help in helping other students. And just really elevated David's self-image and made him confident. David decided that if he could do that well in those classes, he should be able to do that well in all his other classes, too. And his grades went up in everything. And I've never forgotten that. Because it was the fact that the teacher saw something going right and built on it. Built on it and built his confidence and made him feel good about himself that had such an impact on him. And I've remembered that and tried, when I see opportunities, to do the same thing with my students. To remember David and do the same kind of thing. Give them a chance.

[130:31]

V: Neat! Well, that's sort of a neat transition into this question. If you could give advice to a young person just starting out in computer science, what would it be? Particularly, perhaps, with thought of education interests.

B: You know, whether it's computer science or anything else, do what you love to do. You know, don't try to fit yourself in where you don't fit. And … David and I both love what we do. And his brothers and my husband all shake their heads and say, "You … you two are ridiculous! You actually like going to work!" And David has said many times, "Don't tell them at work — I'd do it for free!" I mean, we both *love* what we do! And if that's the way computing strikes you, then it's right! And, you know, stick with it. Because it's great fun. Now, I'm sure that happens with lots of people in other fields, but I don't know them. I … I've known a number of people who feel that way about computing, and I've not encountered it in other fields. Now, I'm sure there are. You know, I just don't happen to …

If you're interested in teaching, you know, get around other people who love to teach. And share what you know. And …

But do what you love to do. That's the best thing. You know? Because … you know, I saw my mother go to work. And she worked because she had to. And she didn't complain. And she made the best of it. And she worked in a … in the admitting office of the hospital for the longest time that I knew of. She had other jobs before. And when I was in high school I worked in that admitting office, too, as a part-time job. Made me determined that was *not* what I was going to do. And, you know, it was a job. You did it because you needed the money and then you had your real life. But I've been fortunate enough that my job *is* my real life. You know, it's just … it's just one aspect. There's my job and my family and lots of other things. But they're all part of my life. They're not distinct things. You don't go to work so that you can afford to do what you want to do. What you're doing at work *is* what you want to do. And I think that's … that's the best you can do.

V: Is there any one story that you'd like to tell so it'll be remembered? That you haven't gotten to talk about yet?

B: [chuckling] Well, we've talked about an awful lot, it seems like. There probably is. And there probably is something that I should think of and haven't.

I think one of the most remarkable experiences that I've had has to do with the SIGCSE community. And it really is a community. I remember Nell Dale saying one time a long time ago — I saw her at a Symposium — and she said, "You know, there are people here I see once a year. But you seen them and you pick up a conversation. And you just continue it. And you forget that it's been a year since you last talked to them." And … and that's true. And I've thought of that many times. That there are just … there are people here that you … you know, they're just part of your life. And you know you can call on them if you need them. You can … you can … you'll be called on and asked to help. You'll share what you have. You share experiences. [ring of a phone, turned off quickly] You tend to know each another. So, you know, it's been … there's been some very special people. Dick Austing. Joyce Little. Harriet Taylor. You. Nell. You know, these are people … some of these people are really, really, really close friends.

Dick and Mary Ann Austing and Harriet and Joyce have come to our house for the last couple of years. We have a movie weekend. And that's … we just, we spend the whole weekend watching and talking about movies. We eat well [laughs]. We have a fun … I happen to have the largest house in the group and we have … and our boys are gone, so there's plenty of room, and so it works as a gathering place. Unfortunately, this year we haven't been able to find a weekend that we can all do, but other than that … It … it … you know, these are people that are a part of your life and it's really quite a remarkable thing.

V: It truly is. Anything else you would like to add, Boots?

B: Not that I can think of.

V: All right. Well, I thank you so much for this time!

B: [notification tone in background] You're welcome!!
[135:19]