

# Computing Educators Oral History Project

## An Interview with *Judith Bishop*

Conducted Wednesday, June 28, 2006

In Bologna, Italy

Interview conducted by Barbara Boucher Owens

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NOTE: This interview is broken into two parts. The first part begins directly below and was conducted on June 28, 2006. The second part took place later the same day. It begins on line 651 in this transcript and at about 51:36 in the full audio.

1 [0:00]

2 **Part I**

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

6

7 J: Absolutely.

8

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

12

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

16 degree. [laughter]

17

18 **B: Was that in South Africa?**

19

20 J: Yes.

21

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

23

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

27

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

29

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

34

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

37

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

45

46 **B: What town was this?**

47

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

53

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

57

58 J: Yeah. It's hard to say. I suspect yes. I suspect the nuns (they were all nuns and many of them  
59 came from Ireland, a couple from America). And they were supportive. But of course their  
60 primary objective was to install discipline in the girls and make them into good citizens. I  
61 remember them more for that, probably.

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**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.

[4:48]

**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.

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**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]

[10:15]

**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

154 my master's.

155

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

164

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

167

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

172

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

174

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

182

183 **B: Tell me about that program.**

184

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

194 [15:25]

195 When I got to Southampton, David Barron said, "Well, the thing we've got to do is get  
196 Pascal, because that's the future." And he's heard of Tony Hoare at Belfast University, who  
197 together with Jim Welsh (who subsequently went to Australia, and Tony went to Oxford; but  
198 they were both at Belfast at that time). They had ported, they had done the first port of the  
199 CDC compiler, to an ICL computer. And we had ICL computers at Southampton. So he sent

200 me on an aeroplane to Belfast with a tape, with the objective of copying this compiler and  
201 bringing it back, which I did and it worked. So we then had it.

202  
203 And then we did the third port at our university onto the new ICL 2970 computer, 2900  
204 series, which was the new wave of computers at that time. It had a step machine and  
205 descriptors and it was meant to really advance the state of the art of computer hardware.  
206 Unfortunately, it never really lived up to its performance characteristics. So we accomplished  
207 the Pascal compiler and it was a very good compiler, and so on, and we used it. But it was  
208 clear the machines weren't going anywhere very fast. And I did my doctorate, in fact, on  
209 descriptors and code generation for these kinds of architectures, which were called structured  
210 architectures. And we organized during that time the first Pascal conference that was ever  
211 held, was in Southampton in 1975 ... no 1976, sorry. In 1975 we organized a conference on  
212 BASIC, which at that time was also very popular, teaching language was becoming popular.  
213 So those were the two conferences David and I organized.

214

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

217

218 J: Well, David was a language person, David Barron. He had written a book called  
219 *Programming Languages*, which was very influential. It was a small book, came out in about  
220 1973 or 1972, and it laid out the foundation for left- and right- assignment, parameter passing  
221 and so on in a very readable manner. And was used a lot in Britain, but I'm not sure about the  
222 States, but it certainly was an early book on programming languages. So we were always  
223 interested in languages and I had for my honors project back at Rhodes University written a  
224 compiler for BASIC for the computer that we had there, which was an ICL 1901a. And so I  
225 knew all about compilers. Languages were fascinating.

226

227 **B: But the languages for educational purposes were just a "happened to" because you**  
228 **started ...**

229

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

234

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

237

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

239

240 **B: Did you enjoy that?**

241

242 J: I enjoyed it very much. There were the usual dreadful moments when I found that I didn't  
243 know enough about the hardware. And of course this was all pre-Internet time. And one of  
244 the people who was particularly up on the whole subject was Peter Poole from the University  
245 of Western Australia. And we used to correspond because he had a Burroughs running Pascal

246 compilers. And I used to send him my programs by letter. It would take two weeks to get to  
247 Australia. He used to run them and send me back the output with annotations. Because I  
248 needed to know how that particular computer compiled the particular test program that I had.

249 [20:30]

250 **B: I've heard of 24-hour turn-around, but ...**

251

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

253

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

257

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

261

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

264

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

266

267 **B: So you have a piece of paper in your hand and ...**

268

269 J: Yep. That was it.

270

271 **B: ... you waved it and then what did you do next?**

272

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

278

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

283

284 And one of the other big shocks was that I had for the very first time work on IBM  
285 equipment. And if you think that Microsoft has a bad name among academics now, at that  
286 time IBM had an even worse name. I mean, if you were forced to work on IBM equipment, it  
287 was the "baddest" thing. Because they made you use PL/I, IBM 360 assembly language,  
288 FORTRAN. And they'd never heard of Algol, let alone Pascal. So it was quite a shock. But  
289 we turned them round and we bought almost immediately an entire lab of Apple computers,  
290 Apple IIs. And we ran Turbo Pascal on that. So that occupied a lot of my time.

291

292 **B: What university were you ... ?**

293

294 J: That was the University of the Witwatersrand.

295

296 **B: Would you like to spell that?**

297

298 J: “W” “I” “T” then water, “S” “R-A-N-D”.

299

300 **B: Thank you.**

301

302 J: Which means “ridge of white water”, which is where Johannesburg is built on and of course  
303 all the gold comes from. The most gold in the free western world. So a very rich place and  
304 one of the two major English universities in the country. So we set forth on Pascal and Apple  
305 computers and then we got Macs and so on. We were always different.

306

307 **B: You were teaching as part of that.**

308

309 J: Yes.

310

311 **B: What was your teaching load like? How did you balance trying to get all these  
312 compilers going?**

313

314 J: Well, remember we didn’t have the Internet.

315

316 **B: Right.**

317

318 J: So there was no email.

319

320 **B: Right.**

321

322 J: So your days were actually quite relaxed, if I remember our days were relaxed. We had  
323 lectures to give and we had tutorials to give. But when we went back to our offices it was  
324 quiet and peaceful. And we used to go to lunch and we used to go home at 5. It was actually  
325 a very quiet life in those days that we had, the expectations were perhaps lower.

326

327 I remember teaching advanced programming. And then I wrote a book with David Barron on  
328 that, which is sort of a data structures course now. And what else?

329

330 **B: So you kept up your alliance with him? He was still at Southampton. You were co-  
331 collaborators, then?**

332 [25:02]

333 J: That’s right. And then I taught compilers and programming languages, first year Pascal. And  
334 I suppose that is when I started my educator’s aspect of life. Because I was asked by Addison  
335 Wesley — one of their editors came up to South Africa — and just happened to be chatting  
336 in the office and said, “I’d like you to write a textbook.” So, I mean, I was only what 29 or  
337 something, and I said, “Oh?!” And he said, “Yeah, we need a book on Pascal.” And so I



338 thought, “I could write on Pascal. I know all about Pascal.” So I wrote the first Pascal  
339 textbook and that went to three editions, plus a Turbo Pascal version, plus a version for  
340 engineers and scientists, which my husband helped with. He did the mathematics on that.  
341 And we repeated that whole formula in Java. That sort of went on from there. And that’s  
342 where I also started going to SIGCSE and ITiCSE conferences as well — to find out what  
343 other people were doing and how they were doing it.  
344

345 **B: Were there colleagues at your institution? I mean, you had this relationship with David**  
346 **Barron. And your husband, you said, was working on this material with you. Were**  
347 **there other colleagues in that environment?**  
348

349 J: Indeed, indeed. It was very interesting, because some of them also went on to write Pascal  
350 textbooks. But I was in a mixed department at that time, of applied mathematics and  
351 computer science, which wasn’t a bad thing. It gave us a certain direction. The students who  
352 came in from school were good at mathematics and they usually took both subjects. And the  
353 applied mathematics was mathematical modeling, numerical analysis type of stuff. So it  
354 fitted together quite well. And those people — we used to talk a lot. They started out very  
355 much FORTRAN programmers and got converted after a while. Yeah.  
356

357 **B: Were they all men at that time?**  
358

359 J: Yes. There was one woman and she left and then eventually I was the only one left. Only  
360 woman. Yeah.  
361

362 **B: What among those courses ... well, even, let’s look over all time. What’s your favorite**  
363 **course to teach?**  
364

365 J: [Sighs]  
366

367 **B: A big sigh.**  
368

369 J: Courses come in different flavors. There are the ones that you can present so well because  
370 you’re passionate about the subject. And then there are the other ones which are easier to  
371 present, because it’s easy, the work is easy. Of course, I suppose the one that has both of  
372 those is first-year programming. The huge disadvantage of that one for us is that the  
373 workload is very high, because you’re dealing with an enormously large class. You’ve got  
374 like three hundred in that class. It’s a big problem to teach first-year programming. But you  
375 do know that you’re forming the mind of students for the rest of their lives, so that is very  
376 satisfying. But if you leave first-year programming aside, I think programming languages is  
377 probably the course I liked to teach the best. I do compilers as well; I’ve done data structures.  
378 At the higher level I’m required to do the distributed systems courses, so I do distributed  
379 systems, high performance computing — those are my research areas.  
380

381 **B: You might talk a little bit about your research and how that kind of fits into your life,**  
382 **your ...**  
383

384 J: The research — it came out of my ... my major area of research came out in the 1990s from  
385 my interest in applying languages to how computers work, which was my Ph.D. But by the  
386 1990s, computers were becoming distributed systems, so I got involved in a community of  
387 people who were looking at linking together computers and what were the languages  
388 required to express the links. So they were called *configuration languages*. And now they are  
389 called *architectural description languages*. So that's still languages, but they are at the glue  
390 level. And that was part of what I did and that's kind of developed toward what I do now.

391 [30:02]

392 However, I do have a major interest since 2003 in mixing my educational interests with my  
393 research interests, and I've managed to make a success of that. I started out by just writing  
394 what many people in the SIGCSE community have done and probably thrown away,  
395 eventually, which is a little package to do graphical I/O in Java or Pascal or whatever. So I  
396 had these from long ago. And in 2003 Microsoft came to me (of course, I was working at  
397 Microsoft for a little while) and they said, "We actually need one of these for a particular  
398 purpose. We hear you've done some of this work. Can you cook one up for us?" And that  
399 eventually fed in to this new version of Windows which is coming out, which is called  
400 Windows Vista. And essentially what it enables you to do is express your GUI in XML and  
401 link it into your program in a very clean and simple way. And that work is going to come out  
402 in the IEEE's 60th Anniversary edition in September. [Reference: J. Bishop & N. Horspool,  
403 Cross-Platform Development: Software that Lasts, *IEEE Computer*, vol. 39, no. 10, pp. 26-  
404 35, Oct. 2006. On-line:

405 <http://www.computer.org/portal/web/csdl/doi/10.1109/MC.2006.337>

406

407 **B: Very good. Congratulations!**

408

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

412

413 **B: Do you have a teaching philosophy?**

414

415 J: Mm hmm.

416

417 **B: Her eyes got big as saucers!**

418

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

428

429 **B: I asked and I got it! Thank you! [both laugh] You've mentioned that you've been**

430 **involved in SIGCSE and a couple of other organizations. What effect, or influence, or**  
431 **part have they played in your life?**

432

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

435

436 **B: Oh, yeah, I've heard of IFIP.**

437

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

442

443 **B: What was the working group?**

444

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

453 [34:55]

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

459

460 **B: Is that choice or chance?**

461

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

466

467 **B: You've spoken of many mentors.**

468

469 J: Oh yeah, yeah.

470

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

474

475 J: Yes, I mean I would like to be seen as a mentor. I love it when I see my ex-students in

476 positions of authority and success. And it does happen and they pop up all over the world.  
477 And they write to you and so on. I have many post-graduate students. I suppose the  
478 mentoring is immediate. We have at our university and in our country various national  
479 mentoring programs and so on for women and one is meant to volunteer for these.

480  
481 **B: And have you?**

482  
483 J: Uhm. I think I've expressed interest, but I haven't actually got involved. But I am, for  
484 example, in a couple weeks time going to be part of the panel for judging the award for the  
485 woman, the women's award for this year. That isn't mentoring, but it is some involvement.  
486 We have numerous groups and they will do things and I join them. [both laugh]

487  
488 **B: But I'm going to skip back to teaching, because I have noticed on my little cheat sheet**  
489 **that I have forgotten something important. Do you have a favorite teaching story,**  
490 **something that happened that you would like to relate ... some kind of classroom story?**

491  
492 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  
493 that I continue to do. And that is towards the end of class, of a semester, not every time, but  
494 more often than not, I'll wind the students up by saying we're going to have a prize giving, or  
495 we're going to have a party. And then we do. And so from the projects we select the best  
496 projects and we show them in a theater. And then we get prizes from the booksellers and  
497 Microsoft and so on and present prizes. And I do that to make the students feel special and to  
498 give them something to take home to their parents. Being a parent myself, I know what a  
499 kick I used to get when the kids came home with a prize. And that seems to end dead when  
500 they leave school and go to university. And so I've tried to put just a little bit of that in.

501  
502 **B: You've just mentioned your children. How have you managed the balancing act**  
503 **between a wildly successful professional career and children, that on the web page, I**  
504 **did notice that you were the parent of two very successful children?**

505 [39:39]

506 J: Well the boys. I think the two secrets were — one I couldn't choose — was that my husband  
507 was an academic, which gave him the same freedom I had in terms of how he arranged his  
508 day to some extent, as opposed to, say, a businessman or somebody where you have to travel  
509 on business incessantly. And so he and I, when the children were very small, could share  
510 many of the duties. And secondly, we always had a nanny, and whereas that might sound like  
511 a colonial thing, I noticed last week when I went to have supper with a woman academic at  
512 the Technical University of Milan, she had a nanny and the nanny came in in the evening and  
513 put the children to bed, so she could spend the time with her husband. And I think that the  
514 idea of having three people to run a house is probably a better formula than two. [both laugh]  
515 Well, that's what we did, that's what we did. Yeah. And the kids turned out. Well, we always  
516 took them everywhere. We went on sabbatical. They've been to school in many countries.  
517 And that provided some instability for them, because they kept missing their friends, but it  
518 provided them with a view of the world they'll never forget. It's a hard decision, that one.

519  
520 **B: Did you ... are there any compromises that you've made in handling the career you've**  
521 **had. You mentioned one, you followed your husband to ...**

522

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

539

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

541

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

547

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

549

550 J: Travel.

551

552 **B: Travel. [both laugh]**

553

554 J: Reading about travel!

555

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

558

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

567 [45:15]

568 **B: A completely different question. If you could change one career decision you made,**  
569 **which one would it be? Or maybe there are no decisions you would change.**

570

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

574

575 **B: Instead you have one with 70.**

576

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

583

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

586

587 J: Oh, the story of the necklace.

588

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

591

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

593

594 **B: You didn't wear the right one?!**

595

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

597

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

599

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

602

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

612

613 **B: Congratulations. If there is one story that you want to tell right now so it won't be**

614 **forgotten by the world, what would it be?**

615

616 J: One story? Uhm. One story. Ha. I think perhaps the one is about my mother.

617

618 **B: OK.**

619

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

637

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

641

642 **B: And did they?**

643

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

646

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

648

649 J: Pleasure!

650 [51:36]

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651

652

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

655

656 **We wrapped up the interview and then thought about it and thought there were a few**  
657 **more questions that we should have asked and we had the time. So, Judith, what can**  
658 **you tell me that was important for you as a woman facing the tenure-track issues?**

659

660 J: OK. I started lecturing (as a lecturer as it was called in those days, I suppose the assistant  
661 professor level) in 1978, when I would have been 27. So I was young, just married, and  
662 really keen and eager to do my job. As it turned out, computer science was a very young field  
663 then and fully trained computer scientists with a Ph.D. in computer science were few and far  
664 between. So I was fast-tracked within the department and given promotion very easily. I  
665 moved up to associate professor within a few years and I was a professor by 1983. So ... in  
666 effect I could just relax after that. I didn't face the hurdles that people these days would face,  
667 because there was no competition. These days, even for women, it's pretty much more  
668 difficult, I think. So that was very easy. Now when I see women who are struggling with the  
669 same level as men, I can sympathize, actually, with their dilemmas, because trying to get  
670 sufficient papers and sufficient involvement in academic life and so on and at the same time  
671 bringing up a family is very difficult.

672  
673 **B: I appreciate that. Well, you sort of said it was difficult for women and different for**  
674 **women in computing these days. But the broader question is how do you feel about**  
675 **computer science education in these current times.**  
676

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

692 [56:05]

693 **B: OK. I guess finally ...well, have you had any lucky breaks?**  
694

695 J: I think I have. And in a way this follows on from the last question. I have been lucky in that I  
696 have been able to keep abreast of technology because I've been involved with companies. So,  
697 in particular, in 2002 I received a grant from Microsoft. It was a competitive grant, a  
698 worldwide competitive grant. There were only 42 given out of more than 100 applications.  
699 And from that, I then became involved with Microsoft Research, which is a wonderful,  
700 wonderful organization with some of the brightest minds on the planet. And I went and  
701 worked with them for 5 months. And then they invited me to lecture on their academic  
702 lecture circuit in Europe. And I went all around Europe, traveling, meeting people, meeting  
703 people from all different countries, seeing how they operated. But always in this sort of more  
704 mixture of research and teaching than one tends to find at SIGCSE conferences. So that was  
705 very stimulating. And through the Microsoft push, I got to hear about new things in advance



706 and be almost forced to know about them. Because people would ask me, “Oh, you’re with  
707 Microsoft, can you tell me about this new Microsoft thing?” I had to have an answer ready,  
708 which meant I had to swat it up. And I couldn’t be clueless or say, “Oh, well you know,  
709 that’s just technology!” And I now have great respect for what any of these big companies  
710 does. Not just Microsoft, I am sure the same is true with IBM, with Sun, with Apple. If you  
711 manage to get in with one of them and learn about the technology at a very intense level, it’s  
712 hugely worthwhile.

713

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

715

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

727

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

730

731 J: Thank you very much!

732 [59:56]