

# Computing Educators Oral History Project

## An Interview with *Maria Klawe*

Conducted Monday, June 27, 2005

In Lisbon, Portugal

Interview conducted by William Aspray

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[**Context for the interview:** This interview was conducted in part as a demonstration for members of the working group that helped define the CEOHP protocol during the ITiCSE 2005 conference in Lisbon, Portugal. As an experienced computing historian, William Aspray was helping other working group members learn the techniques. The room was rather large and echoed quite a bit. The windows had to be open to allow the air to circulate, so outdoor sounds were common. Several other working group members were present throughout this interview and can be heard speaking up at times in the background.]

1 [0:00]

2 **Bill Aspray: In the formal record.**

3

4 Maria Klawe: Maria Klawe.

5

6 **B: This is an interview on the 27th of June 2005 in Lisbon, Portugal, for the Program of**  
7 **Interviews “Building a Sense of History: Narratives and Pathways of Women**  
8 **Computing Educators.” Let’s begin — Oh, my name is William Aspray.**

9

10 **Let’s begin by having you talk a bit about your early life and your family. Could you**  
11 **start by telling us about what your parents did and what their education was?**

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M: So both my parents were university professors. My father ... they both came to be university professors by unusual routes. My father was born in Poland, left Poland during the war. Joined the Free French Army fighting against the Germans, fought there, was injured, and was evacuated to Scotland. My mother grew up in Scotland and, when my father recovered, they sent all of the Poles who had been evacuated, I guess, to a university in Scotland. He already had an undergraduate degree from the University of Grenoble. So he met my mother studying at Glasgow University, and they got married in 1943 and emigrated to Canada that year. And they both started out teaching in ... at the University of Toronto. They each had a Master's degree. Neither of them had Ph.D.s. My mother taught economics, and my father taught applied physics.

When they — I'm the second of four children, all daughters — when they first ... my ... the intention by my mother was to have two children. She was very serious about her career, and she intended to continue working after the two children were old enough to go to school. Birth control was not what it was those — it wasn't as effective in those days, and so she ended up having four children and going back to teach at an university when she was ... well, when my youngest sister was three.

And so she was actually out of teaching economics for twelve years, and staying home raising the children. And during that time the whole field of economics moved on, and she was never able to restart — it moved on and became very mathematical; she was never able to restart her research career.

And that — watching my mother go through the frustrations of being a university professor and being a truly amazing teacher, but never able to be promoted to full professor, she was promoted to associate professor and tenured based on her teaching, but was never promoted to full professor because she did not have a research career at that point — was one of the things that made me absolutely determined that I was going to make sure that, no matter what I did — I was sure I was going to have children — but that no matter what I did, I wasn't going to stop doing research.

So, my ... when I was born, my parents were living in Toronto, they ... my father left to take a job with the Canadian government when I was two, so we moved to Ottawa, lived outside Ottawa in a small place called Manotick. When I was four, he left to take a job with Thomas Nelson and Sons, which was a publisher in Edinburgh, we moved there. And when I was twelve he left that to take a job at the University of Alberta as a professor of Geography; he was an excellent cartographer by that point. So we moved from Edinburgh to Edmonton, which is a very ... it's a ... it's a hard move, I think to ... particularly for myself and for my older sister, who was fifteen, a hard transition to go from a private girls' school, very correct and proper, to a North American school just as you're entering your teens, or in the middle of your teens as my sister was.

The other thing I should say about my childhood is that, because my parents in fact expected to have two children, and because my older sister was a girl, when I was born, I think ... I don't know if whether he [my father] thought it consciously at the beginning, but by the time

58 I was ... certainly by the time I was five, I was completely convinced that I was a boy. And  
59 my father and mother were completely, you know ... they both agreed. But especially my  
60 father. So I grew up, you know ... throughout my life, the best way to make me interested in  
61 something was to say that girls didn't do it. So anything that girls did, I didn't do. So I didn't  
62 cook. I didn't play with dolls, you know. I hated wearing dresses. Any kind of decorative  
63 kinds of things, I was ... you know, I would climb trees. The first musical instrument that I  
64 played was the trumpet because girls didn't play the trumpet. I loved mathematics because  
65 girls were supposed to be bad at mathematics.

66 [5:17]

67 So one of the things that I ... you know, I think the two main things that influenced me, that  
68 came out of my childhood — obviously lots of things came out of it — but one was that I  
69 grew up really completely believing that I was a boy. And I think I was around seven before I  
70 literally gave up hoping every day that I would wake up as a boy. I just thought there was a  
71 significant error in the universe and that it ought to be fixed. [chuckles] And I was seven  
72 before I realized, you know, it's probably not going to happen. You're not going to wake up  
73 tomorrow and find out that the mistake has been corrected.

74  
75 And then the other one was this bit about realizing that if you stop doing research, the world  
76 moves on. And so if you're really serious about being a researcher, you have to keep doing  
77 research. And that's been something that has certainly affected me, not just in having  
78 children, but in terms of taking on administrative jobs. I wanted to make sure that I was  
79 always still active in research, because if you stopped, it would be very hard to come back.

80  
81 **B: And what were the expectations of your parents about the education you would**  
82 **receive?**

83  
84 M: So ... I think that because of the War, my parents put a huge [emphasis on education]. ... I  
85 think even without the War, just given their backgrounds, my parents would have thought  
86 that education was important. My mother is the daughter of a minister, and it was always  
87 expected — she was the oldest child, she was considered quite brilliant — and it was always  
88 expected that she would go to university and do extremely well, and play a ... be ... have a  
89 major intellectual impact in the world.

90  
91 And my father, also, he came from my ... I think, basically, a fairly well off family in Poland  
92 that had commercial interests. And was sent to France to do his high school, and then of  
93 course, went to university in France. And again, it was taken for granted that he would have a  
94 strong education. My father, obviously, lost everything during the War. My mother's parents  
95 disowned her when she married somebody from Poland, because, particularly in Britain, they  
96 were quite xenophobic at that point, and certainly within her family they were very  
97 xenophobic.

98  
99 And so, when they came to Canada, they felt they were starting life in a very new country,  
100 and that ... they truly believed that it was going to be a place where merit mattered more than  
101 background, and that education and success was going to be what you were expected to do.  
102 So that was one thing, it was certainly expected that all of us would go to university, all four  
103 children.

104  
105 The second thing is that my parents, from as long as I can remember, and certainly by the  
106 time I was three or four, thought that I was extraordinarily gifted, and that I could do  
107 anything. And this was ... I mean, I know from watching my own children grow up, that  
108 having your parents really expect you to be enormously successful has a great deal of  
109 benefits in terms of giving you confidence about what you can do. It also puts a lot of  
110 pressure on you.

111  
112 So I can remember, very clearly, being perhaps eight years old in Scotland, and doing well at  
113 school in the sense of getting good marks, as it was called — now it'd be good grades in  
114 North America. But not exceptionally [good ones], and I would sort of point out that there  
115 were others [who did better] to my parents, when my parents would say something about  
116 how intellectually gifted I was, and I would say things to my parents, like “Jennifer  
117 Whitehead gets higher marks than I do!” And they would say, “Oh yes, but you have no idea  
118 how deep your thinking is, and you’ll see in the long run how brilliant you are.” So I mean  
119 they ... they certainly believed it. There’s ... there was no question throughout my life that  
120 my parents thought I could do anything.

121  
122 **B: What about the expectations of your parents about disciplines that you might enter?**

123  
124 M: I grew up being very interested in all kinds of things. Interested in music. Very strongly  
125 interested in art. And they encouraged me, I think from at least as young as five, that I was ...  
126 one of the exceptional gifts that I had in their minds was artistic. But I was also clearly very  
127 interested in mathematics, and I can remember my father bringing me home advanced  
128 mathematics books when I was ten and giving them to me to see if I was interested.

129 [10:22]  
130 And, with the four children, they ... one of the ways they sort of tried to make sure that each  
131 of us felt valued — I mean, I know that, from talking to my three sisters, that each of them  
132 felt, intellectually, very undervalued in comparison to me. And that one of the things my  
133 parents tried to do [to make sure that each of us felt valued] was sort of characterize — you  
134 know, give each of their daughters something that they were wonderful about. So my older  
135 sister became ... was characterized as being very good at languages, and being a very good  
136 daughter. And I was characterized as being intellectually brilliant, but terribly behaved  
137 daughter, causing trouble all the time. My next younger sister was characterized as being  
138 gentle and sweet, and having wonderful dancing and sort of poetic kinds of things. [chuckles]  
139 And my final [sister] got to be the one who learned how to highland dance, and was sort of  
140 brought up thinking of herself as very Scottish. (She was the only one that was actually born  
141 in Scotland, but we left Scotland when she was six.) So I would say that I was sort of led to  
142 believe that I was brilliant and I was very good at art and very good at mathematics, and not  
143 particularly expected to be any good at sports, at athletics, languages. I’m trying to think  
144 what else I’m not good at.

145  
146 I was certainly not supposed to be a parent, in the sense that my father ... I mean, I was not  
147 supposed to be female, and it was just very clear to me that I had the “non-female” role to  
148 play. When my first child was ... when I was pregnant with my first child, my father would  
149 just, like, literally, look at me and say, “I just can’t believe that you are pregnant. I mean,

150 how could you be pregnant?” [chuckles] And when I was ... you know, breastfeeding, after  
151 Janek was born, my father would look at me and just astonishment he said, “To think I’m  
152 seeing you breastfeeding a baby, I never thought that would be possible.” So you know, I  
153 mean, it was a very, very strong belief.

154  
155 And I remember my husband said to me after Janek was born, he said it was the first time  
156 he’d ever seen me happy to be female, because I could have a child.

157  
158 **B: Do you think that your parents accentuated proclivities that the kids had, or imposed**  
159 **them on them?**

160  
161 M: Well, just to give you an example, I didn’t really start doing anything athletic until I was  
162 thirty-seven when I ran my ... I mean, I started running when I met my husband, Nick, when  
163 I was twenty-eight. But I ran my first race, 10K, when I was thirty-seven, and then my first  
164 marathon less than a year later. And I finished fourth in my age group in the marathon, and  
165 for the first time I went, “Oh my god, I might have some athletic ability!” So, of course I  
166 trained, and did reasonably well.

167  
168 When my daughter started running and doing well at running, my mother looked at her and  
169 said, “Where could she get that from? There’s nobody in her family who has ... none of her  
170 parents have any athletic ability!” And I’d been showing my mother medals and photographs  
171 from winning marathons for years! It was impossible for her to believe that, I mean, it was  
172 just like having a baby for my father. So I think that what happened was that they looked for  
173 proclivities and reinforced them. If I look at my older sister and my younger sister, my older  
174 sister is a palliative care specialist, she’s a medical doctor. And my next younger sister, she  
175 has a Ph.D. from Emery in Religion and Anthropology, and she teaches at an university. And  
176 they both felt that our parents could never recognize their intellectual ability in comparison to  
177 mine, because we had been so clearly typed.

178  
179 So, all of us as parents do our best to find ways to make each child feel valued and loved and  
180 so on, and so I know my parents were trying hard. But I know that we all, including me,  
181 [chuckles] spent time finding our way out of the particular image they created for us.

182 [14:57]

183 **B: Had you taken a fair amount of preparatory work in math and science when you were**  
184 **in K-12, K-13?**

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186 M: I took ... I never took any biology. Biology never particularly interested me when ... when I  
187 was in high school, even though I loved nature, and loved plants and birds and wildlife, and  
188 all those kinds of things. But I thought of biology, as it pretty much was in those days, as  
189 entirely memorization and I wasn’t interested [in that]. The one course I really ... subject I  
190 really disliked in school was social studies because it was just so much memorization.

191  
192 But other than that I took, of course, mathematics. But by grade twelve I was taking the  
193 advanced trig course, which, actually, in that particular year, they covered trig in the first half  
194 of the year, and then they did linear algebra and vectors and so on, matrices, for the second  
195 half. Calculus in ... I, at that point, was living in Alberta, and they didn’t teach calculus in

196 high school. So that was all of the mathematics that I had. And then I took physics, and  
197 chemistry for both grade eleven and grade twelve.

198  
199 And I never worked. I never did any homework or anything like that while I was going  
200 through high school in the sense that I never did any homework at home, but there was  
201 always lots of time to do all of the assignments that we were expected to do by ... I think,  
202 like many students, I would do my math homework in my physics class, and my physics  
203 homework in my English class, and my English homework in my something else class, and it  
204 worked out fine. So when I arrived at university, I had some knowledge of linear algebra, and  
205 so on, but no knowledge of calculus.

206  
207 **B: I'll move on to university in just a moment, but I wanted to ask one last question about**  
208 **the early years, which is: Were there some individuals, other than your parents, maybe**  
209 **your siblings, who were a shaping influence, either other students, or adults?**

210  
211 M: I'd say ... so I had one important encounter with somebody when I was twelve years old. It's  
212 interesting mostly because it's a negative encounter. This is somebody who was actually a  
213 geographer from the University of British Columbia, it turned out, and he was visiting my  
214 father in Edinburgh at the time. I was absolutely convinced that I was going to do art and  
215 mathematics and other areas of science, and possibly literature as well, and that nothing was  
216 going to stop me from doing this. And we got into this argument where he was telling me  
217 that the only way to succeed in the world was to focus, and that I was going to have to pick  
218 one thing to be passionate about. And my response was, "Leonardo da Vinci didn't!" And it  
219 was a long argument, and very heated. It was something that I carried; it was one of those  
220 other pieces that said, "There has to be a way that you can have more than one passion at a  
221 time."

222  
223 Somebody who was quite influential when I was in junior high school and then again in high  
224 school was my music teacher. My parents didn't allow us to learn a musical instrument, and  
225 the reason was that my mother's youngest sister had been a concert pianist and had been very  
226 pressured. So my parents were against learning, our being allowed to learn a musical  
227 instrument, and I was intensely interested in doing this. So when we moved to Edmonton  
228 when I was twelve, there were music classes available, but my parents wouldn't let me. So I  
229 was enrolled in drama instead. But without telling them I went and told the teach ... the  
230 school that I had been transferred into music classes and went to the music classes. When my  
231 parents finally found out, the music teacher stood up for me and allowed me to stay in the  
232 class. So I actually studied music for five years, starting at that point, starting with the  
233 trumpet, but adding a number of other instruments. The music teacher was enormously  
234 supportive of this. It was someone who was ... who I still am in contact with today.

235 [19:57]

236 I've had many ... the other teacher I ... I mean, I had many excellent teachers in high school.  
237 Really the teaching was superb, and I think this is partly because it was in Canada. I also ... I  
238 had at least two mathematics teachers who were extremely encouraging with mathematics. In  
239 the advanced trig class I was the only female in the class, and I found the course extremely  
240 easy, and it was not found to be easy by the most of other students. And the teacher was  
241 always saying, "You boys have got to be ashamed, you're having the pants beaten off you by

242 a girl!” But it was said in a very positive way. So, I would say that it’s certainly true that  
243 there were a lot of high school teachers. Also my art teacher was extremely encouraging. I  
244 grew up in an environment where one ... certainly within high school, there was tremendous  
245 ... there was certainly no discouragement about being good at math or at art or at music, or  
246 from their perspective, about having to choose one among many things.  
247

248 **B: OK. So it’s quite clear that you had expectations and your parents had expectations**  
249 **that you would go off to college. How did you choose where to go and what to do?**  
250

251 M: S — As you can tell, I usually start every sentence with “so ...”! The common thing within  
252 Canada at that time, still true in Canada, is you go to the local university. Both of my parents  
253 were teaching at the University of Alberta, which is in Edmonton, and was the local  
254 university. There was some discussion about my going elsewhere, and for that reason, I  
255 actually wrote SATs. No one in my school, I think, had written SATs in the previous several  
256 years, and so ... but I think it’s partly also because I was applying to ... I only applied to two  
257 other universities other than the University of Alberta. One was Queens University and one  
258 was the University of British Columbia. I think Queens required SATs. I literally had no idea  
259 what SATs were. I had no idea that anyone ever studied for them. We had no idea about the  
260 fact that you might not write both of the math SAT exams. So I signed up to write the two  
261 usual verbal and quantitative SATs and then I wrote math one, math two, and physics. When  
262 we got my SAT results back, the counselors were ... they weren’t quite sure what they  
263 meant. I had straight 800s, except for the verbal one, where I had seven-twenty something or  
264 other. So their response was, “We think this is good, but we don’t really know.” [loud  
265 laughter] And I said, “You know, it’s really strange, because in the physics exam, they were  
266 covering all kinds of topics that we’d never covered,” and I said, “I was just guessing, that’s  
267 really unusual.”  
268

269 In any case, Queens offered me a scholarship, UBC offered me a scholarship, and the  
270 University of Alberta offered me scholarships. My parents, when we moved to Canada, had  
271 been — and in fact when we lived in Edinburgh — were extremely poor. I can remember the  
272 first piece of clothing I ever had that was brand new. I was twelve years old, and it was a blue  
273 nylon t-shirt. Very stretchy. And I was still wearing it when I was sixteen. It was very  
274 precious to me; it was the first thing that wasn’t a hand-me-down. Most of my clothing didn’t  
275 even come from my sister as a hand-me-down. She had gotten them ... my parents would get  
276 them from the church as hand-me-downs from other things.  
277

278 By the time they were ... I was going to university, we had bought our house. Money was  
279 still very tight. And I had a much larger scholarship at the University of Alberta, because  
280 most of the scholarships are provincially based. And I was the ... had the second highest  
281 marks in the province, so I got the second largest scholarship in the province. And so my  
282 parents had said that I really could go away if I wanted to go away. But I didn’t think that  
283 was a good idea. So I just felt that financially, things had been so strapped, that it was just  
284 inappropriate.  
285

286 So I went to the University of Alberta. I was going to study engineering. I had thought very  
287 hard about how I was going to combine art and mathematics and science, and had decided

288 that the best route was architecture. But because I really wanted to get a strong math and  
289 science education, I decided I'd do, first of all, an engineering degree and then I'd go to  
290 architecture school after that.

291 [24:52]

292 So I was signed up for engineering and three days before classes started, when I was  
293 checking the courses that you would register in, I found out that the engineering students  
294 were not allowed to take the honors mathematics classes. Now, today that would be different,  
295 I think, in most Canadian universities. They would recognize there would be students who  
296 were interested in engineering who would want to take the honors math and the honors  
297 physics classes, maybe the honors chemistry classes. Canadian system is quite different from  
298 the US system in that they have — particularly in math and physics — they tend to have a  
299 completely separate track of classes. So, if you're not taking the honors math class, you're  
300 not getting theorem-proof, epsilon-delta, calculus, you know, everything in a completely  
301 rigorous way. You're getting much more cookbook type things.

302  
303 When I found out about this, I literally, that day, switched to honors math just so I could take  
304 the honors math classes. And I would love to tell you that it was because ... because I really  
305 loved mathematics and so on. It was ... I grew up, you know, having this feeling that I  
306 should do "the most difficult thing" and my entire personality was wrapped up in being "the  
307 smartest person in the world." And, yeah, obviously, this all has a lot to do with my parents  
308 telling me that I was "the smartest person in the world" and I just wanted to demonstrate that.  
309 So I actually gave up a significant scholarship in terms of the funding of that time. I had  
310 more than one scholarship, but I gave up one that was designed just for engineering because I  
311 didn't do that. So I started out University of Alberta, first year, honors math.

312  
313 The first course, or the course that I think really resulted in my becoming a mathematician,  
314 was the honors calculus class that was taught by a professor called Jack Mackey. He was  
315 very young, he didn't look young to us, but I think he was in his second year of teaching,  
316 something like that. He came in, and I was actually ... for some reason, they had a huge  
317 number of students enrolling in honors math that year. Normally they would have about 60  
318 majors, and they had about 120 who wanted to take honors calculus, which was just unheard  
319 of. So they created a new section. Even though I started out in his section, they kicked me  
320 and another half of the class out to another section. Of course, I had heard the first lecture,  
321 and what he said he was going to do was he was going to take the first two weeks — and this  
322 was a year-long course — and he was going to present all of the ideas in the first two weeks.  
323 And then he would come back and do it in-depth. I heard the first lecture, and it was so  
324 exciting, and so fast, that I was afraid to blink. It was like someone had just — I'd been  
325 living in a dark room all of my life and somebody had raised the blinds. It was wonderful!

326  
327 And after ... he knew I had been assigned to another class, and after three ... after the first  
328 three lectures or so, he asked me to come up and he said, "You know, you're in another  
329 class." And I said, "Yes, but I won't go." And he said "But, you have to go." and I said "No,  
330 I'm not going. I'm staying here. This is too good. I'm having ... I've never seen anything  
331 like this before. I'm not going." So he finally gave in. That course was just an amazing  
332 course ... so that was the ... the ideas for the first two weeks and then the rest of it was  
333 theorem-proof. The entire thing, it was [Tom M.] Apostol's Calculus, and I totally loved it.



334  
335 Most of my other classes that year were not particularly interesting except for my fine-arts  
336 class. The physics I already knew, it was the same as high school physics. The linear algebra  
337 course was just — actually it wasn't, it was analytic geometry and something, and it was  
338 terribly taught and a very bad class. I had a first-year psychology course that was excellent,  
339 that was also very good. I also took first-year economics because my mother insisted, for my  
340 mother. She was sure I should be ... go into the field of economics. And she was sure that if I  
341 just took the class I would understand, and so I took that course. I mean, I still remember a  
342 lot from my psychology and economics that I worked that year, but neither of them had the  
343 magic that this calculus course had.

344

345 **B: So did you ever take any of those engineering courses later on?**

346

347 M: Never.

348

349 **B: Never. Why don't you go forward then and tell us more things about your college days.**

350 [29:44]

351 M: So the next thing that happened that was influential was that this was the time of student  
352 revolt on campuses. I guess I should also mention that in the summer before I started  
353 university, I had ... I'd won — and this is one of these funny things about how I wasn't  
354 supposed to be good at languages — but I won one of the three French awards to study  
355 French during the summer at Université Laval. And while I was there, because I was under  
356 eighteen, I was ... in fact, I think I turned seventeen just as I left to go to Laval.

357

358 We were staying in a place called College Saint Jean and my roommate was somebody from  
359 the same high school, whom I'd virtually never spoken with. And it turned out that she was  
360 living a life that I was completely unaware of. So I had been brought up in a very protected  
361 environment. She introduced me to radical student politics. So I came back, to my parents  
362 horror, and of course being really ... very close to my parents — it would never occur to me  
363 not to tell them about these things. Of course, they were just beside themselves

364

365 So that first year I became involved in student politics. I was doing fine academically. I went  
366 back to [University of Alberta]. But it was very hard for me to see why I was at university. I  
367 certainly liked mathematics. But these were the days — so this is now, I'm starting my  
368 second year in 1969, so it's the late 1960s. There's this whole idea that the world is changing.  
369 The old ways of doing things are not going to make the world a better place, we have to  
370 completely rethink things. The rhetoric was that mathematics and science and engineering all  
371 contributed to the ... to the forces in the world that were really destroying the world. I  
372 couldn't find a way to justify the fact that I felt the world should change. And studying  
373 mathematics, I just couldn't see any connection between that. So halfway through my third  
374 year, I dropped out of the university.

375

376 And I went off to make candles and do embroidery and leatherwork. I dropped out of  
377 university without completing any of my courses. They were all full-year courses, so I had no  
378 credit when I had left at Christmas. I still had ... I had some money. Actually I did quite well  
379 supporting myself, I had many different jobs. I made a lot more money from being an artist

380 than I did from being a math student, but I did teach undergraduate. I started to teach ... I  
381 was a teaching assistant by the time I turned eighteen. And I sold a lot of paintings and did  
382 graphics work for a small film company.

383  
384 So we [I and a friend] were in Vermont, making candles and doing leatherwork for a whole  
385 two months before my savings ran out. In September, we were on a plane going to India. Of  
386 course, we were going the least expensive way, so we were going to fly across the Atlantic  
387 on the shortest and least expensive trip, which was from Halifax to Glasgow. And then  
388 hitchhiked to Venice, took trains to Istanbul, buses from there through Afghanistan to  
389 Pakistan, ended up in India three days before the war broke out with Pakistan.

390  
391 Completely unexpectedly, my parents had ended up going to India as well, my father with  
392 the United Nations, now, with the United Nations development program. They were in a  
393 place called Hyderabad. We went to go visit them. We arrive at their place the day the war  
394 with Pakistan breaks out, and we are stuck staying with them for three months.

395  
396 The place we went after Hyderabad, the first place was ... well, we went [to] Puna and  
397 Bombay, but then Goa. And, sitting on the beaches of Goa, I realized that I had been  
398 surreptitiously doing mathematics in every possible way I could find. I was playing chess. I  
399 was buying recreational math books. And I realized that I really missed mathematics. So I  
400 wrote back to the University of Alberta and said, "I want to come back and be a Ph.D.  
401 student in mathematics. I've decided mathematics is for me. Please take me back. And please  
402 take me back as a Ph.D. student."

403  
404 Remember, I had finished two years as an undergraduate of a four-year honors degree. I had  
405 one course, by chance, out of that year when I dropped out, because I'd happened to come  
406 back to see my mother before she left for India, and they were having the final exam in one  
407 of the courses that I had been enrolled in. And I heard it was an open-book exam and I said,  
408 "Great, I'll just take the textbook in and I'll write it. I'll learn it as I go." And I got an A in  
409 the course — and completely antagonized a bunch of other students in the course, who  
410 thought this was completely unfair.

411 [35:03]

412 In any case, I came back, came back at the end of that year. The math department said I  
413 couldn't be a graduate student because the official ... I had no undergraduate degree, and  
414 they would not ... were not allowed to accept me. But they would replace all my  
415 undergraduate requirements by the equivalent graduate course. So I came back sitting in the  
416 first graduate course in topology and the first graduate class in algebra and all of these kinds  
417 of things, without any of the pre-requisites (being the third or fourth year undergraduate  
418 course in all those classes). And, of course, what I realized was having been gone for a year-  
419 and-a-half at that point, or maybe a year and nine months, I had forgotten everything I knew,  
420 even about the courses I had taken. So I was sitting in these graduate courses, knowing none  
421 ... knowing literally nothing of undergraduate mathematics. And that was probably the best  
422 thing that had ever happened to me. For the first time ... I had never worked, in my life. I had  
423 never studied for exams. It never had been an effort. Now I was killing myself working. And  
424 I was only doing ... by the time it got to the first mid-term, I barely passed the midterms. Of  
425 course, by the time I got to the end of the semester, I was doing well. And ... but I had

426 learned this work ethic.

427  
428 And ... I ... they let me into the Ph.D. program the next year. And I officially finished my  
429 undergraduate degree that year. Even though I was actually, specifically, a few courses —  
430 credits — short, they gave me the honors math degree at the end of that. I started doing my  
431 Ph.D. in mathematics. I stayed in Alberta and I got an NCERT scholarship, which is sort of  
432 like getting an NSF scholarship. So I could have gone elsewhere, but [my friend] was now ...  
433 had been accepted into the zoology program at the University of Alberta, so I started there.

434  
435 I started out working in algebraic topology. I had ... by the time I got to, basically, half way  
436 through my first year [... I ran into problems with my advisor and] I decided to switch  
437 advisers. And so, at this point, I couldn't have cared less what area of mathematics I worked  
438 in, because I just wanted to have a good adviser. So I interviewed all of the other graduate  
439 students on the quality of their adviser, and decided which one got the best ratings. And the  
440 one I picked was somebody called Tony Lau, who, of course, looked ancient to me at that  
441 time — he was probably thirty and I was twenty-three maybe. Or maybe twenty-two. And  
442 went to go meet with this person, and asked him. He happened to be in functional analysis. I  
443 really ... it wouldn't have mattered what area he was in. I went to go meet with this person  
444 and asked him.

445  
446 At any rate, he felt that he was too junior to supervise me, and would prefer that I found  
447 someone more senior. So he asked me if I would — he suggested four or five people and  
448 asked me if I would go and meet with each of them and see if I shouldn't really work with  
449 them. At this point, Tony just had one student, Keith, who was the one who'd given him such  
450 good recommendations. Did all of these interviews and came back.

451  
452 I went off to interview the other faculty members, and I told each one of them that I had  
453 decided I had wanted to work with Tony Lau, but he was uncomfortable with supervising me  
454 unless I interviewed them first. And of course, each one of them told me about his work —  
455 they were all male; there were no women faculty doing research in the department, and so no  
456 women who could have supervised me — and they each said at the end of the conversation,  
457 "We think you should work with ... I think you should work with Tony."

458  
459 So I went and started working with Tony, and Tony ... Tony is just one of the most  
460 wonderful people I have ever interacted with in my life. He's now the chair of the  
461 mathematics department at the University of Alberta. He has had ... three of his students  
462 have become academic administrators. One is the dean of science at Dalhousie University,  
463 that was Keith, who was his first. I'm the second. And the third one, Brian Forrest, was chair  
464 of the pure mathematics department at the University of Waterloo. He's, I think, had more  
465 successful Ph.D. students than any other faculty member that came out of the University of  
466 Alberta. So I claim that my taste was very good, picking Tony, and that my method — you  
467 know, the surveying — actually really worked.

468 [39:54]

469 Tony spent a fair amount of time thinking about what area I actually showed talent in  
470 mathematics and then looked for an area within functional analysis that might match that  
471 talent. Which I thought was really quite extraordinary just by itself. He picked a couple of

472 papers and asked me to read them. They had to do with left amenable semi-groups. And I  
473 read the first one. His method was to ... if I would read the paper and then if I would present  
474 to him, check the ... go through all the proofs, understand them, and then come back and  
475 present to him. I read the first paper, that was fine. I read the second paper, and there was a  
476 part towards the end of the paper where it said "and it's clear that we can generalize this  
477 result to such and such" and I couldn't get the generalization to work. And I worked on it for  
478 two or three days, and was able to get part of it, but couldn't get all of it.

479  
480 So I went off to see Tony, feeling quite demoralized that I couldn't understand this paper.  
481 Showed him where I was having difficulty. Showed him what I had done. And he said, "Oh,  
482 that's amazing, I think you've proved a new result." Pulls out another paper to give me and  
483 says, "I think that this thing you've created to try and do this generalization — seems there  
484 was just an error in that paper — but I think the thing that you created while trying to fix this  
485 might actually solve this other problem that's been open for about twenty years." And so I  
486 took paper number three, and sure enough, he was absolutely right. If I generalized what I'd  
487 done already, I could solve that problem. He looked at this, and he said, "Wow! I think we'd  
488 better have you solve another problem, just in case that's a fluke." And so there were two  
489 other problems in ... related in the same field, that had been open for about the same amount  
490 of time. So he gave me the two papers and I spent the next four months or so working on  
491 those two problems. And I found out ... it turned out that I could show one of them was  
492 equivalent to the first, so that was also solved. And then I found a completely different  
493 solution for the third one.

494  
495 So this was, maybe ... this was the first, maybe, six months of my third year. And it became  
496 clear that this was really more than enough for a Ph.D. Tony was about to head off to  
497 Berkeley for his sabbatical for the next year. And he said, "You know, it's too late now for  
498 the job market," I mean, because you apply for jobs in the fall, and it's a terrible time for  
499 getting jobs in mathematics in any case. "It's too late to apply for jobs for this coming fall.  
500 Why don't you go off to the University of British Columbia and take the final year?"  
501 Because I still had ... I had a four-year fellowship. "Take the final year of your fellowship,  
502 this actually would be a post-doc there, you're still officially a student." Because I couldn't  
503 continue having ... it was too late to apply for post-docs as well, for the coming year, so,  
504 "Take your fellowship." Tony had done his Ph.D. at the University of British Columbia, so  
505 he said, "You know, my Ph.D. supervisor, Ed Granirer, can be your official supervisor while  
506 you're there. You can get some more teaching experience." I'd already taught a full course,  
507 myself, at the University of Alberta and really enjoyed it. "You can go out there, and you can  
508 apply for jobs in the fall, and this will give you exposure to another Canadian university.  
509 You'll meet more people." Tony is saying, "You know, I think Vancouver would be a good  
510 place for you to go."

511  
512 So I went to Vancouver. I went off to UBC. Discovered that I couldn't do mathematics. I was  
513 just much too stressed out to do that. So ... though I ... I mean, I worked the entire year  
514 trying to do mathematics. But, here I had three results, major results, in something like five  
515 months. I didn't produce another result for, I think, probably about thirteen months. That was  
516 a very, very hard time, because I couldn't be productive in mathematics for whatever reason.  
517

518 But I spent my time doing other things. I spent my time learning French. Again. I spent my  
519 time learning to play a musical instrument. Again. I spent my time making friends. I had  
520 given myself one year. In any case, I'm at the University of British Columbia, not being  
521 productive in mathematics, but I'm applying for jobs. What I remember is there were thirty  
522 ... there were 83 jobs advertised in North America for pure mathematicians at that point. The  
523 jobs that I could actually qualify, I applied for all 83 of them. I have applied to many places  
524 you have never heard of — there's Bowling Green University. In any case, out of this I got  
525 ... I got a post-doc offer, a post-doc from ... that I could have taken anywhere. I got one  
526 tenure-track offer at Oakland University. And I got one offer as an assistant ... basically as  
527 an assistant professor, one of these three-year non-tenure-track assistant professors at Temple  
528 University.

529 [45:33]

530 My adviser, Tony, said, "Take the tenure-track offer!" And part of that was that nobody was  
531 getting tenure-track offers, it was a really very bad time. This is, by now, applying for jobs in  
532 1976, and my Ph.D. is officially in 1977. Tony had given me such advice, great advice, in the  
533 past, that I agreed to do that. I went off to Oakland University, which is twenty miles ...  
534 twenty-five miles north of Detroit. My teaching load was two courses per semester. I was  
535 teaching, you know, a pre-calc course, an advanced calculus course, a linear algebra course,  
536 and maybe advanced linear algebra course, something like that, for my first two semesters.  
537 And I completely hated it there. I've always loved teaching, but I found it very hard to teach  
538 these students. They were very ... I would be teaching, literally, advanced calculus to  
539 students who couldn't factor polynomials, who couldn't add fractions. This is familiar to  
540 many people teaching mathematics in US universities.

541  
542 I found this area ... there were no foreign restaurants. There were no single people in the  
543 area. I was ... it was a very scary place to be, because there was tremendous fear of crime in  
544 the area. So there was this bit about worrying about your place being broken into. I ... just ...  
545 The way I coped with being there for that year was I went to a conference once a month.  
546 And, at one of those conferences, I happened to find out that there were people doing  
547 mathematics in computer science departments. And, in getting ... becoming friendly with  
548 one of ... with somebody who I'd known as a ... actually as a mathematician.

549  
550 I guess the other thing I should mention is that, even by the time I was finishing, during my  
551 time that I was at University of British Columbia, I had become interested in discrete  
552 mathematics. I'd been going to discrete combinatorics colloquia and sitting in on a discrete  
553 math course, a graduate course that was taught there. And I'd actually started to do some  
554 research in discrete mathematics. And, because I was doing some research in discrete  
555 mathematics, I was actually getting to know the names of some people who were actually  
556 computer scientists, like Tarjan, and in this particular case, Vashek Chvátal.

557  
558 When I met Vashek Chvátal for the first time, he was half between computer science and  
559 mathematics — or actually, I think, operations research at Stanford University. And I ... he  
560 was constantly getting ... this was in March, and he was constantly getting phone calls from  
561 graduate students of his who are finishing Ph.D. in computer science and getting offers from  
562 Bell Labs and Harvard and Berkeley and so on. And I'm saying, "What is this? What's the  
563 difference between mathematics and computer science? These students are basically doing

564 mathematics, and they've got job offers at top universities. Here am I, I've solved three  
565 twenty-year old-problems, and what do I get? I get a job offer at Oakland University." And  
566 he looked at me and said, "Life's like that, why are you complaining?" He said, "Look at  
567 Andy Yao! Andy Yao did his Ph.D. in physics. He worked with a Nobel Laureate at  
568 Stanford. He realized, shortly after he finished — he did a post-doc with one of the top  
569 people in the world — he realized that there were no jobs. Theoretical physics was not going  
570 to be an area in which he was going to get a great job. He went to the University of Illinois  
571 and did his second Ph.D. in two years, and he's one of the stars in theoretical computer  
572 science. He still does mathematics. Why don't you do that?"

573  
574 This was March 15<sup>th</sup>. I decided that I'm going to do a second Ph.D. in computer science. This  
575 time, I'm not going to make the mistake I made the first time. The mistake I made the first  
576 time was that I went to the University of Alberta, and the reason Tony didn't want to  
577 supervise me was that, frankly, he thought that in order for me to get a good job I was going  
578 to need somebody who had connections. A number of people had tried, including Tony, had  
579 tried to convince me to switch to a Ph.D. program at Harvard or Berkeley, or something in  
580 mathematics, so that I had a better shot at getting a job given the job market. And I had  
581 ignored them all. And I decided that this time I was going to go to one of the top computer  
582 science departments of the world and get a Ph.D. in computer science and my life would be  
583 fixed.

584 [50:21]

585 So I asked Vashek at this point, "What are the top three departments to get a Ph.D. in  
586 theoretical computer science?" And he said, "Stanford, MIT, and the University of Toronto."  
587 So I said, "What do I do about finding out if I can get in?" And he gave me a name of  
588 someone to call at each place. I cannot remember ... I haven't been able to remember for  
589 years, in fact, I may have completely just forgotten at the time, who he told me to call at  
590 Stanford. But whoever it was I called, this is March 15<sup>th</sup>, and this person says, "I'm sorry, all  
591 of our applications were due January 15<sup>th</sup>. We make no exceptions. Perhaps a year from now  
592 you can apply for the year after. There's no possibility."

593  
594 I do remember the people I called at MIT and the University of Toronto. At MIT I called  
595 Albert Meyer, who was extremely friendly on the phone. He said, "Oh, you sound like you'd  
596 be a great student to come here. The only problem is, we currently have eleven students,  
597 Ph.D. students in theory, and we have funding for five and a half, so ... we've already  
598 committed all our funding for the coming year. We don't think we'd be able to fund you." Of  
599 course, I didn't have money.

600  
601 I called the University of Toronto, the person I called was Derek Corneil. Now, there's a  
602 couple of things working in my favor. The first one is I'm Canadian and there's always an  
603 interest in having more Canadian graduate students in Ph.D. programs in computer science.  
604 The second one was that Derek had been on sabbatical at the University of British Columbia  
605 while I had been there for that final year. And I had actually sat in on the graph theory course  
606 that he [taught] — this was the course I had been sitting in on. So he actually knew me.

607  
608 So I call up, and I say who I am, and I told him I was interested in doing a second Ph.D. He  
609 said, "Oh, that's wonderful! I'm the director of graduate studies! You're in!" He said, "And

610 I've got funding for you as well! Just show up here!" And I said, "You know, Derek, there's  
611 a small issue. I've never taken a computer science course." He said "No worries, no worries.  
612 You'll be fine." So I show up. I arrive at the beginning of September in Toronto. I've never  
613 programmed. I've never taken a computer science course. And I am signed up for four  
614 graduate courses in the fall, four graduate courses in the spring, and plus I'm going to audit  
615 one additional course each semester.

616  
617 And the first course, the first lecture I go to, is operating systems. It's one of these, as is quite  
618 common in many places, it's a joint undergraduate ... it's taken by both the senior  
619 undergraduates and the graduate students. And there were too many students for the  
620 classroom. There were perhaps 20 people sitting in the hallways and so forth, and a hundred  
621 seats in the classroom. And the instructor says, Scott Graham says, "There are too many  
622 people in this class, and it's an extremely difficult course. So if you are not a star  
623 programmer, don't take this course. This is the hardest ... it has the hardest programming  
624 projects. If you're not a star programmer, don't take this course." Well, you can imagine.  
625 You've already heard: how do you make Maria do anything? You tell her she can't do it! I  
626 went up to Scott [the instructor] at the end of the class and I said, "I've never programmed,  
627 but I'm willing to work really hard, and I'm going to take this course." He looked at me and  
628 he said, "You're going to fail. You don't have a hope in hell of getting through this course."  
629 Of course, I was even more determined.

630  
631 Unfortunately, because I didn't know how to program, it was very hard for me to find  
632 teammates to work with me, and so ... I ended up with two other people, one of whom really  
633 was useless. And the other person, who had been, I believe, an undergraduate at Harvard, and  
634 had not had a lot of programming experience, and so had been, sort of, turned down by other  
635 teams. So, we were the leftovers. Of course, I was determined that we were going to do very  
636 well in this class. I'm happy to say that I got the highest mark in the course, and we had the  
637 first ... you know, the whole class was writing a concurrent operating system and making it  
638 work. We had the first one in the class that actually compiled and operated correctly.

639 [55:04]

640 Did I work hard? I worked harder than ... I mean, not just in that course, but that year I  
641 worked harder, I think, than I had ever worked in my life before, including the year that I  
642 started out when I came back from having been out of university. But, of course, the thing  
643 that had helped enormously was I had been through this experience of starting taking a set of  
644 challenging courses without having had the material, without knowing the prerequisite. So I  
645 knew it was possible. I was absolutely convinced that if I just stuck with it that it would  
646 eventually become ... I would eventually understand what I was doing.

647  
648 By the time I ... by the time February came around — I got straight As in my fall courses —  
649 and by the time February came around I was getting phone calls from other computer science  
650 departments in Canada saying, "We hear that you're interested in teaching posit — in being  
651 an assistant professor of computer science. We don't care whether you have a second Ph.D.  
652 or not. Why don't you apply?"

653  
654 And I ... one of these invitations came from the University of Calgary. Calgary is also in  
655 Alberta. Alberta is home. I applied for this job. I went up for my interview. Came back from

656 the interview on Saturday. There's a message waiting for me from one of my roommates  
657 saying, "Call the head of the department. He called and he says you must call him  
658 immediately when you get back." I called the head of the department. He answers and he  
659 says, "I heard that you were out interviewing for jobs." I'm suddenly thinking, "Oh my  
660 goodness! Maybe there's some rule about graduate school students being allowed to  
661 interview for jobs." And I very hesitantly said, "Yes." And he says, "Don't you understand  
662 we have positions in our department open?!" I said, "But ... you're a top-ten department.  
663 You're a good department!" And he said, "There had better be an application on my table, on  
664 my desk, by nine o'clock on Monday morning."  
665

666 So I did that. And lo and behold, I did finish that second term of classes, but I started as an  
667 assistant professor July 1st. Tenure-track assistant professor. They decided that, given that I  
668 had such a strong mathematics background, it would be really good for me to really get into  
669 understanding systems stuff — and I was quite interested. I had certainly, actually enjoyed  
670 this operating systems course enormously. I was interested in learning all about systems.  
671

672 So they put me in charge of the systems seminar for the department. My teaching assignment  
673 for that fall was compilers and hardware. It was the introductory hardware architecture  
674 course. Compilers was a third or fourth year senior course. Well, compilers was not a course  
675 I had taken out of my eight courses that I had taken the preceding year, and unfortunately the  
676 whole — Rick Haner was at the U of T, at that point had devised a whole class around a set  
677 of software he had written that would provide a skeleton. And then they could, the whole ...  
678 all the homework assignments were programming pieces that would fit into the skeleton. And  
679 it was not written. There was no book about it anywhere.  
680

681 So I taught this compilers class, literally, by having a one-hour meeting with Rick once a  
682 week to teach me what I would teach for the next week. We were using the Dragon Book by  
683 Aho and Ullman. And I taught this course without ever letting on to my students that I didn't  
684 have a clue what I was doing. At some point the students would say, "But we don't really see  
685 the big picture? Can't you explain to us how all the pieces are going to fit together?" I said, I  
686 lied and said, "You know, I think this is one of these courses that you're really going to  
687 understand best if we understand one piece at a time. And then I'm going to show you how  
688 they all fit together in the end." I can still remember the day when I suddenly saw it myself  
689 and said, "Oh my god! I understand! I know how a compiler works! I can do this!" It was  
690 about two or three weeks before the last lecture in the class.  
691

692 I got good teaching evaluations in the class. At the very end of the course I said, the very last  
693 day, I said "By the way, I didn't have a clue what I was doing. I was learning it as I was  
694 going along." And they went, "Oh! You shouldn't have told us! That's so worrisome!" And I  
695 said, "Well, did you have any idea?" And they said, "No."  
696

[60:09]

697 Another very important thing happened, that particular ... early in that year. We invited  
698 another computer scientist to come and give a talk, his name was Nick Pippenger. And he  
699 arrived, and he happened to arrive on the day that I really completely broke up with my then  
700 current boyfriend. I should say, between the time that I'd left that person and that time, I had  
701 been through many short-term relationships.



702  
703 But I had decided that I really wanted to settle down and have children. And the person that I  
704 broke up with that day, I had — he had expressed interest in getting married and having  
705 children and I was very interested in ... I really was ... at this point I was twenty ... seven, I  
706 guess, or maybe I'd just turned twenty-eight, and I really felt it was time to have ... to be  
707 settling down and having children if I was going to do this. So I had entered this relationship  
708 with this particular individual, really believing that he was very serious, and had found out,  
709 after a couple of months — and he was actually at a different university, but expected to  
710 come and be a visitor at the University of Toronto that fall — I had found out that he was in a  
711 relationship with somebody else after we had agreed that we were going to try out this  
712 relationship with the hope of getting married, etc. And I had decided that that was that. Not  
713 only had I broken up with him that morning, but I had sworn off all men forever.

714  
715 It happened to be the same day that this person, Nick Pippenger, was coming to give his talk.  
716 I had been assigned the job of hosting him, even though he was a theoretician, and I knew  
717 that he was a theoretician. He had proved a result about upper bounds for the communication  
718 bandwidth using of a network ... using Ethernet, or actually, the Aloha protocol. He thought  
719 that it would work well as a joint theory systems seminar.

720  
721 Because I was more junior than the person running the theory seminar, I got the job of  
722 hosting him. So, here I was, waiting for him to arrive in my office. And I was very nervous  
723 about this particular person arriving, because I had phoned him a couple of times to set up the  
724 ... to set up the arrangements for his visit. This was clearly somebody who didn't know how  
725 to talk. I would be having a conversation with him on the phone and there was just dead  
726 silence. There was just no such thing as having an interactive conversation with him. You  
727 would eventually get a "yes", or "no", or maybe an "uh."

728  
729 So I had been thinking hard. I knew I had to entertain him for half an hour before we went  
730 and took him out for dinner. I had been thinking hard about what to do with this half-hour.  
731 And I knew that he had a reputation for knowing all kinds of things about theoretical  
732 computer science and being very good at explaining them. So I decided, "Well, there are  
733 three results that I'm very interested in, that are quite recent. I haven't seen the proofs. If I  
734 ask him about them, it'll probably take him about ten minutes to explain each one, that'll use  
735 up an half an hour. This is good."

736  
737 He arrives in my office, and I welcomed him to the University of Toronto. I introduce myself  
738 and I say, "I heard there's a new result in matrix multiplication, and that you might know  
739 about it. Would you mind telling me about it?" He goes straight to the blackboard and does a  
740 ten-minute presentation, it's beautiful and fascinating. Then I said, "Well, I actually also  
741 heard that there's a new result," and he did the second one. Then I did my third one, he did  
742 the third one. It's wonderful — he's a wonderful expositor. We go out to dinner, it's no  
743 longer [awkward]. We have several other people he knows well there. It's a perfectly nice  
744 dinner.

745  
746 The next day he gives his talk, and it's an absolutely exquisite talk. And I remember looking  
747 at him and thinking, "That's one of the best talks I've ever seen in my life. If I hadn't sworn

748 off men ... I mean, I really like people who can present well." But, I had sworn off men. I  
749 was very serious.

750  
751 That evening we were taking him out for dinner again, but we had also arranged to have a  
752 reception for him at my apartment. Now, I had a little two-bedroom apartment. Everybody  
753 else had houses, but — and there were four or five people in the department who he knew  
754 extremely well — but they all had a reason why they couldn't have the reception for him.  
755 One of them had parents-in-law visiting, another one had a new baby, another one was  
756 renovating, etc., etc. So it was at my place. But one of the couples, in fact the male was the  
757 host of the theory seminar (who should have been hosting Nick in the first place), they were  
758 feeling guilty. And so they agreed that they would cater this particular reception, so I could  
759 go out to dinner, for the dinner with Nick, and then I would come home a little bit early, just  
760 to make sure they had everything they needed.

761 [65:17]

762 So I come home. I enter my apartment. There are balloons on every surface. This was not the  
763 way I left the apartment, it was very tidy when I left. There were streamers strung at neck  
764 height. And when I go into the kitchen, Charlie is emptying a can of very disgusting looking  
765 things called "deep-fried lava-grubs," which are maggots that live in rotting wood. And I'm  
766 going, "What are you doing?" They said, "Well, we tried to get chocolate-covered bees or  
767 ants, but they didn't have any, so this was the next best." "What are you thinking?" They  
768 said, "Well, Nick will eat anything. We wanted to test it." And I said, "But those are so  
769 disgusting, people are going to throw up! Couldn't you get them chocolate covered?" He  
770 said, "No they didn't have them chocolate covered." And I said, "Well, I've got some baking  
771 chocolate, let's just grate chocolate." [loud laughter] "Then he won't be able to see them as  
772 well." So we did this and we put this out. And we had this discussion about, "Should we tell  
773 people what this is if they ask?" And the agreement was we'd have to be willing to tell  
774 people. OK.

775  
776 People start arriving — they did have some other food that was more acceptable. We had  
777 mulled wine, which was very nice, and soft drinks and so on. The first person to take one of  
778 these deep-fried lava-grubs, actually, was Nick. That was fine. The next person was Steve  
779 Cook. Steve Cook, who had not, at that point, quite won the Turing Award, but who was  
780 definitely the most senior in the department. Very dignified. Always wore a jacket and tie to  
781 the department. Very proper. He chews on this. He swallows. There's a strange look on his  
782 face, and he says, "Maria, what was that?" I said "Oh, it was a deep-fried lava-grub, you  
783 know, they're maggots. They live ..." He turned green, asked for the bathroom — I stop.  
784 Clearly this was not good — Charlie and I were both untenured assistant professors. Not a  
785 good move.

786  
787 The reception goes on. People are gradually leaving. Nick shows no interest in leaving and  
788 I'm quite interested in talking more to him. So about 11pm, everybody's gone. In fact,  
789 there's several people coming back to ask if they ... couldn't they give Nick a ride back to  
790 the hotel, and he said, "No, it's fine. I'm just fine." And when they all leave, we just sit and  
791 talk for three hours. It was a wonderful conversation. We're sitting on opposite sides of my  
792 fairly small living room, and we're talking about music and philosophy and authors and  
793 computer science and mathematics and children and — just everything in the world —

794 politics. And I'm thinking to myself, "There are men in the world who are interested in  
795 intellectual discussion. This is somebody, he obviously doesn't have any interest in me other  
796 than just talking to me, and I'm so happy about that."  
797

798 At some point he got up to go and use the restroom. Came back. I was sitting on the couch  
799 and he sat down beside me and put his arm around me. And I literally think, "All men are the  
800 same! There's only one thing they're interested in. This conversation was for nothing." So I  
801 carefully explained to him that I'm not interested in men. I don't do a very good job of  
802 explaining it. I did mention that I had just broken up with this person. I didn't go into the  
803 reasons why I broke up with him. So he leaves thinking that I'm really still interested in the  
804 person that I just broke up with.  
805

806 Well, to make a long story short, both of us, for the next weekend or so, are thinking non-  
807 stop about the other person. I'm over for dinner at Charlie and Yaka's, the people who  
808 catered the deep-fried lava-grubs, the next Monday. They can't stop talking about Nick. I  
809 can't stop talking about Nick. They don't realize how interested I am in Nick. But they  
810 decide that we will call Nick. We call Nick on the phone. We talk for a while. The bottom  
811 line is that ten days later ... well, three days later, Nick has actually come back to visit me  
812 again in Toronto.  
813

814 A couple of days after that, we're both convinced we're going to marry each other if the  
815 other person turns out to be the person they seem to be. A few weeks after that we're  
816 engaged. We have to decide ... he's working for IBM Research in New York at this point.  
817 Toronto has been trying to hire Nick for years; they're delighted: "Now we'll finally get  
818 Nick!" IBM is horrified that they're going to lose Nick. So they eventually decide that maybe  
819 it would be worth making an offer to me. MIT, who's been trying to hire Nick for years,  
820 decides — and I happen to know the person in charge of the applied math department, Danny  
821 Kleitman, had actually met him while I was at Oakland University — they decide that they  
822 would like to hire both of us.  
823

[70:00]

824 So we actually end up ... I really thought we would stay at Toronto. I really loved the  
825 department at Toronto. Nick liked the department at Toronto. I went off for the IBM ... an  
826 interview at IBM, having decided that I definitely wasn't going to IBM, but went off to  
827 California. They were starting a new group at IBM, what became IBM Almaden Research  
828 Center.  
829

830 I remember Nick having been visiting me the weekend before in Toronto, saying goodbye to  
831 me as I left on the plane, and I'm saying, "This is such a waste of time! I've got so much  
832 work to do. I don't know why I'm going for this interview. I know I'm not ... we're not  
833 going to go there." And I call him after the first day of my interview there, and I said, "Nick,  
834 I might have been wrong ..." And part of this was just that I loved California. And part of it  
835 was that when I really thought about it, I liked the people in the group very much.  
836

837 But also, when I thought about it, I thought, "Nick is an extraordinarily shy person. You have  
838 to be able to talk to people if you work at a university, because you have to be able to talk to  
839 students. It's going to be ... the trauma about getting married and having kids (because we

840 both want to have kids), it's going to be ... that's going to be an incredibly hard life-change  
841 for him. Maybe it would be a good idea if I went to IBM Research, and he had a chance to  
842 get used to being married and start having our children. I would give me three or four years,  
843 or whatever, five years, if we stayed there that long, to get started on doing research in a new  
844 area. Because you know, I really made this very rapid ... this is now, it's a year and a half  
845 after I started studying computer science at this point. It'd be nice to actually be able to focus  
846 on research and not have to spend time teaching. I want to be in a university eventually ..."

847  
848 We ended up going to San Jose. Once I got to IBM I realized, pretty quickly, that my  
849 manager really was much more interested in hiring ... getting Nick to come out there from  
850 Yorktown Heights than he was about ... I think he didn't take me very seriously. One of the  
851 things I now know about myself, that I didn't know about myself then, was I'm an  
852 extraordinarily hard person to manage. I am just horrible to my manager. And the obvious  
853 thing to do was to start my own group.

854  
855 I started working on this in my third year at IBM Research, tried to start a discrete  
856 mathematics group. Took me a whole year of ... I mean, the way you do something like this  
857 is that you really have to convince IBM that there's a hole, in research, that ought to be filled,  
858 and it would be important to fill it, and that this would be an opportunity for growth, and to  
859 make IBM Research stronger and all of those kinds of things.

860  
861 It took me a year to do it, but eventually I got made a manager. And I started hiring people  
862 for this group. And towards ... at the same time that I got made a manager, in fact, the same  
863 time I started working on this, the next level up manager, the person in charge of all  
864 computer science in San Jose for IBM Research, at that point, was somebody ... became a  
865 woman called Pat Selinger.

866  
867 So Pat was actually the person who ... Pat, just a year or two ago, we were at a meeting  
868 together, and she said, "I take full credit for your success, because I was the person who  
869 recognized that you had leadership capability, and I made you a manager." And, true enough,  
870 that's exactly true. She was the person who decided that she was going to make me a  
871 manager, and give me hiring slots to fill into it.

872  
873 Then after I had been a manager for a year, she decided that she wanted to reorganize. There  
874 were about ... oh, perhaps about a hundred, hundred and twenty people, researchers working  
875 in computer science for IBM at that point. [...] About a year after I became a manager, Pat  
876 Selinger decided she was going to reorganize the department, and, in fact, what was called  
877 the function, because there were actually several separate departments within the function of  
878 computer science. A strange name for an organizational unit, but that's what IBM used at  
879 that point.

880  
881 So she decided to create a new department that had all the mathematically related groups. So  
882 the theory group, which was managed by Ron Fagin, the discrete math group that I managed,  
883 the functional programming group managed by John Backus, the machine vision group  
884 managed by Dragutin Petkovic, and the distributed systems group managed by Ray Strong.  
885

886 She decided that I would be the manager of those five groups. So I would move up one level  
887 in management.

888 [74:46]

889 But as I told you ... so I'm a horrible person to manage, though I must say Pat was really an  
890 extraordinarily good manager for me, and we never had any problems whatsoever. I think she  
891 was really an outstanding manager. But, I'm a much better manager than I am a managee. So  
892 within a week, I think, to two weeks of my becoming Ron Fagin's manager, he thought I was  
893 the best manager he'd ever had, and we became close friends, and we are close friends to this  
894 day. And ... one of the things that — I take tremendous pride in that, I mean, pride in his  
895 grace in being able to make that transformation, and pride in my grace in being able to accept  
896 it, that ... that we just both got over it, pretty much instantly.

897  
898 And ... that became ... that began a really wonderful time in my life, the two years that I was  
899 responsible for what was called K 5 3 or the "Marx Department." We used to joke about that,  
900 because IBM was so anti-communist. But Mathematics And Related Science — "M-A-R-C-  
901 S" Department. That was just a wonderful time for me. We were really creating a very new  
902 culture for IBM, we were trying very much to mimic ... the kind of freedom and collegiality  
903 and collaboration that you see in some of the top computer science departments.

904  
905 We had ... we were spending a lot of time, our researchers were spending a lot of time, at  
906 Stanford and Berkeley. We were having a lot of students visiting. We started BATS, the Bay  
907 Area Theory Seminar, at that time. So we were actually having researchers from Xerox-  
908 PARC and from HP and so on visiting IBM and visiting other places. This was the first time  
909 these industry labs were sort of allowing this to happen.

910  
911 It was ... it was just a wonderful time, and I remember ... one day I was, I was attending ...  
912 Nick and I were both attending an analytic number theory course at Stanford taught by Peter  
913 Sarnak, because it was becoming clearer that number theory was quite important in  
914 constructions for cryptography, but also for expanding graphs, which were very important in  
915 networks.

916  
917 One of the graduate students there, Anna Karlin, who is now a professor at the University of  
918 Washington, mentioned to me, "How come you always wear shorts when you come to  
919 Stanford, and you never wear shorts when you're at IBM?" And I said, "Well, you know, I'm  
920 a second-line manager, and I sort of feel uncomfortable." And she said "Well, you wouldn't  
921 feel uncomfortable if everyone else wore shorts." I said, "What a great day! What a great  
922 idea! We'll organize a shorts day at IBM!" So we did. Now, we agreed that we were going to  
923 do it on a particular Friday, and my secretary — as department manager I had a secretary —  
924 and my secretary Kim said, "Do you mind if I wear shorts?" And I said, "Kim, to be really  
925 honest, I think we can get away with wearing shorts, but I think that because you're a  
926 secretary, there will be people higher up on the administration who will not look well upon  
927 you if you wear shorts." So I said, "However, I am officially your manager, and it's fine with  
928 me if you wear shorts. But I'm just going to have to warn you that I think other people will  
929 not like it." Kim said, "I'm wearing shorts."

930  
931 So Friday comes along, and of course, this is ... we're now up in the new IBM Almaden

932 Center up on the top of the hill, it's a gorgeous location. You have to come in past the  
933 receptionist when you come in and sign in with your badge. And it was true: nobody wore  
934 shorts at IBM Almaden. All of a sudden there are fifteen people, virtually the entire ... think,  
935 out of the twenty-five people in the department, maybe fifteen or seventeen came in shorts. I  
936 came in shorts. Kim came in shorts. And so on.

937  
938 It was only later that I found out that when they ... of course, immediately the manager of the  
939 lab heard about it, and his, basically COO, you know, the manager for administration, they  
940 imme ... they, of course, started asking about it, and it of course it was all turned out to be  
941 my fault, because I had organized shorts day. Apparently, that morning, there were several  
942 phone calls back and forth between Yorktown, which is where the head of IBM research was,  
943 and Almaden about whether or not I should be fired [chuckles] for organizing shorts day.  
944 And the thing they were particularly upset about was that I let my secretary wear shorts,  
945 because this was damaging to her career. Well, they didn't fire me, but this tells you a little  
946 bit about just how ... how strange things ... I mean now, IBM would not even think about  
947 that being an issue.

948  
949 But we, certainly, during the time I was manager, we got TeX installed for the first time and  
950 were able to use TeX at IBM, it was something we desperately wanted to do. I desperately  
951 wanted us to buy a Macintosh, so we could see what that technology was. Didn't succeed in  
952 doing that.

953 [80:07]

954 Another thing I was extremely proud of was I actually managed to hire somebody called  
955 Miki Ajtai, who was Hungarian and whose father had been a member of the Communist  
956 Party. Miki was legally in the US and so on, but IBM had said it would ... it was not willing  
957 to hire somebody who had had a parent in the Communist Party. I fought that for a full six  
958 months. Miki Ajtai still works for IBM Almaden Research and he's a very successful  
959 theoretical computer scientist. Very highly ranked. Very proud of him. So there were a lot of  
960 things that ... a lot of things that we took on and fought, because we felt that to be able to be  
961 a first-rate theoretical science and discrete mathematics research community we needed to be  
962 able to do certain things. Of course, wearing shorts was not one of them, that was more a fun  
963 thing, but certainly being able to use TeX was one of them. Managed to get IBM to do sort of  
964 over the dead body of everyone in the lab.

965  
966 During the time — I had my first child, Janek, in my ... I guess ... just trying to think,  
967 towards the end of my second year at IBM. He was born April 30th, 2002. IBM was really a  
968 great place to be working at that ...

969  
970 **B: Not 2002 ...**

971  
972 M: 2002 ... 1982. Yes, he's now twenty three. Sorry about that. 1982. It was in many ways a  
973 fabulous place to be working, as a female and to have children. They were very supportive  
974 about ... and I think a lot of this really had to do with ... Pat Selinger had had her first child a  
975 year or a year and a half before I had mine. And she had been very serious about ... No, I  
976 take it back. She had her first child after I had my first child. She had her first child in  
977 between our two children, I'm pretty sure. Is this correct? No? ... Well, I'm not going to get

978 this one right. But I'm going to say something else, because this is gonna ... so, I just  
979 realized that I'm going say something that's completely inconsistent, it just shows one should  
980 do this kind of exercise more often because it reveals inconsistencies in your knowledge  
981 base, that I hadn't recognized. So when I had my first child, I guess I actually ... when I had  
982 Janek, Pat was not my supervisor, she was not my manager at that time, and perhaps I  
983 actually didn't know Pat well ... I think she had David before we had Janek ... Nope, she  
984 had David in between. OK.

985

986 So, when I had Janek, I knew no woman who had had a child and gone immediately back to  
987 work. I did not know of an existence proof that this was possible. When I was pregnant,  
988 everybody told me that ... I was planning on coming straight back to work, because of  
989 having watched my mother not be able to keep up with research. I expected to stay out for  
990 five or six weeks, and then I was going to come straight back to work. Every ... all of the  
991 wives, of ... who had children, of other researchers at IBM, to a person, said, "You will  
992 choose to stay home. You will understand, once you have your baby, that you should stay  
993 home." I was determined I wasn't going to do this, that I was going to continue to do  
994 research.

995

996 One thing we did do, I asked if I could bring Janek. I asked my second-level manager at that  
997 point, if we could ... I could bring Janek into the research lab once he was born when he was  
998 small and have him there while I was doing research, because I figured he'd be sleeping a lot  
999 of the time. They said "no," they checked the insurance policy, and IBM was not insured for  
1000 having children in the workplace for any extended period of time, so they said I couldn't do  
1001 that. And as a result, because I actually did want to be able to have a little bit more time with  
1002 him in the first couple of months, Nick and I arranged to give a series of talks around Europe,  
1003 and take Janek with us. And the plan was that we would leave when he was two months and  
1004 come back when he was two and ha ... four and a half months, and that would give us a little  
1005 bit longer with him.

1006

[84:45]

1007 Because IBM wouldn't allow you to be at a university or any other place for longer than ten  
1008 days without an IP arrangement, and because IP arrangements took about a year to get signed  
1009 with the university, between IBM and the university, we set this up so that we'd stay at  
1010 roughly ten different places. Everyone said to me, "It's a great time to travel with a baby."  
1011 Well, we took Janek and Janek was just start ... by the time we ... flew he was starting to  
1012 sleep maybe three hours at a time between feedings at night. Perhaps as a result of this  
1013 particular trip, he immediately started waking up every hour on the hour, and he continued to  
1014 do that until he was nine months old. My re ... time to get back to sleep after I woke up at  
1015 that point was two hours, so I did not sleep for the ... for seven months between when he was  
1016 two months and when he was nine months.

1017

1018 When we came back, we found a babysitter for him. We, again, used this ... I have used this  
1019 interviewing technique many times in my life. We put an ad in the newspaper. We  
1020 interviewed twenty-five people who responded. We then went and actually met with ten of  
1021 them, and interviewed them. We chose a wonderful woman named Willie, who already had  
1022 three children, and he was really her fourth child. He was with Willie until he was roughly a  
1023 year and a half.

1024  
1025 We then ... shifted him to ... actually to the same babysitter that Pat Selinger was using. Pat  
1026 was, by then, my manager, and she had just had a baby. So we took both Janek and her son,  
1027 David, went to somebody called Edie.

1028  
1029 I had my second child ... I guess I was pregnant with Sasha during time I was a manager.  
1030 And both times I worked right up to, basically, the day, the day before I gave birth. With  
1031 Sasha I just went back to work, five weeks after she was born. Both Sasha and Janek were  
1032 with Edie for a while and, like Pat had done — Pat had established this — that you could  
1033 leave IBM and go to Edie's place, which was literally three minutes drive away. Pat had  
1034 continued breastfeeding her son David by going to breastfeed him at Edie's. I did this for the  
1035 next several months. This really gives you a sense of just how supportive IBM was.

1036  
1037 I have to say with both my children I was very ... it took six to nine months to become  
1038 productive again. I mean, it's not that I was completely non-productive during that period of  
1039 time, but it was just clear that Sasha — we didn't take Sasha on any trips and she woke up  
1040 every hour until she was nine months old. So that's why I say it's not exactly clear that  
1041 Janek's waking behavior was due to us ... our taking him to Europe.

1042  
1043 So due to lack of sleep, I was really very non-productive for those ... for the first nine  
1044 months of both children. But we couldn't have cared less. We were just absolutely obsessive  
1045 about these children. We were just ... we were still, when Janek was a year old, fighting over  
1046 who got to change his diaper. I mean, we just ... we just thought having children was the best  
1047 thing ever [chuckles]. We had traveled a lot before, when we were ... before we got married.  
1048 We had ... you know, been to tons of movies and concerts. So we just didn't travel, and  
1049 really cut out doing all social activities other than things we would do with other parents of  
1050 small children. So our life completely revolved around the children and our work. And ... I  
1051 have to say it was a wonderful time in our life.

1052  
1053 After ... towards the end of my second year as manager — so this is now ... I have two  
1054 children. This is now 1980 ... late 1986? So Sasha is ... about a year and a half at this point,  
1055 maybe it's early 1987. IBM decides to — no, I guess it's 1986 — decides that it's time to  
1056 replace Pat Selinger with a new manager. And this was pretty typical of IBM at that time,  
1057 that they liked to rotate people through management positions at the third level that Pat was  
1058 at. I knew that Pat was very unusual as a manager in terms of the amount of freedom that she  
1059 was giving us to change things within my department. I mean, we were ... we were changing  
1060 every rule that IBM had. I was quite worried that ... I knew that three years was the usual  
1061 amount of time, so I was quite worried that they were going to change Pat. And I spoke to  
1062 Pat about this and said, "Pat, you know it really matters who the next manager of this  
1063 function is. I know they're going to move you on to do something else, because you're  
1064 obviously very talented, you've got a great future ahead of you. And I'm worried that they  
1065 could pick somebody who would not be a good match for our department and would not  
1066 respect what we had done."

1067 [90:02]

1068 But, at that point, I told Frank Mayadas, the lab director, that we were going to look  
1069 elsewhere if ... that we were not going to stay under these circumstances. Because I was



1070 quite sure that the department was going to just gradually ... that people would just leave  
1071 gradually. And he said, "I really don't want to lose you, so let's look into the possibility that  
1072 we can start a new department at the function level that would be around mathematics and  
1073 that you would lead, and so you would no longer be under this." So I worked on that for six  
1074 months and jumped through all the hoops and I had a meeting once every week with Frank  
1075 on Tuesdays to report on where I was. It was one Tuesday when he said, "OK, I've got  
1076 approval from everyone that I need to at Yorktown. We're going ahead with it." I had the  
1077 staffing, I had the budget, I had the offices, everything was all done. "We're going with it."  
1078 And he said, "I've got one more hoop to jump through, but it's a done deal and we'll be able  
1079 to announce this next week."

1080  
1081 When I walked into his office the next week he said — I could tell by his face that something  
1082 had gone wrong — and he said, "It's not going to happen." Then he told me, and he said,  
1083 "And I'm being transferred." Nick and I started looking for jobs elsewhere.

1084  
1085 At that point we decided we were going to look really seriously this time. Last time we only  
1086 looked at Toronto, MIT, and IBM. This time we're really going to do our job. We're going to  
1087 ... we're going to look at universities, we're going to look at industrial labs, mostly in the  
1088 US, but consider Canada. I guess I should say that at the time when Nick and I were getting  
1089 married and deciding where — well, had decided to get married and deciding where we  
1090 would look for jobs, the discussion was ... I had said, "You know, the place I'd always  
1091 wanted to be at was a faculty member at the University of British Columbia." And Nick had  
1092 said, with a straight face, he said, "I'm willing to do many things in marrying you, but I'm  
1093 not willing to go to a department that's as bad as the one at UBC." And, you know, it was  
1094 really true, that there were some excellent people in the department, but the department as a  
1095 whole was just terrible. It had no resources. It didn't attract good students.

1096  
1097 Well, here we are, we're looking, this is now eight years later. We interviewed at, I think,  
1098 around twenty places. We ended up with offers from a dozen out of those twenty. We ...  
1099 some of those ... we gradually eliminated offers. What we tried to do was ... I mean, we  
1100 knew we couldn't possibly think through twelve offers, so what we tried to do was we would  
1101 eliminate a place as soon as we could see it was dominated by somebody — something —  
1102 another institution.

1103  
1104 So when we came down to the end of it, we had ... well, and I guess one of the things I  
1105 should say is that when we started looking, right after Frank had told me that he was ... that  
1106 they were not going to start my new department at IBM Almaden we were in this process of  
1107 looking for jobs for ... it took probably about nine or ten months, because it actually takes  
1108 quite a long time for people to take you seriously when you say you're thinking about  
1109 moving, particularly people ... at that point we were at a senior level we would both be going  
1110 as full professors and so on, and ... the ... during that period of time ... you know, I think a  
1111 lot of people just thought that we would not move, and perhaps about six months into that  
1112 process we were ... we at that point had received some offers, and we were realizing we were  
1113 going to go, and in fact, DEC, at that point, was starting a new lab at Cambridge, and they  
1114 were very interested in recruiting both of us.

1115

1116 One of Nick's mentors was Sam Winograd, Shmuel Winograd, at Yorktown. And at some  
1117 point we were talking to him and telling him about the offers we were getting, which were  
1118 not only great offers, but higher salaries and so on. And ... about, just before, just at the same  
1119 time as we were having this conversation, IBM's strategy to keep us was to make Nick an  
1120 IBM Fellow. I mean, talk about missing the boat! It wasn't Nick that was choosing to leave.  
1121 So about halfway through the search process, Nick's becoming an IBM Fellow was  
1122 announced. And of course, that didn't change anything for us.

1123 [95:10]

1124 So, perhaps a little bit after that we had this conversation with Sam Winograd and we said,  
1125 "You know, we're going, Sam, we've got these great offers, and you know, we're waiting.  
1126 We've got a few more to hear from and so on. We're not sure where we're going, but we're  
1127 going." And he said "But, why would you leave? This is, you know, it's one of the greatest  
1128 research labs in the world! It's this-that-and-the-other-thing." And we went through all of  
1129 these things, and he was at Yorktown, so I don't think he really had understood, quite, the  
1130 situation. He said, "Oh my goodness, I don't think IBM really understands this."

1131  
1132 So all of a sudden, IBM became interested in keeping us. So this began something like a  
1133 three-month thing where they wanted us to talk to the C — the president and CEO of IBM ...  
1134 they tried to underst ... They re-offered the option of starting a separate department. They  
1135 promised that they would put in writing that they would never again change my manager  
1136 without consulting me. That they would have all of the freedoms that I had established. All of  
1137 these kinds of things. It was an amazing turn-around.

1138  
1139 So by the time we got down to making up our mind, we had four choices we were choosing  
1140 among. One of them was staying at IBM. One of them was going to UBC. And what had  
1141 happened was that during the time of our search, British Columbia had decided that they had  
1142 to build computer science into their three universities, and they were going to put a whole lot  
1143 of new resources into the computer science departments, and UBC had decided to search for  
1144 a new department head externally, because they didn't think there was anyone who was  
1145 going to be able to lead it internally.

1146  
1147 UT Austin, that had offered Nick an endowed chair, and had basically told me that if I came  
1148 there was a good chance I would be their department chair within a couple of years, and that  
1149 we would build a theory group there for them. And DEC, which was a chance to help build a  
1150 new computer science function at their Cambridge lab. Those three ... four were still there  
1151 because each dominated the other in some way.

1152  
1153 UBC dominated because it was the most idealistic. It had the lowest salaries by far. It had the  
1154 least prestige. But we were convinced that nobody in their right mind would take the jobs  
1155 that they were offering, who had the kind of possibility of doing the job that we would bring  
1156 to the job, given our connections and so on. So it was the one that sort of said if we were to  
1157 go there, we would make more of a difference there than any place else because nobody else  
1158 would take those jobs. Or nobody else like us would take those jobs.

1159  
1160 UT Austin was the highest prestige and salary in terms of ... and the opportunity to really  
1161 make a difference by building a theory group there, they had, basically, no theoreticians.

1162 IBM dominated in the sense that there was going to be this possibility of building this  
1163 amazing applied math department there, and also we wouldn't have to move, and, you know,  
1164 we were very happy there, loved living in California. DEC was the opportunity to still stay in  
1165 research but to build something really new.

1166  
1167 Well, we chose to go to UBC. The first year there was extraordinarily hard. IBM, frankly,  
1168 had been terrified that we were going to go to DEC, so they were extraordinarily generous  
1169 when we went to UBC. They gave us a fully paid leave, which actually allowed UBC to take  
1170 our salaries and get matching funds from a special thing in the government. So this ended up  
1171 being, you know, like a boost of almost half a million dollars, in Canadian dollars at that  
1172 point, in terms of resources for the computer science department that sort of came out of  
1173 nowhere.

1174  
1175 IBM Canada ... you know, the whole time I was in Canada, IBM Canada was the most —  
1176 just unbelievably supportive. So I have to say, when we ended up leaving IBM, despite the  
1177 fact that our thinking about leaving had been such a negative thing — yes, those were bad  
1178 things, but the actual relationship with IBM has remained extraordinarily positive to this day.  
1179 So it was one of those very funny things, that by the time we were leaving, in fact, we had  
1180 very strong relationships with senior people in IBM. And so we went to UBC. I said I had no  
1181 idea what I was getting myself into when I took the job.

1182  
1183 So I went as department head, and Nick came in as a senior professor.

1184  
1185 When we arrived at UBC, and this was, I think, really becoming a recurrent theme in my life  
1186 by now. I never really ... every time I've taken a job, I thought I understood what I was  
1187 getting myself into. I thought I understood that when I went to Oakland. I thought I  
1188 understood that when I took the job teaching at the University of Toronto. I have to tell you,  
1189 teaching that compilers course was incredibly hairy. I thought I knew what I was doing when  
1190 I went to IBM. And I thought I knew what I was doing when we moved to UBC.

1191 [100:11]

1192 Every single time, when I've gotten there, I have found that the reality was so far different  
1193 from what I had expected. And in the case of going to UBC ... I had a commitment from the  
1194 president and the provost that they agreed we were going to build a world-class computer  
1195 science department, that we were aiming to have one of the top twenty in the world, and that  
1196 they would do whatever it took to do that. And ... I had no idea how bad the budget was.

1197  
1198 So for example, there were no computing labs. At all. I mean, they were still doing ... sort of,  
1199 they still ... I beli ... could there really still be card-readers? There couldn't have been card  
1200 readers! This is 1988. But I think it was still true that they were doing absolutely everything  
1201 on ... they had no terminals ... I mean, just, somehow it was ... primitive in a way that was  
1202 just unbelievable. They had no ... I guess, everybody else, at that point, was investing in, for  
1203 instance, Sun Workstations, and having networks of Sun Workstations, or possibly having a  
1204 server with terminals. And there was just nothing like that, so it was just extraordinary how  
1205 behind it was.

1206  
1207 There were no research labs for faculty members, to speak of. There was actually, for the

1208 whole department, there was one research lab. But there was a commitment to build a new  
1209 building, and there had been ... the functional program had actually been — had begun for  
1210 that. It was expected that it would be completed within five years, so there were plans for the  
1211 new building.

1212  
1213 There were new faculty positions, but there was almost no funding for technical staff. I mean,  
1214 it was just ... the whole ... when they'd done the plan to ... when the province had done this  
1215 plan to build computer science ... at that point there had been a minister for advanced  
1216 education called Pat McGeer, who was at war with the University of British Columbia. And  
1217 UBC had never wanted to have a strong computer science department. UBC, at that point,  
1218 computer science was in the faculty of science, it's still there. And it was viewed as the  
1219 weakest department in the faculty of science. The strong departments were, basically, physics  
1220 and chemistry, and perhaps math.

1221  
1222 It was felt you had to have a computer science department, because you had to be able to  
1223 teach computer science. But there was nothing intellectually interesting in computer science.  
1224 There was no reason to put any resources into computer science. It was just thought of, by  
1225 the rest of the university, as being there as a service department. And the ... this minister, Pat  
1226 McGeer, had been a professor at UBC and had fought with the administration, then had gone  
1227 into politics, had gotten elected, had become the Minister for Advanced Education, and had  
1228 decided that information technology was the future of the province. Had gone off to meet  
1229 with folks in IBM Research. Had gone to Stanford, MIT, Berkeley. Had understood the ...  
1230 the role of universities in driving information technology, Silicon Valley, and the Boston area  
1231 and so on. Had decided that the universities had to invest in computer science. Had decided  
1232 to put resources into the universities.

1233  
1234 So, UBC was in this situation where they could either decide that they would get the  
1235 resources and strengthen their computer science department, or not get the resources and see  
1236 Simon Fraser and the University of Victoria be strengthened. And had of, over the reluctance  
1237 of ... you know, many of the faculty in the faculty of science from other departments had  
1238 decided to go ahead with it. Of course I ... at some level I knew this. But I didn't really  
1239 understand. So, for example, the budget for physics and chemistry per some student FTE, per  
1240 student unit, was perhaps eight times the budget in computer science per student unit. They  
1241 had technical staff that were funded by the university coming out of their ears to support their  
1242 labs, to support research going on in the department. They had lab space. They had all kinds  
1243 of things that was not there.

1244  
1245 What I hadn't really understood was that to ... that there was no ... no place anywhere in my  
1246 budget that I could buy equipment. My entire budget for equipment was five-thousand  
1247 dollars per year.

1248 [105:06]

1249 **Person in Background: WOAH!**

1250  
1251 M: And this is having, you know, the number of majors at that point, when I started out, the  
1252 number of undergraduate students was, I believe, about, oh, perhaps a hundred and fifty  
1253 majors per year? So graduating a hundred and fifty majors per year. So you can imagine

1254 trying to run a program for students with five-thousand dollars per year for equipment. And,  
1255 you know, the number of graduate students, I think, when I started, was perhaps around fifty  
1256 or something like that. Perhaps thirty-five Master's and eleven Ph.D. students or fifteen  
1257 Ph.D. students. Something like that.

1258  
1259 When Nick and I arrived we were faculty members number fourteen and fifteen. Over the  
1260 next five years we hired roughly fifteen faculty members. We were absolutely determined  
1261 that we were going to compete with Stanford and MIT and Berkeley and so on. We were  
1262 very lucky in a couple of things. One was that the University of Washington had a lot of ... I  
1263 knew a number of people in the University of Washington. They, in fact, had thought hard  
1264 about hiring us at the time. About recruiting us. In fact, we interviewed there, at the time.

1265  
1266 But we had decided not to apply to the University of Washington, because we knew that  
1267 Marty Tompa, who's another theoretician, had gone to ... actually to work at IBM for a  
1268 number of years while his wife Anne went off to medical school. We knew that if they hired  
1269 us instead of Marty, that ... we knew Marty wanted to go back to the University of  
1270 Washington, he intended to come back. And we decided not to apply at Washington, because  
1271 we figured that, even though Washington was actually a top-ten computer science  
1272 department — I mean, what could we have been thinking? — but we somehow thought that  
1273 UBC and Washington were roughly equivalent. So therefore, since Marty ... we needed to  
1274 preserve the job opening for Marty, we should go to UBC.

1275  
1276 And the then, I think, chair of the department was Ed Lazowska. Ed ... this whole fact that  
1277 we had made this decision for this reason impressed Ed enormously. I had known Ed for  
1278 quite a while, but Ed just decided that he was going to be as supportive as he could in terms  
1279 of us helping ... maybe he wasn't chair at that point, but he was the person who tried to  
1280 recruit us there. He just decided he was going to help us build a great department in UBC. So  
1281 one of the really great things that happened was that Ed encouraged — and we really needed  
1282 to build systems, that was the area that we felt there was a huge need in — he really  
1283 encouraged the best systems graduates coming out of Washington (and Washington was  
1284 absolutely one of the top places in systems, so they were getting interviewed by MIT and  
1285 Berkeley and CMU and Stanford and all the others) — he encouraged them to come do their  
1286 dry run, to apply to UBC, and do their dry-run interview with us. Now, you know, some  
1287 people might have been offended that we were the practice place. But of course, what it was  
1288 doing for us, it was calibrating. Because we weren't doing as well as getting the Berkeley and  
1289 MIT students to decide that they would apply to UBC.

1290  
1291 But of course, then, these students we were managing to ... even though it took us several  
1292 years before we managed to hire one of their students, they were getting impressed by what  
1293 was happening at UBC. So the word was getting out there. So one of the things we were able  
1294 to do was convince the university that we were aiming so high that we could expect to make,  
1295 roughly, six offers for every person that would say yes. So if we were expecting to hire, say,  
1296 three people, we offer ... we would have eleven offers out there.

1297  
1298 And, yeah, we did get turned down. People went to Cornell, people went to Stanford, people  
1299 went to Berkeley. We did lose out to a number of great departments. We lost out to

1300 departments that, frankly, we thought were not, sometimes, not quite as good as our  
1301 departments. But, over that period of time, the caliber of the people we saw just got better  
1302 and better.

1303  
1304 Now, there was another thing that was going on that contributed to this, and that's that ...  
1305 other departments had been building in the 1980s, and we were one of the very few  
1306 departments that were really growing very dramatically in the early 1990s and just at the end  
1307 of the 1980s. Others had grown at the beginning of the 1980s. So there were many fewer jobs  
1308 out there, but also the production of Ph.D.s had been ramping up. So the quality of students  
1309 that we were ... it was much easier to be — I mean, everybody and their dog had tried to  
1310 build a world-class computer science department in the early 1980s. There were very few  
1311 departments that were as slow in getting on this bandwagon as the University of British  
1312 Columbia. So we had a huge advantage.

1313 [110:01]

1314 The other thing was that we ... before I accepted the job, I had met individually with every  
1315 single faculty member and asked them — and with the graduate students and with the  
1316 undergraduate students — and asked them to sign on, to a person, to this idea that we would  
1317 build a top computer science department, and that it meant that things would have to change.  
1318 So I had gotten every individual to sign on.

1319  
1320 There was another thing that helped, which was that the department had had four tenure  
1321 denials in the four year ... in the years — I think the three years — before I came. It was very  
1322 demoralized and the fights had been very bitter about those tenure denials. Two of them had  
1323 been denied at the department level, and there had not been unanimity about those. Two were  
1324 denied at the university ... at the faculty level, and there was just enormous bitterness. So the  
1325 department had been very polarized and was a very unhappy place.

1326  
1327 One of the rules is, if you ... if you would like to change something dramatically, go to a  
1328 place that's demoralized, where people are really unhappy. Because if you can come into a  
1329 place where pretty much everyone agrees that everything is broken, you can fix everything!  
1330 Whereas if you go into a place where everyone agrees that everything ... or at least if half the  
1331 people think it's working really well, you're going to have tremendous resistance.

1332  
1333 So one of the things that it was possible to do, that I think ... was very, very hard to do, was  
1334 to get all of the senior faculty to buy into the following concept: That we were going to be  
1335 hiring junior faculty who were much stronger than they were, and that, therefore, we needed  
1336 to have a completely democratic way of running the department. That we had to listen, as  
1337 much or more, to the junior faculty, even the most junior assistant professor, as we did to the  
1338 full professor who had been there for twenty years. That we had to listen to our students and  
1339 listen to our staff. And that this would be a place where the only value was on the merit of  
1340 the idea, not on the particular position held by the individual.

1341  
1342 When we were recruiting junior faculty, as head, I would have four criteria that I told them  
1343 were threshold criteria. They're all equal in importance, and you have to be above threshold  
1344 in all four.

1345

1346 The first one is you have to want to become one of the top researchers in the world in your  
1347 area. You have to have that passion, that drive. And you have to have the capability to do  
1348 that.

1349  
1350 The second one is you have to have a passion for teaching. We don't want anyone here who  
1351 doesn't care about students. This is a university, and there are industrial research labs where  
1352 people who are great researchers can go. And so, nobody loves all aspects of all ... of  
1353 teaching all the time, but you have to be the kind of person who finds that passion, that you'll  
1354 get reward out of this.

1355  
1356 Number three is you have to agree that you are going to be part of a department that wants to  
1357 be one of the very best departments in the world, and that that is going to require tremendous  
1358 sacrifice from individuals. Because you're going to have to be working on the aspects that  
1359 are going to make this a great department for the community, for everybody, not just a great  
1360 place for you to be an assistant professor or full professor or whatever. And so, this is a very  
1361 unusual place to be an assistant professor. You are going to be serving on committees.  
1362 You're going to have a service load like that of a full professor. If you're coming, you've got  
1363 to choose that you're coming to build it. This is not going to be a place where you can sit and  
1364 just do your research and then, sometime later, once you get tenured, you get to come ... you  
1365 take on service responsibility. Not gonna happen.

1366  
1367 The fourth one is you have to agree that you value community. That ... we pay less than  
1368 virtually any place we're competing with. We have less resources. We have a horrible  
1369 building (this is the old building). We have heavier teaching loads. We have larger classes.  
1370 So the only thing that we can do that's going to attract people is by making this a place that  
1371 when you work here, you will love working here. What's going to make it that way? It's  
1372 going to make it that way because ... you're going to work with people who support  
1373 everything you do, who are your friends, who are interested in you, who are going to help  
1374 you to succeed.

1375 [114:53]

1376 Now the standard kind of thing that people would say to me is, they would say, "First of all,  
1377 how do you create that kind of environment? What does it take to do that?" And I'd say,  
1378 "Well, the first thing you do, is you ask people ... you tell people that first of all, the most  
1379 important thing it takes is time. Because it actually takes time to listen to other people and to  
1380 help other people. So, in fact, the three things, other than the first one I told you, is going to  
1381 be taking time away from your research. You're going to have to put time into your teaching.  
1382 You're going to have to put time into building the department. And you're going to have to  
1383 put time into making this community." And they said, "Well, when you talk to people, and  
1384 you tell them these thresholds, how do you know they're not just lying to you?" And I say,  
1385 "Believe me, if you're going to choose to come here, you're going to be choosing for this  
1386 value system. Because you're going to have ... if you're good enough to get an offer from us  
1387 — and we think you are, because we wouldn't interview you if we didn't — if you're good  
1388 enough to get an offer from us, you're going to have offers from other places that are higher  
1389 ranked, that pay you more, so you're only going to choose to come here if you have a value  
1390 system that's consistent to this. As a junior person, you're not going to come here unless  
1391 you're the kind of person who would love to be part of a team that's building a great

1392 department. That's going to select for a certain kind of individual. You're going to choose  
1393 because you want to be in a friendly department that supports you, that has a community to  
1394 it." Well, I have to say we hired extraordinary people.

1395  
1396 And when we had our five-year review, after the first five years, our team — I'm not sure I  
1397 can remember everybody on the team. Ruzena Bajcsy was one. Fred Brooks was one. I  
1398 believe ... somebody in ... I'm trying to remember who the others were. Maybe Ian Munro  
1399 was one. And I can't remember who the fourth was — but they wrote a review of the  
1400 department and said "This department has become a top twenty departments in North  
1401 America. It's extraordinary. It's an amazing place." And it was an amazing place. It was one  
1402 of the most wonderful places to work.

1403  
1404 Now, during that time, I have to admit we paid almost no attention to our undergraduates.  
1405 We paid attention to revising curriculum. But we didn't pay attention to recruiting  
1406 undergraduates. We paid a lot of attention to recruiting graduate students. We paid a lot of  
1407 attention to recruiting faculty. Frankly, we felt that we would get good undergraduates just by  
1408 default because that's what happens at all Canadian universities. Canadian universities, as I  
1409 mentioned earlier ... the best local kids go to the best local universities, so we're the best  
1410 local university, so we'll be getting really great students, almost no matter what we did.

1411  
1412 So our primary emphasis was improving the quality of the faculty and dramatically  
1413 improving the quality of the graduate students. And I have to say, that, almost certainly, is  
1414 my favorite job, I've ever had in my life, being head of computer science at UBC. It was an  
1415 extraordinary time. You had this feeling that you were experiencing something that was  
1416 happening nowhere else in the world in the same way. That you were one of the luckiest  
1417 people — and it was really true, our salaries were terrible, and our teaching loads were  
1418 heavier than everywhere we were competing with. But, we were having a lot more fun. We  
1419 felt we were having a lot more impact than anyone.

1420  
1421 And one thing we were very unsuccessful in doing was we made offers to women every  
1422 single year, and we didn't hire a single one while I was department chair. I was the first  
1423 woman faculty member. I was the first woman in computer science there. I was the first  
1424 woman department head in the faculty of science. By the time, you know, I finished my time  
1425 as department head, I was still the only woman faculty member there. So, that was one really  
1426 big failure. And if I think about what happened, I honestly think that the women were less  
1427 willing to take risks.

1428  
1429 We had — I remember the first time somebody turned down a Cornell offer to come to UBC,  
1430 that was Jack Snoeyink. I mean, can you believe turning down Cornell? I mean, really one of  
1431 the top universities in the world, to come to UBC? It was just amazing. But, you know, we ...  
1432 our women candidates were not willing, at that point, were not willing to gamble on us. And,  
1433 you know, I've seen this ... we're not the only — I've had this discussion with other  
1434 departments who have been moving up. That it's not until you get to a certain level, and  
1435 you're actually established and people recognize you, that you can become more ... that you  
1436 become more successful in recruiting women.

1437 [119:54]



1438 At any rate, one of the things I was very concerned about — I mean, I had watched what had  
1439 happened to IBM, after I left IBM — I have to say that a lot of the values that we built the  
1440 UBC computer science department around were values that we had built the MARCS  
1441 Department in IBM. It was one of the reasons that those two years when MARCS was ... had  
1442 come together, was just an extraordinary time. I was back at a memorial event for Larry  
1443 Stockmeyer after he died, a year ago, and back to IBM Almaden. And we were talking about  
1444 — and many people from that time came back, who had left — and we were talking about  
1445 what a magical time it was, being there together.

1446  
1447 One of the reasons I wanted to go to a university was that I wanted to create something that  
1448 would be not subject to the whims of the way industry research labs go. Of course, as we've  
1449 seen over the last few years, with AT&T basically downsizing, IBM downsizing, DEC going  
1450 away, all of these kinds of things, Xerox PARC basically disappearing in terms of the way it  
1451 used to be — I'm so glad that I went to UBC [laughs], that we went to UBC when we did,  
1452 because the thing I was thinking about really hard, having done it once at IBM and then  
1453 seeing it fall apart so quickly, I was really thinking hard about "How can we do this in a way  
1454 that will be sustainable?"

1455  
1456 One of the things I realized pretty early on was that I was going to have to get out of the role  
1457 of department chair. That if I stayed too long — I had seen what had happened to  
1458 departments that had a very strong department chair, where the department became very  
1459 identified with them, and I knew that I needed ... you know, I heard constantly, while I was  
1460 head of the department, "Oh you're such a wonderful head! You're doing such a wonderful  
1461 job! We'd never be doing this without you!" It's very satisfying, I have to say. I mean, it  
1462 feels fabulous to have people tell you that every day, day in, day out. But it's not a good  
1463 thing for the department. So by the time I was in my sixth year, I was already thinking that I  
1464 was going to have to get out. I didn't want to leave that job at all. I mean, I just loved being  
1465 department head. But I knew I needed to get out.

1466  
1467 So I ... the summer between the end of my sixth year and the beginning of my seventh year, I  
1468 had a bicycle accident. I was wearing a helmet, but I flipped my bicycle at high speed and  
1469 landed on my cheek ... basically on my, whatever side this is, left cheekbone. I had a severe  
1470 concussion, and really quite severe loss of brain function for, really, for about two years, but  
1471 very extreme for the first five months. Like many concussions, I had, you know, maybe  
1472 working memory of about thirty seconds in terms of short-term memory. I couldn't read  
1473 handwriting at all. I couldn't read writing unless it was fairly large and was at right angles to  
1474 my eyes.

1475  
1476 You would have thought that this would be sort of a disadvantage as a department chair. It  
1477 caused some shifts in my behavior. First of all, it caused me to bring another person into  
1478 every meeting with me, so that I could ... so that somebody who had more long-term  
1479 memory than thirty seconds would be there. Secondly it caused me to shift to doing  
1480 absolutely all communication by e-mail, in terms of records, so that I would have a written  
1481 record.

1482  
1483 What was quite extraordinary was that after the first few weeks, it was clear that most people

1484 didn't realize that this was happening. In the ten days after my accident, while I was  
1485 recovering and was in bed, there came out an announcement that UBC was looking for a  
1486 senior vice-president for student academic services, and this particular role covered  
1487 information technology, all student services, student affairs, libraries, the center for the  
1488 performing arts, athletics, — I'm probably leaving something out — housing.  
1489

1490 But in any case, a lot of people had been saying to me, "You should think it ... given the  
1491 things you like to do, you should think about being a university president." So I'd been sort  
1492 of thinking, "Well, maybe I should try out holding a senior administrative position in a  
1493 university in order to ... in order to explore this." And when I looked at this job, it had two  
1494 things I thought needed to be fixed in the university.  
1495

1496 One, the university had a very stupid approach to information funding and information  
1497 technology. It had decided that it wasn't going to give computers to anyone, that the  
1498 departments could allocate their own budget if they wanted to do that. And equipment  
1499 budgets in most departments were extremely small, as I've already told you. So, I had ... I  
1500 had managed to figure out a way to get my equipment budget up, so it was now up to about  
1501 two-hundred thousand a year. But departments, for instance, in the social sciences and  
1502 humanities, they had no equipment money. So half the faculty did not have a computer,  
1503 period. They decided also that they would not pay for networking in the university, to ...  
1504 within buildings, at all. That if departments wanted to be connected to the network, that they  
1505 would have to pay for the network. And again, departments didn't have money to do that.  
1506

[125:36]

1507 So what was happening was that we had places that were basically taxing their research  
1508 grants to pay for their ... every computer scientist was buying their equipment for their own  
1509 use and their research, but then using it in teaching as well. Same for most of the science  
1510 people and most of the engineering people. But, of course, there were no research grants like  
1511 that for the people in the arts and humanities. So that was something I wanted to fix. Because  
1512 I thought, "How could you possibly ..." (this was 1997 ... sorry, 1995 at this point ... sorry,  
1513 1994 at this point) "How could you possibly bring a university into the digital information  
1514 age if half of your faculty didn't have access to e-mail?" This to me was just completely  
1515 brain dead.  
1516

1517 The other thing was that I had realized that students really did not feel well treated by the  
1518 university. And after this five-year review, the one area that the reviewers had pointed on  
1519 was that the undergraduates did not feel that attention was being paid to them. So I had spent  
1520 a lot of time in the year and a half after that doing things with undergraduates and was really  
1521 seeing ... I had started teaching undergraduates, and I was really seeing that we were making  
1522 some progress there. I thought, "We need to do this for the university as a whole."  
1523

1524 So, I thought, "You know, I'm going to apply for this administrative job, probably they  
1525 won't pick me, but if they do, then I can focus on these two objectives." So I did, and found  
1526 out in Dec ... the end of November that I was selected for this position.  
1527

1528 Again, I was the first female vice-president at UBC. I was the youngest by at least a decade,  
1529 maybe more. I was the first new vice president in seven or eight years. So you can see that it

1530 was ... I was coming into a team that had been working together, and liked working together,  
1531 very effectively. Liked working together, and felt they did it very effectively. So, I came in as  
1532 this new vice-president.  
1533

1534 At the time I started as vice-president, the euphoria had passed and my father was in his final  
1535 three months of dying of lung cancer, and one of our kittens died. So it was not an auspicious  
1536 start. I found my new job extremely difficult, and once again, here we go again, I thought I  
1537 knew what I was getting myself into. I had had long discussions with the president and the  
1538 provost about what I wanted to do, why I was interested in this job, and so on. And as soon  
1539 as I started the job and started talking about making these changes in how we funded  
1540 information technology and so on to do with students, the president said "Those are not  
1541 priorities for me, we're not going to do those." And I said "But I told you about them when I  
1542 interviewed for the job. I told you this is why I was going to do this." And he said, "Yes, but  
1543 I figured as soon as you actually saw how things run, you would see the light, and you would  
1544 realize that those aren't strategic for the university and they're wrong." And of course, I said,  
1545 "Well, excuse me, I took this job to do these, and I'm going to do them."  
1546

1547 So, it was not a great way to start off. I ... as I mentioned, I'd had many bumps in my  
1548 relationship with my father while I was an undergraduate in university. And I had spent,  
1549 really, most of the rest of my life after India rebuilding that relationship. And it had many  
1550 bumps after that, but it was never ... he never really completely disowned me for long  
1551 periods of time after that.  
1552

1553 The thing that had really helped with my relationship with my father was our children being  
1554 born. He was absolutely just devoted to both children. In spite of the fact that he found it  
1555 impossible to imagine I would actually have children, once the children actually came along,  
1556 both he and my mother were just — I cannot tell you what wonderful grandparents they  
1557 were. So, for example, they would constantly say to me, as opposed to many women who  
1558 have been the first female in their family to have children and continue to work, which I was  
1559 in my family. Often the parents are critical of the fact that you're working so hard in your  
1560 career. My parents were the opposite. They would say "You know, you have the best  
1561 children in the world. They're the most wonderful children. They are doing so well, and your  
1562 career is doing so well!" They were just ... could not have been more supportive.  
1563

[130:19]

1564 And ... I found my father ... my father's dying just extraordinarily difficult. And I found my  
1565 new job extraordinarily difficult. Immediately after my father died, my husband's mother  
1566 became ill and she died six months after my father, and that was also extremely difficult. Our  
1567 second cat died. I just felt that that whole first year was a year of death.  
1568

1569 My relationship with the president was, by no means, an easy one at all. I was fighting, and  
1570 fighting very hard to try and do ... accomplish some of the goals that I had for this vice-  
1571 presidency. I found that becoming a vice-president academic suddenly took me from being  
1572 ... I had felt that while I was head of the computer science department, I was regarded as  
1573 being extremely pushy for computer science by other science departments. And they were  
1574 unhappy that I had managed to divert resources from their departments to the computer  
1575 science department, particularly chemistry and physics, since that's where the majority of the

1576 resources ended up coming. But I was still regarded as being, you know, a highly regarded  
1577 researcher, a highly regarded leader, somebody who ... you know, you'd often get told that  
1578 you were brilliant and creative and other kinds of things like that.  
1579

1580 All of a sudden, when I took this job, which is not on the academic side of the university, it's  
1581 on the support side of the university ... I was not ... I was treated by — not by the members  
1582 of the computer science department, who knew me and loved me and I loved them, but by  
1583 everybody else — as not being allowed to say anything about research or teaching in the  
1584 university, because I was no longer an academic. Still, of course, I was a professor, I was  
1585 doing research, all those kinds of things, but I was just scorned by deans, by department  
1586 chairs, by faculty members, as having become somebody who no longer had a right to have  
1587 opinions. And I hated that.  
1588

1589 However, I kept on working at these two things — the information technology and the  
1590 student things. I managed to convince the deans that it would be in their best interest if I  
1591 reallocated funding from the central computer services to something called the faculty  
1592 workstation program, which would match — put out fifteen hundred dollars of matching  
1593 funds — towards a faculty member getting a workstation if they did not have one that was  
1594 less than three years or less than four years old. And also diverted it ... so that was about a  
1595 million and a half a year I diverted to that. And within three years we got every faculty  
1596 member who wanted them a computer.  
1597

1598 We also created diverted funds to start networking projects to wire the entire campus. I'm  
1599 happy to say that ... it took ten years, roughly, but it has been comp ... no, maybe not ten  
1600 years, maybe seven years, we planned it for ten years. By seven years it was completed, and  
1601 it's actually one of the best networked campuses now. It has wireless absolutely everywhere.  
1602 It's actually ... this was done by basically — the information technology side of it, what had  
1603 to happen was I had to convince department chairs, faculty and deans that it was in their best  
1604 interest that it should happen for the university. But it was done. Because it got the support of  
1605 the deans, and that's how it happened.  
1606

1607 For the students — the students, particularly the student government, was enormously  
1608 cynical about the president, and with good reason. He had been busy raising fees for them  
1609 and trying to get them ... trying to reduce the services that were given to students. Now, you  
1610 know, fair enough, now that I can see things from a slightly different position, he was in a  
1611 situation where he had a government that had frozen tuition, so he wasn't allowed to raise  
1612 tuition. So his way of getting around that was to start charging students for various kinds of  
1613 services. The students were smart enough to see that this was not in — from their perspective  
1614 — in their best interest. They would rather see class size going up than paying more to attend  
1615 university. So there was just a very difficult dynamic between the students and the  
1616 administration, between student organizations and the university. But there was also this  
1617 tremendous feeling of, "The university couldn't care less about us. We're just ... we are  
1618 these widgets that come in and justify them getting so many dollars per year from the  
1619 government. The university only cares about research and graduate students, the  
1620 undergraduates are nothing but fodder."  
1621

[135:18]

## Computing Educators Oral History Project (CEOHP)

1622 I started a set of student forums, and ... on all of the issues that the students thought were  
1623 most important. And, of course, services had declined dramatically because of cut-backs. We  
1624 were going through 3% cuts to our budget every year, year after year. And also, mandatory  
1625 increases in the number of students we had to accept. So it was an extremely difficult time  
1626 for the university. And we started these student forums, and initially they were very cynical,  
1627 but by the time we ...

1628  
1629 The president wanted me to introduce a technology fee of perhaps a couple of hundred  
1630 dollars per year for the students. A lot of universities were doing this around this time. It was  
1631 about 1996, 1997 by now; I guess 1996. And the government said that we couldn't do it  
1632 without having a referendum. No, I take this back. The government said we had to have a  
1633 referendum, but they didn't say we had to follow the results of the referendum. So we had a  
1634 student referendum. They voted against the tech ... and I tried to ... I wanted them to pass  
1635 the fee because it would have made it so much easier to get resources for students. And they  
1636 voted down the referendum — so, I mean, I lobbied for it — so when they voted down the  
1637 referendum by four-to-one and I, against the president's will, refused to instate the  
1638 technology fee.

1639  
1640 In the weeks after the referendum I got three hundred e-mails from angry students — when  
1641 we announced the referendum results — who were sure I was going to implement the  
1642 technology fee. And these were ... it was ... you know, everyone should go through this in  
1643 your life. They were some of the most scathing, hostile, and abusive e-mails I've had in my  
1644 life. I answered every single one of them. And we didn't instate the fee. The fact that I didn't  
1645 instate the fee, turned ... radically turned around the student relationships with the  
1646 administration. I suddenly became someone they could trust.

1647  
1648 And at the beginning of my third year, I guess — no, maybe it's in the middle of my third  
1649 year — I chaired a board of campus advisory ... it was called Campus Advisory Board on  
1650 Student Development and called CABSD ["cabs-dee"] for short. And it had about ten student  
1651 representatives from all the different sort of student organizations that were elected student  
1652 organizations. And it had, roughly, thirty staff and faculty from around the university, from  
1653 every part of the university, that dealt with students. So the student affairs people in each of  
1654 the faculties, the student services, housing, athletics and so on. One of the thi ... we had been  
1655 trying to figure out how to change the atmosphere for students to make it a much more  
1656 nurturing place, and make students feel that they were valued. Focusing, primarily, on  
1657 undergraduate students, but a little bit on graduate students too.

1658  
1659 And, soon after I started, someone had said, "If we had a campus-wide orientation, this  
1660 would have a huge impact on the students, because we could actually introduce them to the  
1661 university and give them a sense of being valued on the first day, or on the days beforehand.  
1662 Most other universities, where the alumni love the university, they have this, they take it very  
1663 seriously. Why can't we do this?" And, around the table, people had said why we couldn't do  
1664 this. They said, "Two years ago we came up with the same idea. We took it out to the deans.  
1665 We had a proposal. Every one of them said no." And I said, "OK, if we can't do it, we can't  
1666 do it."  
1667

1668 So, two years after that we're having a meeting and the students are saying ... have a  
1669 proposal to start a campus-wide orientation. So it's two years later. This is one of the students  
1670 who had run for the student president position, didn't get it. She's proposing to do this. She  
1671 gives a great presentation, I'm looking around the table and I'm seeing everybody is nodding.  
1672 It's February. The orientation would have to be at the beginning of September, this is five  
1673 months. We have no budget. And I said, "I'm seeing people nodding. I think we want to do  
1674 this. Do we want to do this?" They voted in favor, to a person. This is the same people for the  
1675 most part as voted against it. UBC started its first orientation. It's never looked back.

[140:08]

1677 Let me go back to computer science for a little bit. In 1990 ... in 1989, Ed Lazowska asked  
1678 me if I would run for the Computing Res ... the board of the Computing Research  
1679 Association. And he told me that they had never elected a woman. And I said "Great!" Of  
1680 course I ... 1989 is my second year as chair. I'm incredibly busy. The last thing I want to do  
1681 is serve on the board of the CRA. But, because they've never elected a woman, I wanted to,  
1682 at least, be a woman candidate. He said, "Don't worry, they won't elect you anyway. I just  
1683 want to have a woman running." So I ran, and I wasn't elected.

1684  
1685 So, sure enough, when somebody ... either Ken Sevcik or Ed asked me the next year, I said  
1686 "Sure! I didn't get elected last time. No worries. I like this!" [laughter] So, sure enough, I run  
1687 for the board, but I get elected this time. So I become, in 1990, the first woman on the board  
1688 of the CRA. Peter Freeman was, I believe, the vice-chair of the board at that point. And Peter  
1689 Freeman said, "I'd like to introduce you to somebody who has some strong ideas of what the  
1690 CRA should be doing." It was Nancy Leveson. So Nancy and Peter and I had lunch together.  
1691 We talked about the possibility of the CRA forming a committee on the status of women in  
1692 computing. And after lunch, or later at that meeting, I presented the idea, with the support of  
1693 Peter Freeman, and Nancy, I believe, was allowed to sit there. And we proposed that Nancy  
1694 and I would co-chair it. And that's how CRA-W started.

1695  
1696 Now, Nancy and I had some very strong ideas about how we were going to organize this  
1697 committee. I won't go into them in a lot of detail, because I think that's probably a story for  
1698 another day. But just very briefly, that because this was this was the Computing Research  
1699 Association, it had to be entirely composed of strong researchers. This was not going to be a  
1700 service committee. This was going to be ... to get the respect of CRA, it had to have strong  
1701 researchers. Moreover, it was going to do things, it was not going to ... it was — so every  
1702 person who was going to be on it had to have an active project. You couldn't be on it just to  
1703 have it on your resume. You had to lead, or co-lead, an active project. We also decided we'd  
1704 have co-chairs so that it would be a reasonable workload to chair it. We decided that we  
1705 would allow men to be on it, because there were men who really cared about women. And  
1706 Joe O'Rourke from Smith was the first male on the CRA-W. We also said that we would be  
1707 co-chairs for the first three years, and that we would rotate the chair positions so that a lot of  
1708 people ... so that we got new ideas coming in.

1709  
1710 The CRA-W turned out to be an extraordinary, successful committee. Less because of Nancy  
1711 and I as co-chairs, but more because we did choose well the first group of people, and the  
1712 format worked like a charm. It got an enormous amount done. At our very first meeting we  
1713 decided to focus, not on undergraduates, primarily, and certainly not on K-12, because we're

1714 supposed to be the Computing *Research* Association. And I think that's really one of the  
1715 reasons why, if you look today, the percentage of women majoring ... the percentage of  
1716 women doing graduate degrees in computer science is as high as, or higher, than the  
1717 percentage of women — this is North America — doing undergraduate degrees and receiving  
1718 undergraduate degrees in computer science. Because that's where CRA-W put its entire  
1719 focus. And, of course, now there are a number of groups that have been trying ... we're all  
1720 trying now to pay attention to K-12 and ACM-W ... and I think we are starting to make  
1721 progress, have been making progress over the last five to ten years, but there's a lot of work  
1722 left to do.

1723  
1724 The other thing that I'm very proud of CRA for is that ... they took very seriously, when I  
1725 arrived and raised the issue of "Why are there not more women on this board? Why am I the  
1726 first woman ever, and there's twenty four to twenty eight people on the board?" They took  
1727 that, they were so positive about it. So, I think, by the second ... by my second or third year  
1728 on CRA, a third of the board members were female, and the percentage of women on that  
1729 board has remained high ever since. And I have to say, I think all board members on CRA-W  
1730 — at CRA, not CRA-W. I mean this for CRA-W too, but for CRA — they tend to be very  
1731 committed individuals. The women have been among the most committed, the men are very  
1732 committed as well.

1733 [144:46]

1734 The other thing that I want to mention is that, in my ... I realized, while ... I really do feel  
1735 that while I was in my time as vice-president, I had a lot of impact on the University of  
1736 British Columbia. But I also realized that I didn't want to be in that job for very long because  
1737 I wanted to be back, having the opportunity to work much more closely with students. I  
1738 wanted to be back on the academic side. The other thing that I realized was that you cannot  
1739 leave a senior vice-president job. You can't resign it. If you want to have a continued career  
1740 in academic administration, and have the possibility of doing other things, like serious things  
1741 ... holding serious positions in the future, you have to leave it for something that is regarded  
1742 as, at least, a lateral, if not an upward move.

1743  
1744 The other thing was that, by now, my daughter was twelve, very opposed to moving from  
1745 Vancouver. My son was fifteen, very opposed to moving from Vancouver. So I knew that in  
1746 order to get out of this job as vice-president at UBC, I was going to have to move to  
1747 someplace within Vancouver.

1748  
1749 And so when the dean of science position came open, I decided that that was a way to get  
1750 back, at UBC, that was a way to get back on the academic side. However, as another ... at  
1751 the same time, roughly, or shortly before that came open, I thought of another idea. There  
1752 was an NCERT Chair for Women in Science and Engineering that I also applied for. This  
1753 was one of five regional chairs, and I ... the idea is that this would be positions for senior  
1754 women in science and engineering, whose primary task would be to increase the participation  
1755 of women in a field in which they were underrepresented. And I, of course, chose the field of  
1756 computer science.

1757  
1758 So I applied for that position as well. That would have still meant staying at the University of  
1759 British Columbia, but leading this project to increase the participation of women in

1760 computing. Well, somehow it happened I ended up with both jobs. And we ... I knew I  
1761 wanted to be Dean of Science, but we also couldn't really, it would have been too  
1762 embarrassing to tell NCERT that I wasn't going to take the uni — for the university, that I  
1763 wasn't going to take that one. So NCERT somehow approved that I would do both these  
1764 jobs. Now, you're supposed to spend half of your time in this NCERT chair position, on  
1765 these projects. Of course, being dean is much more than a half-time job. Plus I was still doing  
1766 research and a few other things. But nevertheless, I started as dean of science in November  
1767 1998. I actually, formally, started this chair in September of 1997. I started the SWIFT  
1768 project, Supporting Women in Information Technology.

1769  
1770 Shortly after I became dean, or I guess before I became dean, Dave Patterson had e-mailed  
1771 me and asked me if I would run for the ACM council. First of all, I was sure I wouldn't get  
1772 elected because of what had happened with CRA. Secondly, I thought, "If there's any  
1773 organization that, together with CRA, should be paying attention to women in computing, it's  
1774 ACM." And despite the fact that ACM had had the ACM-W, I didn't feel that they had had  
1775 enough impact on K-12 or undergraduate years. So I thought, "I could run for council, and if  
1776 I got elected to council, then I could focus on the issue of women in computing." So I ran for  
1777 council, and I got elected.

1778  
1779 So I'm starting out. I'm now dean of science. Of course, I'm very delighted to take on this  
1780 new job, and happy to get closer back to my computer science department. I'm leading this  
1781 SWIFT Project as well.

1782  
1783 Sometime within my first year as dean of science, I get a phone call from Chuck House,  
1784 asking me if I'm willing to run for the position of ACM president. I go, "You must be nuts!  
1785 I've only been on council for a year at this point. You've got to be totally crazy!" And he  
1786 said, "At least ... this is a great opportunity for you to focus on those things that you care  
1787 about. Please think about it." I talked to my associate deans and I talked to my boss, the  
1788 provost. And my boss said, "Maria, you have to be nuts. You're already ... you're doing this  
1789 NCERT Chair thing, you ... this is a major professional society. You cannot do that while  
1790 you're dean."

1791  
1792 One of my associate deans, her name is Lauren Whitehead, said "You know, think of all the  
1793 things you could accomplish as dean of science, from that role of president of ACM. You  
1794 would get to meet lots of VPs of major information technology companies. You'd get to ...  
1795 you know, you'd have this visibility. It'd be good for the university." I said "Lauren, you're  
1796 nuts. Barry's right." (This is the provost.) "I'm not going to do it." Lauren said, "Well, think  
1797 about it." So I called Chuck back and said, "I'm not going to do it."

1798 [150:05]

1799 Some weeks later, John White calls, to say — who is then the CEO of ACM — to say, "You  
1800 know, we know you don't want to be president, but there's this great job you can be that's  
1801 vice-president. It has no responsibilities. You could take this job and it would keep you ...  
1802 you'd get to see how the executive runs, and you could do this as dean of science." And  
1803 when I mentioned this to Lauren, Lauren says "You've got to do that one." So I said yes to  
1804 running for the position of vice-president, and I was elected.

1805



1806 Well, the position of vice-president didn't turn out to be as easy as I thought it was ... would  
1807 be. I spent my entire time, as vice-president, making peace. It was not an easy time, let me  
1808 say. During that time I decided, you know, it would be easier being president myself than  
1809 having to manage the relationship[s].

1810  
1811 And so, when, lo-and-behold, I was asked to run for the position of president, I said "Sure."  
1812 I'm now going into my fourth year as dean of science. I understand how to do the job. I'm  
1813 not contemplating any major changes in my life. This will be good because I'll be in charge,  
1814 instead of just being the person who's trying to be the fence mender.

1815  
1816 And so I agreed to run, and I was elected. And ... well, you know, shortly after I ... believe  
1817 had agreed to run, but perhaps before I was elected ... yes, I believe it was during the time ...  
1818 it was during the ... I had agreed to run in September, and roughly in November, I was asked  
1819 to advise the Princeton search committee on their search for a dean of engineering. And I  
1820 said sure I'd be happy to do a phone call, that's easy. And they told me about what they were  
1821 looking for as ... for the position of dean of engineering and I gave them my advice, and —  
1822 you know, I thought about this for a long time afterwards, about what a ...

1823  
1824 They had a new president, a woman, Shirley Tilghman. They really wanted to revolutionize  
1825 the culture of engineering and take their school to the top ranks. You know it's a great  
1826 university, but the engineering school is only an excellent engineering school, so it really  
1827 could move forward. It sounded a lot like the situation at UBC, though Princeton is a very  
1828 wealthy university. It seems like there wouldn't be the resource issues, and all of those kinds  
1829 of things.

1830  
1831 I got snookered. [chuckling in background] So I found, you know, in November, I was  
1832 waking up in the middle of the night, wondering if I was interested in this job. They didn't  
1833 mention my being a candidate. Well, I finally called Bob Tarjan, who was an old friend of  
1834 mine, and was on the search committee, and I said "Bob, you know, I've been thinking about  
1835 this. I'm not an engineer. I've never been in a private university in my life. I'm Canadian. I  
1836 realize I'm probably the last person you'd think about for this job, but would you consider it  
1837 — do you think they would consider me? Don't feel embarrassed." Dead silence. Even  
1838 though Bob can be quiet, he's not usually dead silent. And I said "Well, you know, anyway,  
1839 probably it wouldn't work. Because you'd have to offer Nick a position, and you already  
1840 have a ton of theory people at Princeton. You probably wouldn't want to add another  
1841 theoretician." He said "No, that's not a problem, we've already talked in the department  
1842 about that, and we'd hire Nick, that's not a problem." Of course, I realized when he said that,  
1843 that, of course, they'd been thinking about me very seriously. If they'd already gone — and  
1844 so on. So he said "We just thought there was no way we'd ever get you out of Vancouver. So  
1845 we just, hadn't decided how we were going to approach you yet, because we just thought it  
1846 was impossible."

1847  
1848 So I became a candidate. Of course, this was all very quiet, being a candidate. But by May  
1849 2<sup>nd</sup> I knew I was going to go to Princeton. I have to say, I came home, and after I made this  
1850 decision, I realized I couldn't possibly negotiate with the president, because if I negotiated,  
1851 even for one instant, I wasn't going to leave UBC. I loved UBC. I loved Vancouver. There

1852 was just no way I wanted to leave.

1853

1854 But I wanted ... I thought ... rationally, I thought it would be good for me to make the move.  
1855 The main reason was that I'd been doing already a lot to try and change the culture of science  
1856 and engineering within UBC and every time I would give a talk at some conference in the US  
1857 about the things we'd done at UBC, people would say "Yeah, but you couldn't do that in the  
1858 US. That's Canada. Canada is a kind of enchanted place. You can do anything in Canada,  
1859 you can't do that in the US." I said, "If I went to Princeton, and we did that, it would be clear,  
1860 since Princeton is so hard to change, that you could do it anywhere."

1861 [154:57]

1862 So, lo-and-behold, around the same time, a month after I realized I'm going to Princeton, I  
1863 find out that I've been elected president of ACM. So I ... in my first year as president of  
1864 ACM I go through the move to Princeton. I left my husband and kids in Vancouver for ... I  
1865 moved to Princeton in January 2003, Nick stayed with Janek and Sasha because Sasha was in  
1866 her last year of high school, absolutely refused to be moved, and I didn't blame her.

1867

1868 In that same set of time ... between my first six months of being the president of ACM, my  
1869 close friend, Anita Borg, became ... entered, really, started entering the final stages of dying  
1870 from her brain tumor. I agreed to serve as chair of the board of the Anita Borg — what now  
1871 is called the Anita Borg Institute for — I'd been a trustee since Anita founded it. Telle  
1872 Whitney agreed to become president of the Anita Borg Institute if I would agree to chair the  
1873 board, and because I thought Telle was a magnificent choice for being president, I agreed to  
1874 chair the board.

1875

1876 So there I was, starting a new job, beginning chairing this board, and being president of  
1877 ACM. Then, towards the end of my first year my ... well, actually, really just the weekend  
1878 after Anita's memorial ... first memorial, the private memorial service for Anita, after she  
1879 died May 4th, my mother became very seriously ill. So we went into the final stages of  
1880 leaving Vancouver while my mother was dying over the next three months. That was my first  
1881 year as president of ACM.

1882

1883 The second year as president of ACM wasn't early as bad, in terms of personal things. At  
1884 least Nick was now living in Princeton. It was a hard time, I have to say, that first year of  
1885 being president of ACM. But I have to say ACM's an extraordinarily wonderful  
1886 organization. The staff are amazing. The volunteers are amazing.

1887

1888 I felt, throughout my time, both as president of ACM and during that time as chair of the  
1889 board of the Anita Borg Institute, that I was doing a terrible job at absolutely everything I  
1890 was doing, because there wasn't enough time to do any of it. And, Fran Allen, when she ...  
1891 I'll never forget, she was asking me when she was deciding to run ... had decided to run for  
1892 the position of president during these last set of elections, and I think Dave Patterson was  
1893 also going to be running. And Fran said, "Frankly, Maria, what would you do if you had  
1894 another two years as president as ACM?" And I said, complete straight face, and I meant it,  
1895 "Kill myself." [laughter]

1896

1897 I just absolutely could not have survived any longer. But, it was a wonderful experience, I've

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1898 enjoying being past-president much more. I'm much more used to my job, as ... as dean at  
1899 Princeton. The transition to Princeton was extremely difficult, but it's been good for me. I  
1900 have grown, I've learned, and I'm thrilled to say that Princeton Computer Science  
1901 Department has just put in, brought in a proposal to the Broadening Participation in  
1902 Computing program at NSF. I think it's a wonderful proposal. I understand it's going to be  
1903 one of maybe five-hundred proposals that are coming in, so I have no idea what our chances  
1904 are of getting funded, but even just in the two and a half years I've been at Princeton we've  
1905 increased the number of women faculty in engineering by 50%. We've increased the number  
1906 of women faculty in computer science by 50%. We had ... almost 40% of our incoming  
1907 Ph.D. students this year being female in computer science.

1908  
1909 I can see the departments really working hard to change things. I can see several other  
1910 departments really working hard. We've completed our strategic vision for the school of  
1911 engineering, I think its very exciting. It's called "Engineering for a better world," and it's  
1912 really all about this changing culture to make engineering and science as a whole a place that  
1913 welcomes everybody: Women, minorities, people with many passions who want to be  
1914 Leonardo da Vinci and don't want to just focus on one thing.

1915  
1916 The other thing I like about Princeton is I still paint, and Princeton loves the fact that their  
1917 dean of engineering paints. And I still paint, I started, probably about ... when I started my  
1918 time as dean of science, I started painting in meetings. I'd paint all the time. I really feel that  
1919 the world is a much better place for women in science and engineering and in computer  
1920 science as a whole now than it was twenty years ago. And I think it's going to get better still.

1921  
1922 The thing that worries, absolutely, the most, at this point, is that computing as a career is  
1923 perceived in a way that is so far from what it is today, and from what it will become in the  
1924 future. And we've just been going through several years of decline in interest after the burst  
1925 of the dot com bubble in 2001. I think we've got a lot of work to do in K-12 and at the  
1926 university level to turn things around so that we really start to be an appealing discipline for  
1927 students to major in again.

1928  
1929 And ... that's the end of my story.

1930 [160:30]