

Computing Educators Oral History Project

An Interview with *Matthias Felleisen*

Conducted Thursday, March 10, 2011

In Dallas, TX, USA

Interview conducted by Barbara Boucher Owens

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CONTEXT FOR THE INTERVIEW: An afternoon interview starting at 2pm in the living room of a hotel suite in the Sheraton Dallas Hotel. The room was quite quiet. Barbara and Matthias both sat in chairs at a round table with the microphone and two recorders placed on the table in front of them. That morning, Matthias had given the opening plenary address at the SIGCSE Technical Symposium because he had just been awarded the 2011 SIGCSE Award for Outstanding Contribution to Computer Science Education.

1 [0:00]

2 **Barbara Boucher Owens: This is an interview with Matthias Felleisen being conducted**
3 **on March 10, 2011, in Dallas, Texas, by Barbara Boucher Owens. This interview is part**
4 **of the Computing Educators Oral History Project.**

5

6 **Did I pronounce your name correctly?**

7

8 Matthias Felleisen: Absolutely!

9

10 **B: Wonderful.**

11

12 **We're going to start way back. As you saw on some of the earlier forms that we start**
13 **real far back. So could you tell me something about your parents?**

14

15 M: My parents are children of World War II. Grew up in a very poor time in quite poor families.
16 I don't know my mother's parents at all. My [maternal grandmother] died due to malnutrition
17 after the War. Her father kicked all the children out.

18

19 And my father had clearly ... clearly had the intelligence to move on to the advanced school
20 system, but my grandfather couldn't afford to have a child — he had four children — in an
21 advanced school. So my father and my mother together had about seven or eight years of
22 school.

23

24 As a matter of fact, we traced our family tree back for two hundred years and nobody in the
25 family has ever gone beyond regular school. So I was the first kid ever to go beyond what we
26 call the regular school, which is eight years of school. I went to college prep school
27 [Gymnasium] and then to college, and I discovered that a Ph.D. gives a professorship and ...

28

29 So, yes, that's my family background.

30

31 **B: Wow. So you said you grew up in a very small town. Can you tell me something about**
32 **... was that just where you were born ...**

33

34 M: It was a small town. I grew up there. I was born in that town. I grew up there. They had a
35 little birth station. It was a clinic just for births. I was one of the last kids born in that little
36 town.

37

38 When I left that town there were still farmers that used horses and one of them actually used
39 an ox to plow the field. So most people either commuted or farmed. And some of the people
40 who commuted to jobs in the neighborhood still had farms on the weekend. So they would go
41 out on a little tractor and do something. Or they'd have a vineyard where they grow wine.
42 Because the name of the town means "vineyard". So it's a very farming-oriented town with a
43 lot of commuter jobs in the city nearby or ...

44

45 **B: What was it near? What was its name or the name ...**

46

47 M: The name is Weingarten and it's on the French border in ...

48

49 **B: In Alsace?**

50

51 M: [Close to] Alsace, exactly. Where Alsace is narrow, sticks into Germany, that point is us. In
52 principle, I could take the train across the border and visit France that way. It's a very pretty
53 part of France.

54

55 **B: What was the school like in this small town?**

56

57 M: The school was a small school, an elementary school. The first four years separated from the
58 second four years. So the regular school is the eight-year school, that was the only school in
59 town. They had an elementary school; when I joined, it was spun off a separate school to
60 make more positions for administrators. That was the goal of people's lives, was to become
61 an administrator in a school or in a bank or whatever.
62

63 I went for four years. And after four years you took exams that would classify you as either
64 college-prep track, middle-school track — which in Germany means a ranking not an age
65 group — regular track, or special track, which means you are not capable of taking more than
66 the first three schools.
67

68 **B: How old were you when you take ...**
69

70 M: You are in fourth grade. That's ... you are ten years old. That test score then tracks you. You
71 can later on switch, next couple of years you can still try to switch, but in principle fourth or
72 fifth grade tracks you for the next eight years.
73

74 So they put me into the upper track. It was a huge struggle. I had to go to the county seat.
75 That was a 25-minute commute with a bus, and then walking and biking, the whole thing.
76 There was in my first class in that central school were 300 people. It's called gymnasium in
77 German. Three hundred twenty, to be precise. We were 45 to 50 [students] per classroom.
78 And three years later there were 150 [students] left. And when I graduated there were 104
79 [students]. That's how you track.
80

81 Everybody who drops out goes to the next lower school. And when you drop out to the next
82 lower school. You always sink one level. Sinking was considered a social shame. Your
83 family had a blemish when somebody tried to escape the natural place of order in society.
84 And I got very close to failing out of that track, that college-track school, because of my
85 English scores: They were miserable. I only did a couple years of English and so my parents
86 helped me through that little crisis. I recovered and took French and was happy ever after for
87 the next eight years and finished at the school. But that was the Gymnasium school. That's
88 how I got into college.
89

89 [5:35]

90 **B: What were your favorite courses when you were in gymnasium?**
91

92 M: My absolute favorites were math and physics. We had an excellent teacher after ... So in
93 Germany teachers grow with you. You meet a teacher, say in sixth grade, and they stay with
94 you for three, four, sometimes six years. So you can go through the whole school with a
95 single math, physics teacher. They have to know the entire range of material. As a matter of
96 fact, my teacher basically taught me, "We have to be able to teach first and second year
97 college so that we can prep you to survive in college." Math and physics, we had a fantastic
98 teacher. He was actually — there is a region somewhat bigger than a county in this country,
99 but smaller than a state — and he was the head teacher of all math teachers in that region.
100 You could tell. He could just ... at the very end of my school time there, he said, "You can
101 choose whatever you want for the last eight weeks, because we have gone over the material

102 we have to teach.” I challenged him to teach complex functions and analysis. He said, “I
103 have never done this, but I will work my way into it and I will teach it to you.” And he did.
104

105 So that was my natural inclination. But I will say, to my teachers’ credit, that every one of
106 my teachers, including the subjects I disliked intensely, like German literature or French lit,
107 they could excite me, they could interest me in the subject. And in the end I liked everything
108 that I took. Now, they all had Ph.D.s, or many of them had Ph.D.s in their subject ...
109

110 **B: In gymnasium?**

111
112 M: Yes. Everybody had a Master’s at a minimum. And everybody learned to teach after they had
113 taken their Master’s degree with a thesis or a Ph.D. with a thesis in this field. They would go
114 to a master teacher who would tell them how to teach. That’s how actually teaching works.
115

116 **B: Did you have any outside activities when you were a teenager ...?**

117
118 M: Yes, I played volleyball intensely until my knees didn’t work anymore. Then I switched to
119 swimming at my doctor’s advice. I did a lot of swimming. I became a swim coach. So at the
120 end of my school time I started coaching kids who would swim just below the national team.
121 I would have them five times a week minimum, and every other weekend you’re on the road
122 for 20 hours, take them around the state, or southern Germany, to meets and stuff like that.
123

124 M: I did politics as well ...
125

126 **B: Did you have a job as well ...?**

127
128 M: I didn’t have to work because certain levels of achievement give you merit scholarships in
129 Germany. I got scholarships and the swim coach turned into a little job. It was minor.
130

131 I did some politics. I ran for town council when I was 18 [years old]. And the best thing that
132 ever happened to me was that I lost, because I had won a Fulbright fellowship at the same
133 time that said I could go to the United States, fully paid, tuition paid, stipends, travel paid,
134 everything paid, including living, for a year and a half. So I lost and I left and went to Tucson
135 [Arizona].
136

137 **B: Wow, wow. What a story! Do you have any brothers or sisters?**

138
139 M: I have one brother and one sister.
140

141 **B: Can you tell me something about them?**

142
143 M: My sister is three years younger. She became a teacher. She’s actually a math teacher now in
144 the same town. She lived in the same house as my parents for a long time because that’s the
145 way it is. You grow up in the house, you move to the other apartment in the house, you take
146 care of your parents. Then she moved away, an entire block.
147

148 My brother escaped much, much further away. He is at the other end of the county now. He
149 is happily married at the other end of the county. He is an IRS agent, something like an IRS
150 agent.

151
152 **B: So he was also in mathematics.**

153
154 M: Well, he can count. He can count the taxes as they are coming in.

155
156 No, it turns out he studied. The IRS or something like the IRS in this country, has its own
157 college. They send them there to become a computer person for the IRS. So he has a degree
158 that mixes tax law with computer knowledge to support all the agents in the field.

159 [10:06]

160 **B: You mentioned somewhat that your parents got you through your problem with**
161 **English and put you in French. It sounds like they had high expectations for you and**
162 **they gave you a lot of support. Is that true?**

163
164 M: Absolutely.

165
166 **B: Can you talk about that?**

167
168 M: When I grew up the belief in that part of society, in the layer and groups of people I grew up
169 in, was if you study hard you can escape. You can earn more. You can live better than they
170 did. And it just is all about getting through school and doing the best you can. And my father
171 really regretted not — being really bright — not being able to go to school, go the college-
172 prep track, and go to college. So he did everything on his own in evening school. Eventually
173 through evening school earned the equivalent of a college degree. That got him a reasonable
174 job, good middle class job.

175
176 My mom thought eight years of school with a brilliant exit exam at that point. Because you
177 take intermediate exams, in principle you can quit that school. She thought eight years of
178 school was fantastic. Ten would give me a job in town where I could go to a bank, build a
179 house on one of the hills, which was the dream of everybody who lived in this town. But my
180 father really believed that you should go and take it as far as you can. So he was always
181 behind me and saying “Work harder and do whatever you need to do.” And I did!

182
183 **B: So the last we heard in your path is that you went for a year and a half to Tucson,**
184 **Arizona.**

185
186 M: That’s correct.

187
188 **B: On your Fulbright. What happened next?**

189
190 M: In Tucson? I actually ... So what happened in Germany, I started college in a degree ... I
191 wanted to do math, because I loved math, as I said, in school. I read in a handout of the math
192 department that 50 percent of their graduates (and it is one of the better departments in this
193 country) would become actuaries, a word I didn’t know. So I looked it up in a dictionary and

194 the dictionary said it is people who calculate when other people die. So that was a very
195 disappointing thing for me. So I said, “Pure math is clearly not for me.” So I looked for the
196 next best math major, which was a business school major. The business school that I ran into,
197 that I enrolled there, was extremely mathematical. You study in the first four semesters, you
198 go all the way from multivariable analysis to topology. Functional [analysis]. You go through
199 differential equations and economics. Economics and business are taught in the same
200 department. You also take statistics and computing because the business school thought
201 computing was good. So I finished that and went to Tucson and that translated as an MIS
202 degree.

203

204 So I ended up in Tucson, which was just ... So Fulbright places you when you are an
205 undergraduate. If you are a graduate student they let you go where you get in, where you
206 want to go. So they chose for me to go to Tucson, Arizona, where they had a great MIS
207 degree — except that I wasn’t doing MIS.

208

209 **B: I’m going to step back a minute because on your CV you don’t have the name of the**
210 **school in Germany at all, under education.**

211

212 M: I do! Karlsruhe.

213

214 **B: Okay, but that’s after the MIS.**

215

216 M: Yes. Yes. Yes. I’ll tell you the story in a moment.

217

218 **B: I can’t wait to hear it.**

219

220 M: So the Fulbright got me to Tucson. And I was bored out of my mind in the MIS classes. They
221 were friendly people, but it wasn’t challenging. So I walked around campus, basically, and I
222 said, “I had taken a programming course and I had taken a course on something else in
223 computer science, couple of concepts ... breadth course.” Two weeks after being there, I
224 said, “I want to switch majors into computer science.” I took all the computer science I could
225 possibly take that fall, and I had a ball. So I started computer science. And the second
226 semester I enrolled in everything I could do again. The counselor said “You are committing
227 suicide with that load.” I said, “No, no, no, I can do it.” And yes, I didn’t sleep very much,
228 but I had thirty-something hours by the end of the spring semester of computer science.

229

230 At that point I convinced the school in Tucson, the college in which computer science was
231 located, that my intermediate exam in Germany was equivalent to a bachelor so that they
232 would admit me to the qualifier exam. So I took the qualifier exam on a lark and passed it.
233 And they said, “Okay, we’ll give you a master of science in computer science.” And Matthias
234 was happy. And I said, “Okay, now I am quitting.” Because I had to go back. Fulbright
235 forces you to go back. They give you a J1 visa, or at least at the time they did, and that forces
236 you to go back for two years to your home country. So I spent another couple of months
237 traveling around the United States, hitch-hiking up the west coast, traveling the west, and had
238 a wonderful time.

239

[15:31]

240 Then I returned to Germany and finished what is considered an undergraduate degree by
241 Americans. The German university did not take the Master's seriously. They told me that if I
242 really wanted to I could go to the Secretary of Research responsible for the state and get this
243 entire degree from the United States acknowledged as one course, reduce my course load by
244 one course. The course load is seven years of studies, four courses a semester. And so I
245 finished my degree there after another two years. So I had two years before Tucson and two
246 years after. Finished my degree, and decided ...

247
248 In Tucson I had discovered what a Ph.D. was. I discovered that professors actually talked to
249 students, they don't just talk down to them. I had discovered that a Ph.D. opens the door to
250 professorship. Now professors in Germany have this unbelievable reputation. So that's going
251 to be fun, to be a professor. At least I'd get a Ph.D.; and after returning to Germany, I knew
252 that the only place to get a Ph.D. for me would be the United States. So I immediately
253 starting working toward coming back and doing a Ph.D. in computer science, finishing my
254 degree in this business-econ mixed major that I had. That's the story. That's how I really got
255 into computer science.

256
257 **B: Wow. Wow. You've answered some of the ... we wanted to know what made you choose**
258 **the career. But it sounds like the academic love that made you ...**

259
260 M: It was academic love. There was a short time where in Germany economics, especially
261 mathematics of economics, where you study growth theory, or market theories, in terms of
262 differential equation systems, I was very attracted to do that. I was offered to do a Ph.D.
263 there. But then I ran into a couple of people who gave me two books to read that changed my
264 mind completely. One of them was Herb Simon's *The Science of Artificial* and the other one
265 was *Gödel, Escher, and Bach*, which I had discovered in the United States but hadn't [had
266 time to read]. As I read those two books, I devoured them. And I decided I would go there.
267 Now, I had to leave in January because I was done. I didn't want to stay. The only school that
268 accepted me in January was Indiana University. Lucky me — at least I thought so — the
269 author of *Gödel, Escher, and Bach* was still a professor there. I decided if I wasn't smart
270 enough for a Ph.D. I could always learn how to write great books from him and then make a
271 living as a book author. The worse thing that ever came to my mind, but that's my idea of a
272 Ph.D.

273
274 **B: [laughs] Oh dear! In the US program did you take courses outside the business,**
275 **economic, math, and computer science area?**

276
277 M: Yes. I took 30 hours of philosophy. At Indiana, you had to do a minor. Technically, it was
278 philosophy courses. In reality, they were logic courses because the entire logic department at
279 Indiana was a part of the philosophy department. But philosophy was considered a hard core
280 subject. And so I took courses, a normal logic thing, from Mike Dunn, who later became the
281 dean of the Informatics School at Indiana. A wonderful teacher. I took every course I could
282 from Smullyan, who was a logic teacher there. They shared him with the City College of
283 New York. He would be one semester here, one semester there. I took four courses with him.
284 He eventually offered me to co-author his book on fixed points. That's a wonderful little
285 story on the side. I took courses on modal logic, temporal logics. It was just ... I took every

286 course I could in this philosophy department. My motivation was, initially, to understand
287 philosophy through computer science. It is only later that it clicked in me that philosophy as
288 perceived in Indiana, as this largest branch of logic, is just a small part of the bigger
289 philosophy idea. But that is the motivation. I took courses in that.

290
291 I tried to take courses in psychology, but it just wasn't in the timetable. I finished my Ph.D.
292 in 3 ½ years and I wasn't prepped for psychology. But I would have loved to do memory
293 models under Shiffrin, who did very mathematically intensive models of how memory works
294 in human beings. They used more computers in the psychology department than the
295 computer science department had for all their students.

296 [20:03]

297 **B: When you were working on the Master's in Arizona, did you do research as well?**

298
299 M: No, there was no research component involved. You were supposed to do your Master's very
300 quickly, do your qualifier, and then move on to the Ph.D. It was all a very intensive, course-
301 focused program. But I discovered what people did for research because I took three
302 seminars: one on mutation testing by Tim Budd; there was a student of David Gries's ... was
303 doing David Gries's monograph — I was the only one who saw this thing before it was ever
304 published. And took a second seminar on that, applying Hoare/Dijkstra kind of things to
305 distributed communicating systems. And it was fun. It was fun to see what research was like
306 and I thought it was great research until I saw even greater research at Indiana.

307
308 **B: Tell me about the research path at Indiana.**

309
310 M: So in Indiana, I landed there in... after a 40-hour trip from Germany, which should have
311 taken 8 hours. But it was January. We were snowed in in Luxembourg. We were snowed in
312 even more in Chicago. And then I thought Indiana would be easier and there was even more
313 snow than in Chicago and Luxembourg together. It was that horrible winter of 1984 when I
314 arrived there.

315
316 I stumbled into Dan Friedman's office and we had a fun conversation. After two hours of
317 exchanging thoughts about what one could do for a Ph.D., he took me to his secretary, gave
318 me a stack full of papers that was about a foot high, and said, "Read those by Monday." That
319 was Friday afternoon. I almost started crying. I was ready to go home. So I got to my hotel
320 room and half-an-hour later there was a knock on the door and one of Dan's student showed
321 up. And he said, "Let's talk about this whole thing over pizza and beer." So we went out, had
322 pizza and beer, and he told me what it was really like. That Dan meant for me to read these
323 things, but not over a weekend. He [Dan] was a fantastic advisor and I should avoid certain
324 other people who write great books in this department and thank God they were moving
325 away. That's how I stumbled into Dan.

326
327 Dan and I hit it off very, very quickly. I loved his kind of research, the way he did research.
328 He's the one that I owe the entire inspiration for teaching. I did not think I would be a
329 teacher. I thought of myself as a researcher, very competent in mathematical things. I saw
330 myself in a research lab, or maybe in industry. He said to me after I had committed to do
331 research with him in that first semester there, "All of my students have become professors."

332 What I failed to check was that, yes, it is a true statement. But the *for all* quantifier can be
333 instantiated with zero. He had never had a student before. So his dream was that all of his
334 students would become professors. And yes, I did become a professor. But that one remark
335 inspired me to think really about a professorship as a reality. I honed in on that and I found a
336 topic with him. He and I just hit it off really well, both in terms of writing books together,
337 doing research together. It was a fantastic time.

338

339 **B: Were there other faculty or particular people in Indiana that shaped ...**

340

341 M: The most influential other than Dan was — in computer science — was actually Mitchell
342 Wand. He's now a colleague of mine. Actually he's the colleague that recruited me to
343 Northeastern. He overlapped with me for one semester only, but was very influential in
344 shaping of my understanding of the mathematics of semantics, programming language
345 semantics. He and Dan have worked together a lot. Outside of that I think the faculty in logic
346 and philosophy were far more influential than computer science faculty. But it was a very
347 strong programming language group. There were lots of people in programming languages. It
348 was *the* place to be if you were not at a coast at this point in time, in the 1980s. Everybody in
349 programming languages had some influence on me. But Dan and Mitch were clearly the most
350 dominant, while Mike Dunn, Smullyan, Cocchiarella (Nino), people like that in philosophy
351 were much more influential in that sense.

352

353 **B: Were there any other things that happened in Indiana to make the path that you then**
354 **took ...**

355 [24:51]

356 M: Totally. There's lots of little stories. Here's the first one.

357

358 Dan wanted his students to be teaching assistants. Even if he had a grant, he wanted us to go
359 through teaching his favorite course — programming languages for undergraduates. It was a
360 radically different course than everybody else's course at that point in time. So he took me
361 for his course, I was his TA. So I had taken it first. I was his TA. And as I was his TA, I
362 would realize how much the students misunderstood initially, for the first third of the
363 semester, what he was teaching them. And not enough of them were really understanding
364 what was going on. For the first part, for the first two weeks of this course, he used this book
365 called *The Little LISPer*. It was a very thin, green book he wrote in two weeks on a
366 typewriter at the University of Texas in Austin. And I would explain to him how my
367 mathematical understanding of certain things just didn't jive with *The Little LISPer* and his
368 book was misleading students in doing the wrong thing. I did this verbally in class, as
369 opposed to privately one-on-one. And so we had these discussions in front of undergraduates
370 until he one day said, "You come along."

371

372 He took me to his secretary, handed me 300 pages of attempted re-writes that he had made
373 for this book, and he said, "Re-write it any way you want, but don't ever come back to class."
374 Which was a fantastic job, so he taught me to re-write his book. And I rewrote his book.
375 That's how I became involved in book writing and really thinking about how to get students
376 to go from a problem statement to a natural solution. That's the beginning of [our book],
377 *How to Design Programs*. That's the central anecdote for me that reaffirmed then that I

378 wanted to be a professor, second semester in Indiana. That [imprinted] me for my insights on
379 how to teach.

380
381 It became a fun project. I wrote this book. My roommate, a mathematician, at the time, said
382 “Don’t do that. Don’t write anything with the professor. He just exploits you.” But no, Dan
383 and I got along and we still write books fifteen years later. It was good.

384
385 And at the same time, it got me closer to a friendship level with my advisor, not to a pay
386 relationship. Because of that, I’ve never had a relationship with my graduate students where I
387 said, “I hire a graduate student.” I never hire a Ph.D. student. They come to me. We work
388 together. It is my job to raise enough money so they have bread, water, a mattress, and
389 maybe a roof over the mattress. But at the same time I get them through and I see them to
390 tenure. That was one influence from Dan’s side.

391
392 Then I got married and I wanted to have a job so that my wife could be close to her family.
393 And Dan got me a job in Austin where he visited me at the end of this job because they were
394 trying to recruit me away. He was trying to bring me back as a Ph.D. student and he gave me
395 his 10-minute idea on — he always had ideas. Every morning he had ideas when he was in
396 the shower. That morning in the hotel he had a shower idea. He came to me and said, “Look
397 at this equation. Isn’t it beautiful?” It was a beautiful equation and it was all wrong. But it
398 completely, totally inspired me for my dissertation. So here I was, one-and-a-half years into
399 my Ph.D. studies, and one 10-character equation on the board inspired me to look into certain
400 things. And, believe it or not, within a year I had written four or five major papers on that
401 stuff. It turned into a new, novel theory of semantics. And my dissertation was more or less
402 done. It was such a coincidence because it used to be lucky to finish a Ph.D. in 3 ½ years, but
403 it was another one of those insights where you see an advisor throwing ideas every day and
404 one in a year works out. But I was lucky enough to be there when he had it. So that’s another
405 insight on research. Research is when you have lots of ideas, many of them fail and if you
406 can’t fail, it ain’t research. But if you have one, run with it and work it all out.

407
408 So those are the two most important stories from Indiana that got me launched.

409
410 **B: Did you meet your wife in Indiana?**

411
412 M: Yes, we met in Indiana — in the dorm, actually. I stayed in the dorm for one semester, ever
413 in my life, it was my only time. Same for her. We moved out. Yeah, we hit it off there and
414 we got married.

415
416 **B: Is she a mathematician as well?**

417
418 M: No, she is as far away as she can be. She is in classical archeology. She did her Ph.D.
419 program there and of course, that’s not an area where you have lots of jobs. She always said
420 when we were in grad school, “If I am lucky and I get my Ph.D., I will earn as much as a
421 janitor.” So now she is an artist. She does wonderful art. But she is not a mathematician. We
422 don’t understand each other at that level. [both laugh]

423 [30:07]

424 **B: [both laugh] So from Indiana you went to ... ?**
425

426 M: From Indiana, I finished in 1987. And I went to Rice University. It was a new program. They
427 had just launched the department. It was two years old. It was an excellent place to interview.
428 I had interviewed at other places before. I knew I had an offer coming from Berkeley and I
429 did get the offer from Berkeley. But at Rice there were 12 faculty members and eight of them
430 had published in the conferences where I had published. They had letters on the door, glued
431 to the door. The secretary had said, "To the Department of Compiler Science". I felt like I
432 had arrived in paradise. It was a place where a junior professor could study any area of
433 programming languages, compilers that he ever wanted. I decided that I would be there for a
434 few years and just study anything in languages and compilers I would want. And I did. That's
435 how I remember Rice.
436

437 **B: So can you tell me something about the tension — or was it fun? — between teaching**
438 **and doing research at Rice? What kind of students did you get? Tell me something**
439 **about the milieu in which this ...**
440

441 M: Right. There was no tension between research and teaching for me. Because of Dan
442 Friedman's influence, I always saw the two things as two different sides of the same coin.
443 That is not true for everybody in academia, remotely. But it was true for me. And at Rice it's
444 encouraged. Rice is very, very encouraging that their research faculty teach courses. As a
445 matter of fact, they do not wish to hire instructors. They made an exception for large
446 departments to hire instructors, but on the average, they encourage professors to teach
447 everything from the freshman courses to the Ph.D. courses. That was good for me. In that
448 sense it was a really, really good match. I had reasonably small classes. The undergraduates
449 were unbelievable. They were excellent. We recruited graduate students. Starting in my
450 second or third year I was getting the best graduate students. I could compete. Later on, when
451 I went on sabbatical to CMU, I could see that my graduate students could easily have gotten
452 into places like CMU. So it wasn't bad. It took a while to build, and it was difficult to sell
453 Houston to people. But once we had that figured out, we had great students at all levels, both
454 undergraduate and the Ph.D. program. It was always fun to teach there.
455

456 **B: What was the division between your teaching undergraduates and graduates? At what**
457 **level were you teaching students at Rice?**
458

459 M: Initially, I taught at what is called the junior level programming languages course and the
460 Ph.D. level course in programming languages. I ran a seminar on the side, just to get my
461 students going. My research took me into very theoretical parts of mathematics. Since the
462 math department didn't teach them, I asked my chairman whether it would be okay if I taught
463 a course on topology. So one year I taught a course in topology and I had seven or eight
464 computer science students taking a course on topology with me. Of course, what that meant
465 was I had to work my way through the book, refresh what I had done in my business school
466 training, and go beyond that. But I needed it for my research and the students were interested
467 because they needed it for their research. So we studied topology together. Another year we
468 did universal algebra and category theory. Again, I just asked my chairman and he said, "No,
469 go ahead." Another seven or eight students signed up and we worked the whole way through

470 books in mathematics on category theory and universal algebra. So that was really fun in that
471 regard. As you can see the research was unified with my teaching.

472
473 At the undergraduate level, what slowly happened was that when I got there, we had created
474 a course in Scheme, an introductory course that used Scheme, more or less like the course
475 that was run at MIT at the time. It was very fashionable that top-tier universities switch to
476 Scheme because Abelson and Sussman had really liberated freshman teaching from syntax.
477 They were introducing real concepts in freshman teaching. But that course was becoming
478 stale. So after promoting me to full professor in my fourth or fifth year there, I volunteered to
479 [take over] the freshman course. That is when the project really started because I started
480 realizing that one could interject a lot of the research that I had done over the last ten years
481 into the undergraduate freshman level course to make it much, much better than it was. It had
482 become a course that was great for the absolute top-tier student in CS, but it wasn't appealing
483 to the broader student body at Rice. It wasn't preparing them for the broader ideas of
484 computer science. And so I pulled all these things together and said, "I'm going to refresh the
485 core courses with research." Again, I could merge my research into the freshman course and
486 nobody objected. Quite the opposite. My new chairman encouraged me very much to just
487 keep going with that stuff.

488 [35:36]

489 **B: Can you tell me something about your relationship with your graduate students? You**
490 **said you modeled your way that you dealt with students with Friedman's. Can you tell**
491 **me something about your students?**

492
493 M: Well, yeah, we always had a fantastic time together. We were friends, working on the same
494 problems. And I would meet with my graduate students every day. Within a year or so I had
495 three graduate students. I would spend every day, an hour, half-an-hour sometimes only, but
496 every day I would spend a good amount of time with them. We would hang out together. I
497 would bring them over to my home. We would have parties together.

498
499 I was made chairman of the colloquium series, which meant that Ken Kennedy, who was
500 chairman at the time, would give me a bunch of money. I could bring in whoever I wanted,
501 unless somebody else wanted to bring in somebody. Most people were too lackadaisical to
502 bring people in, so I brought in anybody who counted in programming languages. When they
503 came in, I took them out to dinner with my graduate students and we hung out together in my
504 home. We had a bottle of wine, sat on the front porch and watched the thunderstorms and
505 talked semantics, or type theory, or classical logic versus constructive logic. We had a fun
506 time. It was always more of a friendship circle that hung out together. That continued very
507 much through the 1990s. When I created this team and put it together, it wasn't just because I
508 was a reasonable advisor who cracked technical problems, I had a human relationship with
509 my graduate students. So when I proposed to them to do something radically different in the
510 mid-1990s, they followed me also because they thought, I suspect they saw something
511 different than a technical advisor. They saw somebody who was willing to go all out and just
512 do something different as a human being. They got to know me all the way, not just as their
513 guide in math.

514

515 **B: I noticed that you did — in the later, middle 1990s — you had a sabbatical at Carnegie**
516 **Mellon or what was ... ?**

517
518 M: I had a one-year sabbatical at Carnegie Mellon with the POP group. I was hosted by Peter
519 Lee and Bob Harper. It was a fantastic time, it was a good time. It was a good year away.
520 Every time you move, you just get new ideas. You see things in a different light. I had
521 always criticized a certain part of our research area. The strongest people in this area were at
522 Carnegie Mellon, so, to make sure that my criticism was correct, I went there to study with
523 them, took all their courses, sat through their seminars, just to understand exactly what was
524 going on, much deeper than I had in the past. And I did that. We spent 12 months up there.
525 My kids finally saw snow. Yeah, it was a wonderful time away.

526
527 That was when it jelled in me that I was solving — at the time I was solving a very old
528 problem in computer science, in programming languages. It was called the Full Abstraction
529 Problem. The problem is to come up with a mathematical characterization that has
530 topological and algebraic properties that are very simple, nice, elegant, that characterize the
531 behavior of sequential programs perfectly. People had started seeing that problem in the
532 1960s. They really wrote down the essence of the problem in the early 1970s. A number of
533 people — a lot of people actually — tried to solve this problem from different angles in the
534 late 1970s, 1980s. I had an idea. I carried it through. And then I realized solving old
535 problems means nothing because there are only six or seven people in the whole world who
536 understand what you are doing.

537
538 So the second half of my sabbatical at Carnegie gave me a time to reflect on what I wanted to
539 do. But I didn't know exactly what I wanted to do. But it was a time when I started thinking,
540 "There is more to life than solving old problems." So when I returned to Rice, this idea of
541 education emerged, of reaching out from programming theory to education in middle school.
542 That idea emerged over that time, really came to the forefront about half-a-year after I
543 returned from Carnegie Mellon.

544 [40:04]

545 **B: You said "kids saw snow."**

546
547 M: Yes.

548
549 **B: Did that have anything to do with thinking about taking your work into education —**
550 **not that they saw snow, but ... ?**

551
552 M: No, but my kids did have something to do with — my kids learning. My older son had gone
553 to school, we saw problems in school that ... And usually school was great; it was a
554 wonderful school in Houston in a little town called West University inside of Houston. And
555 then we started to see problems with the school system. We just weren't happy with how
556 very, very talented kids saw mathematics. That was my particular thing.

557
558 So that fall after we returned from Carnegie Mellon. So at first the school the school system
559 in Pittsburgh was a problem. We couldn't find a really good school. We went to the Bishops
560 School at the time; it was a Catholic school. Then we came home and put him in the lab

561 school at Rice. It was worse than anything we had ever experienced before. I went to school;
562 I watched for a week how they trained kids. I actually offered to teach. I taught for a week
563 and I had a great time with these kids. And so seeing my son being told to sit in the hallway
564 to study math books on his own because he was beyond the material; and watching kids not
565 succeed because the teacher didn't quite know how to teach the material, where I as a
566 professor could actually bring it across to the kids. That was one of the contributing ideas to,
567 "Yeah! There could be something done; there ... something could happen there."
568

569 And then another idea was one evening — we had a babysitter, every day ... every month for
570 symphony tickets, symphony seats, season tickets, my wife and I had them. The babysitter
571 was in one, the strongest school in Houston, Bellaire Public School. She brought over her
572 math homework one evening. She did her math homework. She started on a certain page —
573 we went away. We came back, she was still on the same page. I actually recognized the page.
574 And there were a bunch of a lot of piled up, crumpled up, paper lying on the table and she
575 was very frustrated. That was before the time when kids had cell phones, could text and
576 distract themselves. There was nothing in the house to distract her. She had to do her math.
577 So I said, "Do you want to show me where you're stuck?" Before I took her home and she
578 showed me. It turns out it was calculating through function definitions and determining how
579 compositions worked and how things worked. By sheer coincidence, I had taught something
580 like that in Scheme to my freshmen that week. So I showed her how I was doing it in the
581 freshman course, translated into this notation that she was using in her textbook. And after
582 working through a couple of examples just randomly made up, that I made up for her, it
583 clicked in her. She said, "Why can't my math teacher explain this to me like that?" I said,
584 "You know, it really all depends on how you explain things. So I want you to do something. I
585 want you to take a friend tomorrow who has trouble like you and explain to her what you
586 learned from me. And then tell me how it worked." The next time she babysat, she was so
587 happy she actually hugged me when she saw me because she had moved to a B and her
588 friend had moved to a C, from a D-level grade, because they had followed my advice and had
589 really absorbed that algebra. And she said it was just unbelievable. It worked out for both her
590 and her friend. So that was the other inspiring thing that happened.
591

592 So around January I flew to a research conference called POPL in San Francisco. I returned
593 from there with a graduate student, sitting next to a graduate student, his name is Cormac
594 Flanagan, and he asked me that question, "What does our beautiful language theory
595 contribute to the man on the street?" And because I had this experience with my kids and that
596 babysitter, I said "Well, maybe not the man in the street, but at least the kids in the middle
597 school and high school." So we discussed for the entire flight home. He drove home with me.
598 We sat around for a while. We discussed some more. I told my wife, "I'm going to change
599 my life. Everything that I've done up to now is going to change. I'm going to do education
600 because we know how to do it right, the right way." That's the January 26th that I mentioned
601 on the first slide of my talk today.
602

603 **B: Wow! Those are good stories! Good stories. What's the teaching load at Rice like?**
604 **What was it like?**
605

606 M: Basically it is one-one. But you were strongly encouraged to do a seminar on the side if you
607 had time. That was optional. You did one undergraduate, one graduate course.

608 [44:55]

609 **B: I also see on the CV that you went to France for a while.**

610
611 M: Yes. This problem that I was working on before I went to Carnegie Mellon, this Full
612 Abstraction Problem, was something that the French in particular had tackled very much. In
613 parallel they had also discovered my thesis work, which was an independent piece of
614 mathematical work on characterizing how programs behaved with mathematical equations. I
615 discovered that they had invited me over to be on Ph.D. committees, and they said, “Why
616 don’t you spend the summer with us just to see whether we can have a joint research
617 project.” And it turned out I showed my host the solution we had found to this old problem
618 — we had not published anything yet — and he just fell out of ... it was just an eye-opening
619 experience. I watched his eyes grow bigger and bigger, and he said, “This is isomorphic to
620 what I tried back then, but I missed that one ingredient over here.” And we just spent weeks
621 talking about it. He showed me how to do it better because he had better tools to develop the
622 solution space, but he hadn’t seen the one missing ingredient in his world. And so we worked
623 through that. It was a fantastic time. My wife came along. She was pregnant with our second
624 one at the time. We had a wonderful time in Paris. They invited me a couple of years later for
625 another summer. We spent another summer in Paris. They tried to recruit me, actually, at the
626 end.

627

628 **B: So you started the Teach Scheme Project at Rice.**

629

630 M: At Rice.

631

632 **B: And that was part of your epiphany about you wanted to go into education.**

633

634 M: Yes, 1995. That’s when I started it. Three teachers, summer of 1995. And four years later it
635 was 100 teachers. It was a very rough path, but it was a wonderful time to bootstrap it there.
636 That’s right.

637

638 **B: You said you got pulled away to Northeastern. Do you want to talk any more about**
639 **Rice, about what happened with that development of the project?**

640

641 M: Well it wasn’t ... it was one of those times when you think of a start-up. It was a very intense
642 time. We were all working very hard. We were working 60, 70 hours a week minimum
643 before we discovered this project. After we started it became a lot more work.

644

645 We had to continue our research because we had obligations to our NSF and other funding
646 agencies. We wanted to do that. I also wanted to get my Ph.D. students a Ph.D. that was
647 technical. And I wanted to create the curriculum, the software, the programming language,
648 the IDE to run this outreach program. And there’s a huge gap between those. So we basically
649 did double duty. We worked from the moment we woke up until the moment we went to
650 sleep. And, lucky us, when we started the mailing list around 1996, for example, Matthew
651 Flatt, the first person I mentioned this morning, was an early riser. He would be at the office

652 at 6:00am. He would stay until 6:00pm or 8:00pm in the evening. Then Shriram would come
653 in the late afternoon and stay until 3:00am or 4:00am in the morning. Someone else would
654 fill the gap. So 24 hours a day we were on the mailing list, answering teachers' questions on
655 the spot because we were there. Everyone worked at some point, at any point. It was [like a
656 time in a start-up]. When people create a start-up they have, as Paul Graham put it one day,
657 "the agony of a lifetime packed into three or four years." We did that, too. But it wasn't a
658 commercial start-up, it was an intellectual start-up. It was a very, very intense time, being
659 there all the time for our software, for our teachers. Working on the curriculum. Working on
660 the IDE. Working on the programming language. Working the mailing lists. Recruiting
661 people. And raising money, in my case, trying to attract funding agencies, the foundations.
662 Presenting my work. Trying to get the money to get my Ph.D. students through their studies
663 and getting them a Ph.D., too — a technical Ph.D.

664
665 **B: I am tired, listening to you. [both laugh]**

666
667 M: Well, let's stop then.

668
669 **B: Whoa! Whoa! Whoa!**

670
671 M: It was a very, very intense time. That was four or five years of the most intense work time
672 that I have spent in my life. But it was fun. At the same time it was fun, it was rewarding.
673 You could see how teachers were just blown away by what they could achieve with this very
674 simple stuff, with this very simple starting and sliding up that hill.

675
676 **B: In terms of your career path, had you reached the full professorship before you started
677 the Teach Scheme project?**

678 [49:49]

679 M: Yes. Rice was nice enough to give me tenure behind my back in my third year, going into the
680 fourth year. They compiled a dossier because they felt that cracking that problem was good.
681 And when the letters came in, my chairman came to me and said, "You know, I think the
682 only way we can keep you here is to make you full professor on the spot." So they made me
683 a full professor in my fifth year.

684
685 **B: Wow!**

686
687 M: I felt awkward because what that meant, of course, was that several people that were hired
688 with me, just before me, or even after me would be ...

689
690 **B: ... taking the standard path.**

691
692 M: Taking the standard path, while I am already sitting in on their cases. It was in some sense
693 awkward, but you know, that is what you live with. It was good because it freed me from ... I
694 did tell Ken Kennedy when he hired me that I considered tenure syntax and my real work
695 semantics, meaning I wanted to see tenure and all those things as things you don't really care
696 about, something you have to do but it is not what matters. What matters is good results,
697 good impact on the people that you are with. He said it was the first time ever that somebody

698 had said this to him, but he hoped it would work out for me. And it did. So I worked only on
699 problems. I only focused on my graduate students from Day One. I love teaching in the
700 classroom. And that all paid off in three years. And so my fifth year they made me a full
701 professor and I went off on sabbatical as a full professor.
702

703 **B: So how did Northeastern lure you away from Rice?**
704

705 M: Well, it was partly a personal story. The other story is that I started in a department where
706 two-thirds of the people were in programming languages. By the time I finished, I wrapped
707 up my career at Rice, I was more or less just working with one person, but we were not on
708 the same wavelength any more. I had lots of students; he had maybe one. It just didn't click
709 anymore with anybody at Rice. My outreach project was praised by a lot of people. My
710 chairman, Moshe Vardi, was very supportive. My provost was very supportive. But other
711 people looked at it as something weird — “Now, there's a brilliant person who cracked a
712 very important mathematical problem and he does good research, but why does he do that
713 extra stuff?” — was sometimes the looks I got at certain levels in between the chairman and
714 the provost. So it wasn't a bad atmosphere by any means, but I no longer had ties to the rest
715 of the faculty. A lot of the faculty that I started with didn't get tenure. About 50%, actually,
716 of my generation didn't make it through tenure.
717

718 **B: What percent?**
719

720 M: Fifty. So there was no connection. And then one day my wife said she wanted to be
721 somewhere else. And I said, “Well, just put your finger on the map and I'll get a job!” And
722 she said, “Well, how about New York or Boston?” I was flying out to a conference that day
723 and I ran into Mitch Wand, who had been in Indiana with me — he had moved to
724 Northeastern — and we had dinner together. I said, “Well, look, my wife wants to be
725 somewhere else and she mentioned Boston. Don't you have a job up here?” He said, “Well,
726 we may have a chair.” I said, “I'll take it!” He said, “Okay, I'll interview you.” I gave him
727 my CV and four weeks later, he offered me, or his department offered me, the job.
728

729 **B: Wow!**
730

731 M: That's the story.
732

733 **B: You came in as a full professor?**
734

735 M: Yes. They interviewed me at Northeastern. Then I went up there. I talked to the dean.
736 Northeastern wanted to strengthen its research component. It is mostly, it was mostly, a
737 teaching school at the time. They had some strong research programs, in particular in
738 programming languages, and they had finally created something like chairs. They called
739 them Trustee Professorships because the Board of Trustees endowed these things, gave them
740 to certain departments to say, “Make a strong research area somewhere.” So they offered me
741 this trustee professorship. I could move my entire team up there. At the time I had a research
742 programmer, I had a post doc, I had seven Ph.D. students — six Ph.D. students — and
743 another one who was not with me asked me to please take him along, so I took him along,

744 too. We all moved up there to Northeastern. Yeah, it was a very easy transition. The dean
745 was very welcoming and he has been God's gift to me in the sense of accommodating what I
746 wanted to achieve. He tries to really help me wherever I need help, he smoothens the path.
747 We have had a great collaboration for the last ten years. It was a fantastic decision to move
748 from Rice to Northeastern.

749
750 **B: One of the things that you haven't talked about — and you did in your talk today, you**
751 **had one of the major players on your team is a female — what's been the gender**
752 **balance in your areas of research? Since ... this began as a women's oral history,**
753 **women computing educators.**

754
755 M: Oh!

756
757 **B: And it's more, because you can't tell women's stories without hearing men's stories to**
758 **know whether they're different or not.**

759
760 M: Yeah.

761 [55:12]

762 **B: So what's been ... has gender ever played into what you do and it's just ... ?**

763
764 M: Gender plays absolutely no role in my work.

765
766 **B: Do you get more females interested in your work because it has an educational**
767 **component? Or you don't see it?**

768
769 M: Not at the graduate student level. When we actually deploy the curriculum in middle schools
770 and high schools, we see the interest of girls peak. For example, one of the first evaluations
771 we did was with Karen North in her classroom in Alief, Houston. She taught the same 75
772 children — 76, somewhere around 70-80 range — children both our curriculum and the C++
773 curriculum, AP C++ curriculum, in parallel. That was a chore. But she volunteered so that
774 our evaluator could then go in and ask these kids questions. The amazing thing was that
775 among females, our curriculum won over the AP curriculum by a ratio of 4-to-1. Not 4% —
776 4-to-1. We had similar field reports from other schools around Texas at the same time. We
777 never followed [up on] that because I do not believe in [advancing] one gender over another.
778 I want to bring [all students] in a high school to the CS course, [not just one gender].

779
780 We have a conjecture that girls prefer to follow rules and boys prefer to play Game Boy.
781 What that means in terms of programming, in learning to program: programming has only
782 rules in the traditional way in syntax. You play until you parse it, until your program goes
783 through the parser. It's more or less like playing Game Boy. A parenthesis here, a brace
784 there, a semi-colon over there and voila! your program goes through the parser. Isn't it fun!
785 And nobody has actually any method to check whether this is a good design or a bad design,
786 so at that point the program runs, you tweak it, and it's done. That's a good boys' game.
787 Girls, on the other hand, seem to be much more interested in having a fixed set of rules for a
788 game. Design rules, design recipes offer that, after the syntax. Our syntax is extremely
789 simple. It's not the obstacle at all. It's design, rational design.

790
791 I also found out that in my own freshman courses, I had a dramatic increase in females in the
792 late 1990s, where we got to one-third, sometimes 40%. And females, on the average, did
793 much, much better — at the just below the A-plus grade. So A-plus people are people that
794 get it no matter what you put in the classroom, no matter who you put there, no matter who
795 teaches them. But all the people who get regular As or A-minuses or maybe B-plus, we found
796 a lot more females were performing at that level than boys. The boys split radically. They
797 didn't want to follow rules. They didn't want to have good design. They just wanted to have
798 something done. It's a conjecture. We had no sociologists on our team confirming that and it
799 isn't my primary interest. My interest is to get everybody to see the beauty of computing.

800

801 **B: That is very interesting. What are your professional service path you ... particular**
802 **organizations do you belong to?**

803

804 M: I was invited to many working groups. I am missing a working group for ... an IFIP working
805 group this week, which is meeting in Marble Falls [Texas]. I went to SIGCSE instead. I
806 belong to the ACM and all these SIGPLAN and SIGSOFT committees. I do my usual service
807 in the sense of I run conferences, I was general chair, I was on program committees, but I do
808 nothing special. I consider my education outreach a much more important service. It is not
809 my primary job. I do research. I publish lots of research papers still. But my educational
810 outreach is my service in that sense, my service to the community as opposed to my service
811 to the research community. So my service isn't particularly different from normal
812 researchers.

813

814 **B: Thank you. You've named some challenges that you've had during your career. Are**
815 **there any others that you'd like to note, things that ...**

816

817 M: Not in public.

818

819 **B: Not in public. Okay, we'll take that one. You may give the same answer to the next**
820 **question. Are there some compromises that you've made? You've mentioned some,**
821 **actually.**

822

823 M: I've mentioned some and yes, I don't want to talk about those compromises. [both laugh]

824 [60:08]

825 **B: Okay! We'll get one that might be a little easier, okay? Outside of ...**

826

827 **I have a question for you, because you didn't really address ... It took me a long time to**
828 **figure out why it was "Racket" when I went to download Scheme when I was teaching**
829 **programming languages.**

830

831 M: Yes?

832

833 **B: And I saw it wasn't Dr. Scheme anymore, it was Dr. Racket. I thought, "What does it**
834 **have to do with tennis?"**

835

836 M: It's not tennis! [laughs]

837

838 **B: I know that! I know that. I know that!! I thought, "Oh, Barbara, how can you be so**
839 **dumb!" Tell me about the name change.**

840

841 M: The name change — that's a very good one. I mentioned in my plenary address this morning
842 that we changed Scheme. What that meant was we created languages that were similar to but
843 quite different from what Scheme had been intended to be. At the same time we implemented
844 our teaching languages in a big language — what we call Scheme — but even that language
845 grew so radically to support this big software product. It is 800,000 lines of code at this stage.
846 We just grew. We became by far the biggest Scheme implementation.

847

848 You may not know that, but there are actually seventy-plus actively maintained Scheme
849 implementations in the world. There are lots of them. You won't be surprised to hear that
850 none of them agree exactly on what they do because there is no real standard, but there is
851 something called a report that is revised every so often. Until the early 2000s it was revised
852 in complete, total consensus of the entire community that was willing to travel to a certain
853 place. Of course, if 70 people are in a room, you will never get complete and total agreement
854 on anything. But the committee also realized that we had been stuck for almost ten years, not
855 revising the language, not being able to communicate among those 70 sub-communities, of
856 which PLT had become by far the biggest. We have tens of thousands of users — at that
857 point we probably had 250 schools that were using Dr. Racket — 250 university-level
858 schools around the world — that were using it in AI, in programming language, in natural
859 language processing, in introductory computing, in graduate school, research, you name it. It
860 was just used all over. We have probably about three or four hundred high schools at that
861 level using it. We had entire countries taking it up, or provinces in countries, looking into the
862 curriculum, and every student would have Dr. Racket.

863

864 **B: Dr. Scheme.**

865

866 M: Dr. Scheme, at that point, that's correct. So that meeting that happened in Boston was
867 revolutionary for the Scheme community because they finally agreed break the consensus
868 rule and instead appoint a committee of editors that they would trust to guide the next
869 language revision effort and to produce the revised report, number six. Only one of us
870 volunteered to be on this committee, but because we had the biggest extension, the most
871 productive programming language that looked like Scheme, it is not surprising to hear that in
872 the end, the entire report looked like our programming language. To the credit of other
873 editors, several other editors had — of the six — had checked that what we had designed as a
874 programming language made sense, could be easily added to existing Scheme
875 implementations, and confirmed this report. But ... that was only six out of 70 major groups
876 that looked at Scheme implementations.

877

878 So when the report was finally voted on, they, of course, called out — there was a lot of
879 discussion about this. They changed the rules on voting. It was no longer a majority passing,
880 it was a super majority. People who were ... the older generation, and some of the younger
881 generation who seemed to feel very old, were vehemently arguing against this extension

882 because Scheme had become a very big language. It was no longer a small language you
883 could describe in five pages. It became a language that needed almost 100 pages of
884 description and that was anathema to people like that. At the time I wrote a blog post that
885 was called “The Sixth Report on Scheme is Perfect.” It was actually a tease that explained
886 that nothing is ever perfect and that languages need to grow, constantly grow, and that
887 described that perfection is a process, not a point. This group did not take this blog post well
888 because it created a super majority that was needed to pass the standard. Within half a year
889 they organized a counter-movement. And we decided it was a bad idea for us to split the
890 community. So we agreed to a friendly divorce.

891 [65:36]

892 We are a much, much different language from Scheme now. We decided to give it a different
893 name and the name was supposed to allude to the idea of conniving, planning, scheming,
894 racketeering. So we came up with Racket. But Racket is ambiguous. It could be just a racket
895 of young kids being loud and making a racket. It could be racketeers, who connive and
896 scheme, as where the language came from. Or it could be a tennis racket [laughter] where
897 ideas bounce off.

898

899 **B: Okay!**

900

901 M: So this is where we changed names. It was a good decision because it gave the Scheme
902 community breathing room to develop its own life, to find its own standard, the middle
903 ground between a big language and the small language that they want to be. And it gave us
904 the freedom to build this thing into a product that people need because we have companies
905 that depend on it, we have lots of companies that depend on that Racket. We have lots of
906 schools that depend on its implementation. We can't pay attention to the idea of having a
907 small language because it is beautiful. We need a useful language that is beautiful.

908

909 **B: Thank you for that enlightenment. This one will probably be easy, too. Do you have**
910 **outside interests that would get some insight into you, besides Scheme and Racket and**
911 **... ?**

912

913 M: Well, I was an avid swimmer. I was in the pool from the age of 14 or 15 through three or four
914 years ago. Every day I would go to the pool and swim. I was a swim coach, as I mentioned
915 briefly. I spent about five years training kids. It was a very insightful work because it was
916 working with children and seeing them grow. I worked with them every day. So one of the
917 girls I picked out was probably about six, seven [years old] when I fished her out of what we
918 called the fish pool. A hundred kids every year came to learn to swim. And she looked like
919 she had the right proportions, the right flexibility in her ankles, in her arms, and the right
920 style, approach to swimming. So I asked her to swim a hundred meters and she needed like 2
921 minutes and 10 seconds, whatever, a long time for a kid and I forgot what it was. And she sat
922 on the side of the pool and cried. And then I worked with her every day. I worked with ten,
923 twelve of them, every day, similar age group. And when I left she had broken the minute
924 barrier. She was on her way into the C team of the German swimmers. And a couple of years
925 later she was nominated for the Olympics in Seoul. And seeing that growth was very
926 influential. So in that sense, that was my swim coach activity.

927

928 But I was also ... after I had coached these kids for an hour-and-a-half every day, sometimes
929 in the morning, too, I would go in the pool and swim. I stuck to this swimming for almost
930 thirty years now and I finally gave up because just doing the butterfly for thirty years
931 eventually damages your shoulder. So that's one of the things: I did it until I couldn't do it
932 anymore. And I will teach until I can't do it anymore.
933

934 With my wife, I am developing a little house on the site that we bought. A little house in
935 Maine. It is close to the beach. We can walk to the beach. It's our little dream thing, we're
936 putting it together, we garden together, puttering away, creating our little studios. She does
937 her art in there and I write my books in there and do my research. So that is our major hobby
938 that we have joined in together doing these kinds of things.
939

940 Our other joint hobby is traveling. Last few years we have mostly traveled to Istanbul. I gave
941 a lecture there, my lecture for what they call the Turing Day at a private university in Istanbul
942 and they were willing to fly me for two days. I know my wife loves this region of the world
943 so I said, "Come along!" We spent the week vacationing there and we've been back several
944 times since then. So those are our hobbies. We just explore this culture, we explore different
945 cultures. This is what it boils down to. This is a cultural, this is a real melting pot, Istanbul,
946 everything you can possibly think of is there. So we explore cultures together.
947

948 We read books about this and things like that. I read a lot. I read about philosophy, history,
949 politics. And sometimes science fiction.

950 [70:18]

951 **B: And science fiction is your fiction?**

952

953 M: Absolutely! I read all kinds of fiction, but always science fiction. If I need something light
954 and fast that is just totally different, I read science fiction. And I know that sometimes I get
955 ideas from that. Just as I get ideas from philosophy books.
956

957 **B: What is your hope for the future? One hope I — see if I got it right — is that all high**
958 **schools, all schools, have a smooth path of thinking mathematically in system design**
959 **with an arithmetic which is not necessarily based in numbers, but that any kind of**
960 **symbols.**

961

962 M: My hope is ... my professional hope is that many high schools have almost all their students
963 in a course on programming, computing, that helps these students strengthen their math
964 skills. That's the central thing.
965

966 **B: I have one more question and that's it.**

967

968 M: That's great.

969

970 **B: Cool! What advice would you give a young person starting out who thinks that they**
971 **might want to follow computing as a path?**

972

973 M: As a graduate school? Or anything?

974
975 If you are really interested in computing, and applying it, and being able to apply it wherever
976 you want, you need to learn as much math as you can. A lot of people will tell you you don't
977 need math in computing. Computing is mathematics. Period. So that is very important to
978 keep in mind. Don't become math shy.

979
980 It is better than that. Everybody who can make into college can learn all forms of
981 mathematics. Don't ever be afraid of anything. I was in business school and I did topology.
982 You can do it, too.

983
984 But there's something else you need to know. Computer science is not about mathematics
985 only. It's also about being able to communicate the thoughts that you have to other people.
986 Programs are not just instructions to computers. They are instructions that other people must
987 be able to read. You must be able to talk about your programs. You must be able to write
988 about your programs. You must be able to express yourself about what your future programs
989 will accomplish. You must be able to articulate the history and philosophy behind your
990 programs. So you need two things to prepare yourself for a career in computer science.
991 Mathematics and articulation skills, the best possible articulation skills you can possibly
992 acquire in your native language.

993
994 **B: Thank you. I lied.**

995
996 M: One more question? That's fifty bucks. [laughter]

997
998 **B: If there were one story that you hope that people would go out and tell about you, what**
999 **story would they tell about you? "You know that Matthias guy ..." What do you hope**
1000 **the story is?**

1001
1002 M: That I had a good impact on people. That some people, just a few people in the world, are
1003 better off intellectually, maybe professionally, because something I did touched them. If I can
1004 see stories like this happening at the graduate level — I know my graduate students will tell
1005 stories like that — and I know undergraduate who say these things. And there are these
1006 stories around where I was really harsh on people because I believe in tough love. I have
1007 undergraduates who flunked or nearly flunked courses and they thanked me. They sent me
1008 thank you notes afterwards for giving them an F. Two of them in particular, I keep those
1009 forever. They are posted on my message board. Their thank you notes basically said, "I took
1010 this course as the capstone course of my career at Northeastern, and I was supposed to take a
1011 job, and getting an F made me realize I wasn't prepared. And best of all, I had to go back.
1012 My coop job had actually offered me to continue on my position." They are almost identical
1013 stories, both of them. Both of them wrote back, "As I looked at my work, through the eyes of
1014 this course, I realized I wasn't ready. And I am going to go back and make sure that I
1015 understand what you tried to teach us." That kind of impact, that if you get an F from me,
1016 you still you think saw something new, and it will change how you deal with your
1017 professional life is a good thing. It is not a good thing to get an F, nobody should get Fs, but I
1018 hand them out sometimes.

1019

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1020 The best part of that story is that a few years later somebody wrote back and said — one of
1021 those kids wrote back just recently when I announced that I would finally teach this course
1022 again — that many years later he is still benefitting from actually finally figuring out what I
1023 taught there. And that is just great.

1024

1025 **B: Wonderful. All right! Thank you so much.**

1026

1027 [75:59]