B: This is an interview with Judith Bishop of Pretoria University, South Africa. It is being recorded on June 28, 2006, in Bologna, Italy, as part of the [Computing Educators] Oral History Project. Did I get your name right?

J: Absolutely.

B: Very good. Well, thank you, Judith, for agreeing to be interviewed on such short notice. I have some questions. We’re going to start way back. Thinking about your parents, thinking about your early years. Did your parents have college degrees?

J: My father did; he was trained as a lawyer and he eventually rose to be a judge. My mother didn’t; she brought up seven children. [both chuckle] So she recently turned 80 and she said she had learned quite a lot during that time so she didn’t really think she needed the college
degree. [laughter]

B: Was that in South Africa?

J: Yes.

B: Were they either interested in computing or engineering or math?

J: Well, no, as far as all of us were concerned, computing didn’t really come into existence until about 1967, when we all went along to the university’s open day and the first computer was revealed and shown to everybody. And that was when the word came into our consciousness.

B: Were you a good student in those early years in school?

J: I was an obnoxious student because I was too good, I think. I was at a convent, which was not really known for its academic prowess. And I think I was very good at mathematics and drove the teachers crazy. But … I enjoyed my school life very much. I enjoyed English as well as mathematics, yes.

B: Did you have brothers or sisters who went on to college? You said there were seven of you.

J: Yeah, we ended up all — I was number two — and we all ended up being high achievers in different directions. Mathematics, veterinary, geology, physical education, lawyer, and so on. So, yeah, our environment at home was very much an academic one. The boys were all at a private Jesuit College. And I was the only girl for a long time. And some of the time I used to go to the Jesuit College for extra maths lessons so that I could get ahead. The town I grew up in had many schools. It was a town which was well known for having a university and schools and so it had a very much an academic …

B: What town was this?

J: It was called Grahamstown, or it is called Grahamstown. And it is down in the Eastern Cape. And it was settled by the English settlers in 1820, when they all came out from England to colonize that particular part of South Africa. It was part of a British government program. And my ancestors were part of that immigration in 1820. So the English people there built the schools, built the churches, and, eventually, the university,

B: During that period of time you said you were very good at maths and you loved English as well. Were there particular teachers that were shaping influences? Because you mentioned your home was really supportive.

J: Yeah. It’s hard to say. I suspect yes. I suspect the nuns (they were all nuns and many of them came from Ireland, a couple from America). And they were supportive. But of course their primary objective was to install discipline in the girls and make them into good citizens. I remember them more for that, probably.
B: You had said that you were a bit of a challenge.

J: Yeah.

B: Do you want to elaborate on that?

J: Well, it was simply that I could think a lot faster, perhaps, than some of the teachers that I had at the subjects. And had to stop sticking my hand up and giving the answers out loud and so on. That’s what I remember.

B: So you were interested in math, you were interested in English. How did you decide … I assume that you decided to go on to, higher ed right away.

J: It was normal. It was normal. I mean among my friends — my parents friends’ children — we all were going to university. There was no question. We were sort of en masse heading in that direction. And when I arrived at university I signed up for mathematics, to be a teacher. And this was the interesting bit, because towards the end of that year, our first year, we were told that there was going to be a computer science course as from the next year which would be a two-year major and we could start if we wanted to. And, of course, I was already in love with this machine up on the first floor of the physics block. And I signed up straight away. And there were nine of us in that first class, which was in 1970. So 1970 was the first class and I think it was also one of the first two in South Africa to run a full computer science course. And off we went. And I never looked back.

B: So that you were, immediately when you left, after you saw that 1967 introduction to computer, you were in love. And that was it. No looking back.

J: Yeah, yeah.

B: Were you disappointed, were you happy with it?

J: Oh, I was absolutely enthralled, particularly in the programming. To be able to make the computer do what I wanted it to do. And in those days we were doing all sorts of interesting projects. The first project I can remember was, in fact, to translate English from another language. And I can’t remember the other language, but I remember having to get a list of basic English words and form these into a linked list and a hash table and all this stuff. And then be able to take this English and produce it in a different natural language. And that was only in second year that we did that. So we were pretty well challenged, because the teachers we had were from physics and applied mathematics, obviously. And they were very bright. And they had all been to Cambridge University to get their doctorates and they had come back to teach us and they didn’t hold back on anything.

B: What university was … ?

J: The university was called Rhodes University. It was named after Cecil John Rhodes.
B: Can you … you haven’t mentioned any particular high school teachers. Are there particular university teachers that you remember that, as an undergraduate …

J: Oh, definitely. We had two. The first one was Professor Ralph Braae (that’s B-R-A-A-E), who was the head of the department of applied mathematics. And he initiated this computer science course, which was called computer science from the beginning. And he was actually very much interested in numerical analysis, so he came from that side. But he saw the applicability, just like probably Babbage did, to automatic computing. And he could see that many of his equations and his work could be solved if he could write programs for it. So he was the one who started our computer science.

And then he employed a young man called Howard Williams as a second lecturer. And the two of them did all the courses. And Howard eventually went on to be professor and head of the department at Harriet Watt University in Scotland. And has just recently retired. And Prof. Braae died a while back. But his son, who was also part of our department, became professor of electrical engineering at the University of Cape Town. He’s still there.

And another person who was in our group Francois Jacot-Guillarmod. And he’s quite well known because he was one of the two people that started the Internet in South Africa. If I can just explain that. As you remember, the Internet sort of just came into force, in the early … late 1980s, early 1990s, during which time South Africa was not accepted by the international community in many ways. And they formed an alliance with a university in the US to do a direct link to them and from there to the Internet. So that South Africa was then connected in the academic world. And Francois ran that and he’s remained as head of the computer center of the university ever since. So he is heading up to be 55 years old now and that’s where he’s been and he should get a medal. [chuckles]

B: Wow. Wow. So you finished your baccalaureate degree. And then what?

J: Oh, OK. So we had a four year system: three years plus one. And I did the three years plus one. And then there was a bit of a formative experience, if you can call it that, which we tend to have. At the end of my four years, Professor Braae said that he was going to a summer school called “Teach the Teachers,” which was to be run by IBM, and he was looking forward to that. He showed me the program and I said, “Well, oh! I’d love to come to that,” because it was these lecturers from England who were coming up courtesy of IBM to teach really interesting things in computer science. And he said, “Well, I’ll ask IBM if you can go.” And his phrase that he used then, which I’ve kept as a phrase ever since, was “Faint heart never won fair lady.” So he will ask, he said. So he asked IBM and IBM said, “Fine, I could go along,” although it was for lecturers not students.

And so I went along for this two week course, where we had these people, Ewen Page, David Barron, and Jim Eve from the UK. And they taught computer science and I really enjoyed it. And during that time I met somebody from another university in South Africa, at the University of Natal in Durban. And they said, “Why don’t I come and do my master’s there?” And I decided that would be a good idea to get more experience. So I moved to do
my master’s.

And the master’s was very interesting. And I think also was completely formative because they had there a computer, which was a Burroughs 6700. And everything was programmed in Algol. And this was now 1973. So to have everything programmed in Algol, with Algol string handling and so on — operating system was written in Algol, you could page through it, you could alter it (and we did) — was amazing. And I worked with very, very, intelligent people there who since have gone on to be heads of departments of Imperial College and so on. So it was very lucky that I managed to do that. Five years later I went back to that university and they were still using the software I had written. So I was happy.

B: Were you the lone female or were there other females in that department? In both degrees, your undergraduate and your Master’s.

J: When I was an undergraduate there were other girls. But when I was a post-graduate at Natal the other women were all computer operators and they wore white coats and they were very strict. And they were feared as computer operators. I was the only non-computer operator female in the area.

B: Did that bother you at all or did you notice it?

J: It didn’t bother me at all. I didn’t even notice at that time that there was a difference. In fact we were so few, really, because our numbers were less than five or six, that the fact that there was one female didn’t really stick out at that time. I certainly wasn’t made to feel different, or special. And then, afterwards, it was kind of expected that one went overseas to do a doctorate. So I applied to various universities and I was accepted by some. And eventually I decided to go to the University of Southampton. And I arrived there in 1974 and spent three years there and got my doctorate.

B: Tell me about that program.

J: Well, it was very interesting because I’ve still got the letter that I received from Professor Barron, David Barron, which would have been in about May, 1974, accepting me for going there. And he said, “We are a small group and we are investigating interesting aspects of software engineering.” And when I look back now, I don’t even know if that term had been coined in 1974. That’s a long time ago. But he used it in that letter. And in fact what happened was very exciting because Pascal had just been invented in 1972 and we’d been poring over the Pascal report and so on at Natal, but having a Burroughs computer we couldn’t run it because at that time it only ran on CDCs (that was the machine that Wirth had at Zurich).

When I got to Southampton, David Barron said, “Well, the thing we’ve got to do is get Pascal, because that’s the future.” And he’s heard of Tony Hoare at Belfast University, who together with Jim Welsh (who subsequently went to Australia, and Tony went to Oxford; but they were both at Belfast at that time). They had ported, they had done the first port of the CDC compiler, to an ICL computer. And we had ICL computers at Southampton. So he sent
me on an aeroplane to Belfast with a tape, with the objective of copying this compiler and
bringing it back, which I did and it worked. So we then had it.

And then we did the third port at our university onto the new ICL 2970 computer, 2900
series, which was the new wave of computers at that time. It had a step machine and
descriptors and it was meant to really advance the state of the art of computer hardware.
Unfortunately, it never really lived up to its performance characteristics. So we accomplished
the Pascal compiler and it was a very good compiler, and so on, and we used it. But it was
clear the machines weren’t going anywhere very fast. And I did my doctorate, in fact, on
descriptors and code generation for these kinds of architectures, which were called structured
architectures. And we organized during that time the first Pascal conference that was ever
held, was in Southampton in 1975 … no 1976, sorry. In 1975 we organized a conference on
BASIC, which at that time was also very popular, teaching language was becoming popular.
So those were the two conferences David and I organized.

B: How did you get interested in teaching use of languages? Did Pascal make you think
about languages? How did that happen?

J: Well, David was a language person, David Barron. He had written a book called
*Programming Languages*, which was very influential. It was a small book, came out in about
1973 or 1972, and it laid out the foundation for left- and right- assignment, parameter passing
and so on in a very readable manner. And was used a lot in Britain, but I’m not sure about the
States, but it certainly was an early book on programming languages. So we were always
interested in languages and I had for my honors project back at Rhodes University written a
compiler for BASIC for the computer that we had there, which was an ICL 1901a. And so I
knew all about compilers. Languages were fascinating.

B: But the languages for educational purposes were just a “happened to” because you
started …

J: Well, no, I was also a teaching assistant for David Barron. And so we had to persuade the
department that we could switch from FORTRAN to Pascal for teaching. He wanted to do
that and I was to be his right hand man on that. So together, in fact, for two years we taught
Pascal to first year students. And so I became interested in how to teach at that time, yes.

B: Very significant in your career! Your research experience was fairly practical compiler
experience?

J: Yes, it was compilers and the study of the match between languages and computers.

B: Did you enjoy that?

J: I enjoyed it very much. There were the usual dreadful moments when I found that I didn’t
know enough about the hardware. And of course this was all pre-Internet time. And one of
the people who was particularly up on the whole subject was Peter Poole from the University
of Western Australia. And we used to correspond because he had a Burroughs running Pascal
compilers. And I used to send him my programs by letter. It would take two weeks to get to Australia. He used to run them and send me back the output with annotations. Because I needed to know how that particular computer compiled the particular test program that I had.

[20:30]

B: I’ve heard of 24-hour turn-around, but …

J: No, this was four-week! Four-week turn-around! [both laugh]

B: Oh, dear! I’m not familiar with the Ph.D. program system … the way the Ph.D.’s achieved in England. Is it strictly a research degree? Or is there coursework that goes along with it?

J: I think then and now it is strictly a research degree. You start on day one. You are thrown in at the deep end. Find yourself a project. Start working. And three years later, please hand in a thesis. That’s it. [laughs]

B: Was there a phase in your life that there were any interruptions from this very straight path? Academic …

J: No, that was it. I mean, I knew before I started university it was nine years and I would do it.

B: So you have a piece of paper in your hand and …

J: Yep. That was it.

B: … you waved it and then what did you do next?

J: Well, of course, during this whole period I had become entangled with a man and he was a mathematician. And in the 1970s it wasn’t easy to get jobs in Britain for mathematicians. So we decided a smart move would be to go back to South Africa where he could get a job, although he was British. So he went to South Africa and got a job there and so I had to follow.

And the place where he went was Johannesburg, which was like the other side of the world as far as I was concerned. I’d never been to Johannesburg. It was the big, dirty city, and I’d always lived in a small town. So we went and lived there. And I gradually got to know and like it very much, living in a big city and of course being at the hub of everything.

And one of the other big shocks was that I had for the very first time work on IBM equipment. And if you think that Microsoft has a bad name among academics now, at that time IBM had an even worse name. I mean, if you were forced to work on IBM equipment, it was the “baddest” thing. Because they made you use PL/I, IBM 360 assembly language, FORTRAN. And they’d never heard of Algol, let alone Pascal. So it was quite a shock. But we turned them round and we bought almost immediately an entire lab of Apple computers, Apple IIs. And we ran Turbo Pascal on that. So that occupied a lot of my time.
B: What university were you …?
J: That was the University of the Witwatersrand.
B: Would you like to spell that?
B: Thank you.
J: Which means “ridge of white water”, which is where Johannesburg is built on and of course all the gold comes from. The most gold in the free western world. So a very rich place and one of the two major English universities in the country. So we set forth on Pascal and Apple computers and then we got Macs and so on. We were always different.
B: You were teaching as part of that.
J: Yes.
B: What was your teaching load like? How did you balance trying to get all these compilers going?
J: Well, remember we didn’t have the Internet.
B: Right.
J: So there was no email.
B: Right.
J: So your days were actually quite relaxed, if I remember our days were relaxed. We had lectures to give and we had tutorials to give. But when we went back to our offices it was quiet and peaceful. And we used to go to lunch and we used to go home at 5. It was actually a very quiet life in those days that we had, the expectations were perhaps lower. I remember teaching advanced programming. And then I wrote a book with David Barron on that, which is sort of a data structures course now. And what else?
B: So you kept up your alliance with him? He was still at Southampton. You were co-collaborators, then?
J: That’s right. And then I taught compilers and programming languages, first year Pascal. And I suppose that is when I started my educator’s aspect of life. Because I was asked by Addison Wesley — one of their editors came up to South Africa — and just happened to be chatting in the office and said, “I’d like you to write a textbook.” So, I mean, I was only what 29 or something, and I said, “Oh?!” And he said, “Yeah, we need a book on Pascal.” And so I...
thought, “I could write on Pascal. I know all about Pascal.” So I wrote the first Pascal textbook and that went to three editions, plus a Turbo Pascal version, plus a version for engineers and scientists, which my husband helped with. He did the mathematics on that. And we repeated that whole formula in Java. That sort of went on from there. And that’s where I also started going to SIGCSE and ITiCSE conferences as well — to find out what other people were doing and how they were doing it.

B: Were there colleagues at your institution? I mean, you had this relationship with David Barron. And your husband, you said, was working on this material with you. Were there other colleagues in that environment?

J: Indeed, indeed. It was very interesting, because some of them also went on to write Pascal textbooks. But I was in a mixed department at that time, of applied mathematics and computer science, which wasn’t a bad thing. It gave us a certain direction. The students who came in from school were good at mathematics and they usually took both subjects. And the applied mathematics was mathematical modeling, numerical analysis type of stuff. So it fitted together quite well. And those people — we used to talk a lot. They started out very much FORTRAN programmers and got converted after a while. Yeah.

B: Were they all men at that time?

J: Yes. There was one woman and she left and then eventually I was the only one left. Only woman. Yeah.

B: What among those courses … well, even, let’s look over all time. What’s your favorite course to teach?

J: [Sighs]

B: A big sigh.

J: Courses come in different flavors. There are the ones that you can present so well because you’re passionate about the subject. And then there are the other ones which are easier to present, because it’s easy, the work is easy. Of course, I suppose the one that has both of those is first-year programming. The huge disadvantage of that one for us is that the workload is very high, because you’re dealing with an enormously large class. You’ve got like three hundred in that class. It’s a big problem to teach first-year programming. But you do know that you’re forming the mind of students for the rest of their lives, so that is very satisfying. But if you leave first-year programming aside, I think programming languages is probably the course I liked to teach the best. I do compilers as well; I’ve done data structures. At the higher level I’m required to do the distributed systems courses, so I do distributed systems, high performance computing — those are my research areas.

B: You might talk a little bit about your research and how that kind of fits into your life, your …
J: The research — it came out of my … my major area of research came out in the 1990s from
my interest in applying languages to how computers work, which was my Ph.D. But by the
1990s, computers were becoming distributed systems, so I got involved in a community of
people who were looking at linking together computers and what were the languages
required to express the links. So they were called configuration languages. And now they are
called architectural description languages. So that’s still languages, but they are at the glue
level. And that was part of what I did and that’s kind of developed toward what I do now.

However, I do have a major interest since 2003 in mixing my educational interests with my
research interests, and I’ve managed to make a success of that. I started out by just writing
what many people in the SIGCSE community have done and probably thrown away,
eventually, which is a little package to do graphical I/O in Java or Pascal or whatever. So I
had these from long ago. And in 2003 Microsoft came to me (of course, I was working at
Microsoft for a little while) and they said, “We actually need one of these for a particular
purpose. We hear you’ve done some of this work. Can you cook one up for us?” And that
eventually fed in to this new version of Windows which is coming out, which is called
Windows Vista. And essentially what it enables you to do is express your GUI in XML and
link it into your program in a very clean and simple way. And that work is going to come out
in the IEEE’s 60th Anniversary edition in September. [Reference: J. Bishop & N. Horspool,

B: Very good. Congratulations!

J: Yeah, it came all the way from just “this is a little GUI package.” But with my collaborator in
Canada, who wrote the C# book with me, we worked out the importance of the work and we
positioned it correctly in the research environment.

B: Do you have a teaching philosophy?

J: Mm hmm.

B: Her eyes got big as saucers!

J: Oh, definitely! Don’t talk down to the students. I think Dijkstra had the same. He said many
teachers should be head up for — what was the word he used? — anyway, for abusing the
minds of the students. Don’t give them stuff that they’re going to have to relearn later; give
them it correctly the first time. They don’t have much time, especially those students who are
not going to be majors with you. Don’t give them simple, simple, simple. Give them the real
stuff, as the physics people do, as the chemistry people do. Give them the real stuff. And so
when I see very poorly written programs in introductory books on C — with if statements
going if, if, if, if — I really feel we’re doing the community in. And so I would rather just
take it from a higher level, explain it well, and give them something that will last a lot longer.

B: I asked and I got it! Thank you! [both laugh] You’ve mentioned that you’ve been
involved in SIGCSE and a couple of other organizations. What effect, or influence, or part have they played in your life?

J: I think the one that has played the most part is one which is not all that prevalent in the American consciousness, and that is IFIP. I don’t know if you’ve heard of IFIP.

B: Oh, yeah, I’ve heard of IFIP.

J: I was invited to be a member of an IFIP group way back in 1980. And this was because IFIP liked to be international, just in the same way that SIGCSE is now proving to be the same stimulus for involving people on a worldwide basis. But at that time, I was invited to go to this group. And there was a group of about 50 people.

B: What was the working group?

J: 2.4, which was on systems implementation languages. It’s now software implementation technology. But it’s the group which basically looks at languages and compilers. And during the 1980s we were the group who encompassed all the people who were working on Ada, and working on Ada compilers, and subsequently on feature developments of languages that came out, So they were very much the practical languages, not the functional or Algol-type languages. And we met every year. And those people supported me and we all supported each other and they pushed me into positions that I would otherwise never have managed to get to from way down in South Africa.

[34:55]

In terms of the ACM, I regularly did go to SIGCSE conferences. Not every year, but enough. And also the IEEE; I was involved with then to some extent with the conferences board. And ACM, I’m now just the outgoing chairman of the Software Systems Award, which I’ve been running for a while. Yeah. But I haven’t risen in the SIGCSE hierarchy at all. I’ve been a little bit on the fringe, I think.

B: Is that choice or chance?

J: Uhm. I have to say that it would probably be by choice. But the reason is one that might come out in other people’s stories as well, is that we are forced at our university to do research and anything to do with education is looked at with a beady eye. And only a small amount is tolerated. And we have to be very careful.

B: You’ve spoken of many mentors.

J: Oh yeah, yeah.

B: You’ve talked about David Barron. And then you talked about the people that have pushed you through IFIP. What’s your role as a mentor? Now, do you see yourself as a mentor? Can you tell any stories about what’s happening?

J: Yes, I mean I would like to be seen as a mentor. I love it when I see my ex-students in
positions of authority and success. And it does happen and they pop up all over the world. And they write to you and so on. I have many post-graduate students. I suppose the mentoring is immediate. We have at our university and in our country various national mentoring programs and so on for women and one is meant to volunteer for these.

B: And have you?

J: Uhm. I think I’ve expressed interest, but I haven’t actually got involved. But I am, for example, in a couple weeks time going to be part of the panel for judging the award for the woman, the women’s award for this year. That isn’t mentoring, but it is some involvement. We have numerous groups and they will do things and I join them. [both laugh]

B: But I’m going to skip back to teaching, because I have noticed on my little cheat sheet that I have forgotten something important. Do you have a favorite teaching story, something that happened that you would like to relate … some kind of classroom story?

J: This isn’t exactly a story but it’s one thing that I’ve done quite a lot, and that I like to do, and that I continue to do. And that is towards the end of class, of a semester, not every time, but more often than not, I’ll wind the students up by saying we’re going to have a prize giving, or we’re going to have a party. And then we do. And so from the projects we select the best projects and we show them in a theater. And then we get prizes from the booksellers and Microsoft and so on and present prizes. And I do that to make the students feel special and to give them something to take home to their parents. Being a parent myself, I know what a kick I used to get when the kids came home with a prize. And that seems to end dead when they leave school and go to university. And so I’ve tried to put just a little bit of that in.

B: You’ve just mentioned your children. How have you managed the balancing act between a wildly successful professional career and children, that on the web page, I did notice that you were the parent of two very successful children?

J: Well the boys. I think the two secrets were — one I couldn’t choose — was that my husband was an academic, which gave him the same freedom I had in terms of how he arranged his day to some extent, as opposed to, say, a businessman or somebody where you have to travel on business incessantly. And so he and I, when the children were very small, could share many of the duties. And secondly, we always had a nanny, and whereas that might sound like a colonial thing, I noticed last week when I went to have supper with a woman academic at the Technical University of Milan, she had a nanny and the nanny came in in the evening and put the children to bed, so she could spend the time with her husband. And I think that the idea of having three people to run a house is probably a better formula than two. [both laugh]

Well, that’s what we did, that’s what we did. Yeah. And the kids turned out. Well, we always took them everywhere. We went on sabbatical. They’ve been to school in many countries. And that provided some instability for them, because they kept missing their friends, but it provided them with a view of the world they’ll never forget. It’s a hard decision, that one.

B: Did you … are there any compromises that you’ve made in handling the career you’ve had. You mentioned one, you followed your husband to …
J: Well, that wasn’t exactly the first time I had to follow him. And I do think that there is a gender difference. Men, in my experience, feel very sensitive about the importance of their jobs. That isn’t to say that women don’t, but I think they have a higher sensitivity that the job is very important to them in terms of their self-esteem and their position in the family and their position vis-à-vis their colleagues. So at another time in the late 1980s when the political situation was very bad in South Africa, we moved to England, which was intended to be a permanent move. And I had a very good job there. I was appointed as a reader back at Southampton, but Nigel couldn’t get a permanent position. We thought he would get one when we got there. When that didn’t happen after two years we actually went back to South Africa, because of his job position. And then every time we went on sabbatical, he had to choose the place first, and as a computer scientist, I always got a position. Computer scientists were welcome more or less everywhere. So I went to the Software Engineering Institute in Pittsburgh, because he was at the University of Pittsburgh. And I went to the University of Cambridge Computer Laboratory because he was at the University of Cambridge. Well, these were great places, but not necessarily the ones I would have chosen. Yeah.

B: Do you have any outside interests? Any strong interests besides computing?

J: Oh, well, I had one, which I think was a wonderful one for the time. I was very big in the Scouts, the Boy Scouts. I did that for ten years, when the children were young. And I used to go camping and I had my own troop of little boys and we went all over. And it was a nice outdoor, outdoor interest. But I eventually stopped that. And I suppose my interests are now centered around travel and reading and music and opera and that stuff.

B: What kind of reading do you like to do?

J: Travel. [both laugh]

B: Travel. [both laugh]

J: Reading about travel!

B: Well, we are getting down sort of the end of our time together. If you could give advice to a young woman starting out a career, what would it be?

J: I think to retain the element of excitement. I express it this way. That when I started a computer filled an entire room and it had a tiny amount of memory and it could do only one thing. But that computer handled everything that was required by our entire province, not only the university. Now, that was thirty years ago. What we can be certain about is that in thirty years time computers will look nothing like they look like now. And I think it is enormously exciting to be part of that process. So to try to keep ahead and not stay with what you perhaps you had learned ten years ago. Keep moving, keep moving. Because the excitement in our field is in the change.

[45:15]
B: A completely different question. If you could change one career decision you made, which one would it be? Or maybe there are no decisions you would change.

J: I think I would like to have changed this one, but I don’t think we normally can. Obviously, I think I would like to have written more research papers. I would like to have a CV with 300 research articles or something like that.

B: Instead you have one with 70.

J: Yeah, but 70 is not good, I mean, not for somebody of my age in a research career. You probably would want to have double that. So I think that would have been — instead of fiddling around doing Pascal compilers and working out how to handle the optimal strategy for managing the laboratory so that everybody got a good chance and the students liked you — write another research paper. That would have been an alternative. I’m not sure I would have done it, but …

B: And I do have to … this isn’t the last question I’m going to ask you, but it’s the next to the last, I think. You have on a lovely necklace that has a story.

J: Oh, the story of the necklace.

B: I have to tell you it is black-and-white beaded necklace, and I believe it has a story. Am I right?

J: Yeah, but this is not the right one, although this is a lovely one.

B: You didn’t wear the right one?!

J: I forgot! But I’ll tell you the story of the necklace.

B: You can tell me the story of the one you have on, too, if you want.

J: Oh, yeah. But this is a native bead necklace, which has five different segments and each segment is different. And so it’s a traditional necklace from Africa.

But the one that I should have worn is pearls and in the center it has a symbol which is like a … a symbol of … an atom — an atom or something! — in gold with little diamonds on it. And this was specially created as the award for the woman in science last year because last year was the year of physics and also Einstein’s birthday. And they give this award each year in South Africa to a top woman scientist. Now, of course, they usually envision this woman will be a physicist or chemist or somebody like that. So when the necklace was eventually presented to a computer scientist it did a look a little bit incongruous because of this curly atom. But I love the necklace and I do wear it a lot and it always incites comments. And that was a great moment both for me and for computer science that I was chosen.

B: Congratulations. If there is one story that you want to tell right now so it won’t be
forgotten by the world, what would it be?


B: OK.

J: She never went to university. But I can always remember the sense with which she supported the education of all the children. And I was a great disappointment to her, because I was not the daughter she wanted. She wanted a daughter who was interested in frilly dresses and going to parties and getting boyfriends and showing off the womanly side of life. She had five boys; she didn’t really want another tomboy, which is what I turned out to be. But she rose above that and she eventually came to terms with that, I think, by the time I was about 16. She had given up on the frilly dresses. So she eventually decided that she needed the best for me, so she arranged, as I said, with a Jesuit college for me to go and do extra maths. And then, as I was heading for university, she said, “Well, we better go and see what you’re going to do.” So she took me to one of these psychology assessment people. And I had to do all these tests, and I came out. And then we had to go in for the interview. And there was a deathly silence. And my mother was saying, “Oh, she didn’t do so well then.” And the psychologist person said, “Well, no, she did fine. Her marks are just off the graph, so I think your daughter is going to be the first person on the moon.” [both laugh] I wasn’t actually the first person on the moon, but I think my mother was then reconciled eventually to a clever daughter. And ever since then they have kept a scrapbook of everything I’ve done and been enormously supportive.

Yeah. I think parents are extremely important, and therefore, when you become parents yourself, one has to pass the torch on and be supportive also to your own children. And if you are at all lucky, that they can follow you in computer science.

B: And did they?

J: My one son nearly did. He started out and then he became a musician. He was doing computer science and music and decided to stay with music.

B: Well, I really thank you for this, Judith, rather short time.

J: Pleasure!

[B: This is an interview continuation with Judith Bishop of Pretoria University in South Africa, conducted on June 28, 2006.]

We wrapped up the interview and then thought about it and thought there were a few more questions that we should have asked and we had the time. So, Judith, what can you tell me that was important for you as a woman facing the tenure-track issues?
J: OK. I started lecturing (as a lecturer as it was called in those days, I suppose the assistant professor level) in 1978, when I would have been 27. So I was young, just married, and really keen and eager to do my job. As it turned out, computer science was a very young field then and fully trained computer scientists with a Ph.D. in computer science were few and far between. So I was fast-tracked within the department and given promotion very easily. I moved up to associate professor within a few years and I was a professor by 1983. So … in effect I could just relax after that. I didn’t face the hurdles that people these days would face, because there was no competition. These days, even for women, it’s pretty much more difficult, I think. So that was very easy. Now when I see women who are struggling with the same level as men, I can sympathize, actually, with their dilemmas, because trying to get sufficient papers and sufficient involvement in academic life and so on and at the same time bringing up a family is very difficult.

B: I appreciate that. Well, you sort of said it was difficult for women and different for women in computing these days. But the broader question is how do you feel about computer science education in these current times.

J: From going to computer science conferences and reading — computer science education conferences — and reading proceedings, which I usually do if I can’t go, I am a little bit dismayed because I feel that the people who attend the conferences and so on are aging. There seem to be more older people than younger people that I see. And they are not moving with the times. They tend to present ideas which they learnt many years ago and which they feel work. And then they tweak them a bit to present them in a new way, or to have some new tip or technique which works and which inspires them on their home ground. But does not actually open their minds to what’s going on in the field, in computer science, both in research and in technology. So, for example, I can take one concrete example that I listened, almost with horror, at stories of programming languages courses that are being taught where the languages being presented all came from pre-1985 days. Presumably this is because that is what those teachers are familiar with and comfortable with teaching. But if you don’t have research pushing you and the impetus, and the stimulus, of that research making you read and use the modern stuff, I don’t think you end up feeding it back into your teaching. And so I’m worried about people who spend their lives just in education.

[56:05]

B: OK. I guess finally …well, have you had any lucky breaks?

J: I think I have. And in a way this follows on from the last question. I have been lucky in that I have been able to keep abreast of technology because I’ve been involved with companies. So, in particular, in 2002 I received a grant from Microsoft. It was a competitive grant, a worldwide competitive grant. There were only 42 given out of more than 100 applications. And from that, I then became involved with Microsoft Research, which is a wonderful, wonderful organization with some of the brightest minds on the planet. And I went and worked with them for 5 months. And then they invited me to lecture on their academic lecture circuit in Europe. And I went all around Europe, traveling, meeting people, meeting people from all different countries, seeing how they operated. But always in this sort of more mixture of research and teaching than one tends to find at SIGCSE conferences. So that was very stimulating. And through the Microsoft push, I got to hear about new things in advance.
and be almost forced to know about them. Because people would ask me, “Oh, you’re with Microsoft, can you tell me about this new Microsoft thing?” I had to have an answer ready, which meant I had to swat it up. And I couldn’t be clueless or say, “Oh, well you know, that’s just technology!” And I now have great respect for what any of these big companies does. Not just Microsoft, I am sure the same is true with IBM, with Sun, with Apple. If you manage to get in with one of them and learn about the technology at a very intense level, it’s hugely worthwhile.

B: And finally, are there current influences and important women in your life right now?

J: Indeed, I think so. I think there is a bond that develops between women of one’s own age if you’ve met when you were younger, or even if you meet when you’re older. That enables you to “click” whenever you happen to be in the same place at the same time. And I find this enormously rewarding. In particular, I could mention, for example, Wendy Hall, who is the new vice-president of ACM, and she and I were at university together. And to watch her climb the ladder to become vice-president of the Royal Engineering Society, on the Prime Minister’s Science Board, and so on (this is in the UK), she is now on the European Science Commission, and yet see what a joie de vivre she has for life and charging around and doing all sorts of things, setting up this new company, and so on, and the sheer energy of it all. I find people like those that just send me away, and think, “Oh yeah, I can carry on doing that now!”

B: All right. Well, thank you again! I’m glad you added the little stories that you did at the end. I think it enriches our time together. Thanks.

J: Thank you very much!

[59:56]