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Oral History Project
Interview
John Impagliazzo
Bologna, Italy
June 28th 2006
Interviewed by Alison Young

A: This is an interview with John Impagliazzo recorded in Bologna, Italy, recorded on June the 28th [2006] as part of the Oral History Project. John, just say your name into the machine so that we've got it correct.

J: John Impagliazzo.

A: Right John, as part of our Oral History Project, we would like to take you right back to the beginning and talk to you about your parents. Did your parents have college degrees?

J: No, they did not. My Dad came to the States when he was ... I don't really recall; it was about 1929 and I don't recall exactly how old he was at the time, probably around 25 years old. He was an officer in the military; in fact, he was the personal bodyguard of King Victor Emmanuel III and so he appreciated education. In fact, his uncle was the Chief Justice of the Supreme Court in Lucca, Italy.

A: And your mom?

J: My mom was born in Providence, Rhode Island, and she was the first born of my grandparents in the United States. At that time things were difficult and there was a tremendous amount of time devoted to keeping the family together financially because my grandfather died at a very young age, right after they came to the United States. There were five sisters in the family and what they did was that they all worked to try to make one of the sisters become educated and, in fact, she was the only one that graduated high school.

A: OK, so neither of them were in maths, or science, or engineering fields?

J: That's right.

A: Did you have any siblings?

Yes, one sister. She wanted to go to college but then she went to business school. She was quite a good bookkeeper/accountant; her name is Serafina, but we call her "Chicky" because when she was little, young born, she looked like a little chicken and that name stuck with her. She is now the school district registrar for the County of Newton in Georgia.

A: OK, were you a good student at school?

51 J: I was always a good student, I always enjoyed learning.
52

53 **A: Did you take courses in maths and science?**
54

55 Always in high school, yes -- and in college I gravitated to engineering right away. I
56 had two loves: one was music and the other was engineering. The question was:
57 could I make a living writing music and composing music and conducting orchestras?
58 The answer was no; the probability of that was nil given the rate of success for artists
59 at the time. So I went to my avocation at that time which was electronics. I was very
60 very good with electronics and I pursued my first degree in electronics.
61

62 **A: Were you and your sister given the same encouragement to go to college?**
63

64 Oh yes. My father highly valued education; so did my mother. They felt that
65 education was the one thing that no-one could ever take from you. I can still here
66 them tell me that people can steal everything from you, but never your education.
67

68 **A: Was there anybody else in those early years that inspired you or was a
69 mentor to you that helped you pursue your career in engineering, physics, maths,
70 science?**
71

72 J: No, not really. I just fell in love with it. I did quite a few things with radios
73 when I was a teenager. It sounds silly now, but I used to go to the town dump and
74 fetch out all the old radios that were discarded and I would disassemble them and save
75 all the good parts and reconstruct them into other parts. My friend and I, I think, built
76 the first stereo system ever on the planet. It was probably 1956 or 7 when we did that.
77 Back at that time, we had binaural sound which was sound with two speakers, but was
78 never stereo. We built a pre-amplifier that would actually split sound into separate
79 components and therefore we could channel it in a mixed way, which is what we
80 know today as stereo. It was very fascinating to listen to this in the late 1950s; it
81 really was a startling sound at the time. Unfortunately, I never had the foresight, and
82 neither did my friend, to patent it; so, that's the way life is.
83

84 **A: So you finished high school and you went to college, why did you choose
85 the college that you went to?**
86

87 J: I went to SUNY Farmingdale, which was a technical college and I went there
88 first of all because it was close to home. It didn't feel like going away from home and
89 spending money in dorms for useless reasons and besides, I used to play music on
90 weekends to make ends meet. I had a band so that helped out on the financial side to
91 keep things going and from there I went to ...
92

93 **A: So you went to college knowing what you wanted to major in?**
94

95 J: I really liked electronics then. I majored in electronics and I graduated 5th in
96 my class, in a class of about 300.
97

98 **A: And you went from there to St. John's?**
99

100 Yes, I went to St. John's University because I began to enjoy the science of
101 electronics more than just the electronics. I wanted to know why things worked. So I
102 started studying physics and became fascinated with physics and tried to pursue that
103 area; actually I had a double major in college. I think I'm one of the few people who
104 graduated with a baccalaureate degree of (I don't know how many credits) probably
105 near 250 to 300 credits because I transferred credits from one school to another and
106 switched majors so I lost about 90% of my credits. I had to redo that but I did a
107 physics and mathematics double major at St. John's and I finished that in three years.
108

109 **A: OK and then you stayed on and did a master's degree?**

110
111 J: Yes. I won a National Science Foundation Fellowship to SUNY Stony Brook,
112 which was an upcoming university at that time. I went there and pursued engineering,
113 which was at that time engineering analysis; it was the mathematical side of
114 engineering and that was basically a very applied engineering-math pursuit.
115

116 **A: So when you had finished your first master's degree and there is a gap to**
117 **your second master's degree, what did you do then? Did you go straight into**
118 **teaching?**

119
120 J: Ah yes, I was planning to go into industry but I did enjoy teaching. I guess it
121 had to do with the music, because since I was 16 years old I was always teaching
122 young students music, the guitar or piano, and I just enjoyed seeing these youngsters
123 accomplish things. Probably one of the pinnacle areas was the time when I organized
124 a piano recital; all of my students got together and they did a piano recital for their
125 parents and relatives; it was very, very nice. It was so grand to see youngsters learn
126 and accomplish something. From there, I thought that maybe teaching would be
127 acceptable and I tried it and I have been with it ever since. I worked in industry in the
128 summers.
129

130 **A: But you started out teaching math?**

131
132 J: I started out teaching math, yes. I was always good at mathematics.
133
134

135 **A: You started teaching first of all at Adelphi University as an Adjunct**
136 **Professor?**

137
138 J: No. Actually I started teaching at SUNY Farmingdale, which was my Alma
139 Mater from my first degree. It was a little strange going back to the place where you
140 studied because your teachers were now your colleagues and you got to know the
141 interpolitics of the things you didn't really know all the time when you were a student.
142 It was a good experience and I taught mostly engineering calculus through differential
143 equations.
144

145 **A: So how did you get into computer science?**

146
147 J: Well, when I was studying physics (this is like I guess the early 1960s), I used
148 some of the electronic parts to build an analogue to digital converter to convert digital
149 numbers into binary and that seemed to be fun. I had also taken an audited online

150 course through television at MIT – online was television in those days. The course
151 was on the theory of computing and how computers worked. When I was at Stony
152 Brook, Aaron Finerman (who was well known in the early days and was one of the
153 pioneers of computing) became the computer person at Stony Brook. I had sat in one
154 of Aaron's classes, which was rather interesting. It kept perking my interest in that
155 area. But later on, when I was doing mathematics, I started writing my first book at
156 that time. I began to express engineering principles in a graphic way and I got
157 involved with Fourier series and Fourier transforms, which are very akin to
158 engineering. I showed, at least graphically, how to generate these series and how to
159 create analogue waves with a digital or other analogue waves; you can create all kinds
160 of things such as square waves from sine and cosine waves. It was very challenging
161 to be able to do this with computers. I also started building tutorials in the early
162 1970s on computers so students could learn mathematics doing tutorials. At that time,
163 we started programming with Basic. I built tutorials in Basic to teach mathematical
164 principles and to teach Basic programming to students. It seems like yesteryear –
165 really yesteryear, a time warp – when that was going on, but it was very interesting
166 because things like that hadn't really been done before.

167
168 **A: So you were like a professor then in computer science?**

169
170 J: No, I was in mathematics at that time. At that time I really started enjoying
171 mathematics. I was fascinated by some of the theories in mathematics and how they
172 related to computing in some ways and then pursued my master's in mathematics and
173 then to my fifth degree which is a PhD in mathematics. That was also another nice
174 thing because I chose an applied area of math which dealt with biomathematics or
175 computational biology as they would probably call it today. I modelled population
176 dynamics using different methods of mathematics. Springer-Verlag learned about my
177 thesis, which wasn't even completed yet, and they immediately offered me a contract
178 to publish my work. As I mentioned, it wasn't even finished yet and they wanted that
179 right away. It was really a break through because I solved one of the unsolved
180 problems in mathematical demography at the time; it was a particular method of
181 doing solutions.

182
183 **A: So why did you choose Adelphi University to do your last two degrees?**

184
185 J: Adelphi was close to home and where I worked; I also was adjunct there
186 where I taught courses. They actually had an outstanding department. The professors
187 came from the Courant Institute of Mathematical Sciences of NYU – New York
188 University. A group of that faculty left Courant and they opened up the math
189 department, a special research department, at Adelphi. So, my degree was similar to
190 one from Courant because basically, it was the same teachers and it was also very
191 very rigorous. It was not an easy thing; you really had to know your math very well
192 to get through it.

193
194 **A: Was there anybody in those early years when you were beginning**
195 **teaching and still studying who was like a mentor to you? Who shaped your**
196 **future career?**

197
198 J: No, not really. I was guided by my thesis advisor, obviously, and my
199 dissertation work. I basically did it all on my own. I wasn't very fortunate in the

200 sense that my daughter was handicapped and she took a tremendous amount of time
201 from one's life to take care of her and to do things and earn a living. The medical
202 bills were outlandish and any time you earned a dollar it disappeared. We don't have
203 a social medical system in the States; everything is private and it could wipe you out
204 right away. So I did quite a bit of teaching and sometimes at four universities at the
205 same time in the same semester. One time I counted I was teaching seven different
206 courses from elementary math and computing to advanced differential equations at
207 these places. Sometimes it is just the way the dice roll and you know you have to do
208 these things. You do what you have to do.

209

210 **A: Are you happy to share your teaching philosophy with us?**

211

212 J: Well, I think students need to become engaged and they need to try to
213 understand what they are doing and why they are doing the things that they do. It's
214 okay to show them tricks and how you can take shortcuts to do things. But, I was
215 always the type that whenever a student had a question, I would always go back and
216 do it from foundation up so they understood where the result came from. Particularly
217 in mathematics, where most of the time calculus solutions are concrete and you
218 actually get a definitive answer; you don't have to hypothesise too much about it,
219 especially if they are engineering type problems.

220

221 **A: Do you think your teaching style has changed over the years?**

222

223 J: Yes, it has changed from kindergarten right through the universities....

224

225 **A: Your own teaching style?**

226

227 J: Pardon, my own teaching style? I would say, I don't think too much; I don't
228 think so. Obviously you have to teach differently if you are teaching computer
229 courses versus math type courses.

230

231 **A: Can you explain that a bit further?**

232

233 J: Well in math type courses, you begin with concrete premises that you assume
234 to be true and then you can build something from there in a very logical way.
235 Sometimes computing can become a little bit "hit and miss", you know, try this and
236 recompile, try that and recompile, and the students constantly do that and they spend
237 endless hours in labs doing that. Probably, the good old days were better with the
238 punch cards; you had to think five times before you submitted the punched cards
239 because you had to wait 24 or 48 hours for the turnaround. I think my style generally
240 is still the same, to engage students.

241

242 **A: Okay. I just want to change direction now for a while....you have a very**
243 **impressive record on your CV of professional organisations. Could you tell us**
244 **what types of professional organisations you have belonged to?**

245

246 J: Oh, several. I guess it started with the Computer Society and ACM. Way
247 back I started with the Institute of Radio Engineers (IRE) which doesn't exist
248 anymore. That organization merged with the American Institute of Electrical
249 Engineers (AIEE) and became the IEEE. So, I was one of the early members of

250 IEEE. However, I dropped out for a while because of things on the home front with
251 my daughter. My first publication was with IEEE and there I discovered multimodal
252 propagation with antenna propagation waves; it became the lead article of the journal
253 for that year. I didn't pursue the organisational stuff in those early days, but in the
254 1980s things began to change and I started to be more involved with organizations. I
255 began with ACM, the Computer Society, and recently (in the last 10 years) I have
256 been active with IFIP, chairing its 9.7 committee on the History of Computing. I ran
257 the SIGCSE conference in 1996 when that was the kick-off of the 50th Anniversary of
258 ACM with Big Blue and Kasparov waging battle at chess. It was also the 50th
259 Anniversary of the ENIAC, so it was a busy time for me in Philadelphia then. Hence,
260 I became involved that way. A year later, Jim Miller announced that he was not going
261 to continue as editor of the SIGCSE Bulletin anymore. He was giving it up and I said,
262 "Gee! That might be something I might be interested in doing". So, I started doing
263 that in 1997 and I'm still its editor. So, right now I am involved with that. In
264 addition, I have been affiliated with the Education Board of ACM since 1986.
265 Twenty years! Where did they go? I was involved in the Ed Board in one capacity or
266 another, particularly chairing its Accreditation Committee for twelve years. I don't do
267 too much with the Computer Society, though I help them with tasks from time to
268 time.

269
270 **A: That's the IEEE Computer Society?**

271
272 J: Yes. That's the IEEE Computer Society. However, I am involved with IEEE
273 as Treasurer of the IEEE History Committee and I chair the Financial Sub-committee
274 for that committee. I am very involved with the IEEE people in different ways.
275 Those are basically the organisations I am involved with now.

276
277 **A: How do you think your involvement with these organisations has shaped
278 your career?**

279
280 J: Well, it has certainly made me a lot busier. I don't know if it has shaped my
281 career. My career is in its limelight at this time. Although I still feel like I have fifty
282 more years, in reality I only have a number of years. However, I don't think it has
283 changed my career at all in terms of working. Hofstra does not recognise the hours
284 people volunteer for organisations and the time they spend. However, I guess
285 professionally on the world front, it has affected me professionally. What it has done
286 (and what I have done) is to try to expose computing history worldwide. I have
287 organized several conferences already through IFIP on computing history, one for the
288 Nordic countries, one on History of Computing in Education in France. Later in
289 August of this year, I will be doing another IFIP conference on computing history in
290 Santiago, Chile. However, I guess the feather in the cap is the SoRuCom conference
291 that I'm doing in a couple of days. This is a very high profile, week-long conference
292 on "Perspectives on Soviet and Russian Computing". I don't know how it happened
293 but I was able to reconstruct the Former Soviet Union historically, even including the
294 Russian Academy of Sciences. In fact, I am doing a presentation next Tuesday which
295 will involve "Comparative Computing Education, East and West". The Eastern
296 perspective will be given by the director of the Russian Academy of Sciences and also
297 the chief industrial representative for Microsoft Research Russia. For the Western
298 part I will be doing the US perspective and the president of IFIP will be doing the
299 European perspective. The conference is gaining much acclaim so far. They plan to

300 have a plenary session at the conference and they are going to do a mass media
301 broadcast. I have no idea who will be watching this, but I guess I should be wearing a
302 jacket and tie.

303

304 **A: Of all the things that you have done for these professional organisations,**
305 **outside of your normal duties, would this be the one that you are most proud of?**

306

307 J: Do you mean the event?

308

309 **A: Yes, the conference next week.**

310

311 J: I would say this is perhaps the greatest achievement; it would not have
312 happened without me, mostly because of the politics within Russia. To get the
313 Ukrainian camps of computing talking with the Siberian camps of computing might
314 become confrontational perhaps. Much has to do with the philosophies of computing
315 and to get them all together in the same place and make presentations. The quality of
316 the people who are coming is paramount. The people are some of the most
317 outstanding pioneers and scientists from the Former Soviet Union. It really is an
318 accomplishment. I can't take full credit for myself because without other support
319 within Russia, it would be impossible to do these things. For this event to happen is
320 surely an accomplishment.

321

322 **A: John, you have also spent some time on your sabbaticals working outside**
323 **of the USA.....can you just tell us a little bit about that?**

324

325 J: I enjoy doing international things. As you well know, I helped out at Unitec
326 with its masters and doctoral programmes. There are others. People know me as
327 someone they should call. The Chilean government through one of their grants and
328 consortium of universities has invited me to look at their computing curriculum and to
329 revamp much of the computing curricula within Chile or at least make
330 recommendations for them. To be asked to do that is sort of honorary.

331

332 **A: And Estonia?**

333

334 J: Yes, Estonia. I don't know how that happened though I think I know when it
335 started. I was invited by Tony Clear to talk in New Zealand and I gave a talk at the
336 New Zealand Computer Society and then after that I gave a talk at the NACCQ
337 Conference. In the audience was a person from Sweden who heard me speak about
338 accreditation and things of that sort and I believe it was she who, through other
339 circles, suggested to the Estonian government that they should call me and invite me
340 to help the government with accreditation. The country already had an accreditation
341 system set up, but they had yet to do the computing accreditation process in Estonia at
342 that time. They made me the leader, team chair as it was, and they asked me to
343 conduct this process at three universities for baccalaureate, master's, and doctoral
344 programmes. So, in just one shot, in one week, we had to do nine programmes with a
345 committee of three. It was very exciting. In fact, the problem was that they hardly
346 had any documentation for guidance, though they had some crude standards. So I had
347 to reconstruct the standards for them. I also set up the model by which reports were to
348 be done and I also created the forms to help them to do their visits. They are still
349 using my forms today, so it was a very good experience.

350

351 **A: You have also been involved with accreditation visits within the USA; do**
352 **you want to share some of that with us?**

353

354 J: Yes I have been doing that since 1987. I have been involved with CSAB and
355 then with ABET. I don't recall how many programmes I have done, but it is close to
356 40 accreditation programmes worldwide. Of those maybe 15 are within the United
357 States, maybe more, because I have been doing accreditation visits for about 18 years.

358

359 **A: Have you spent much time supervising post graduate students?**

360

361 J: At Hofstra we only have a master's programme. Therefore, the post graduate
362 work takes place with supervising master theses and projects.

363

364 **A: Have you faced any particular challenges in your work environment?**
365 **Challenges that have, e.g. juggle commitments between home and work?**

366

367 J: Commitments between home and work? I don't quite understand.

368

369 **A: Any particular challenges that you have faced that have made your work**
370 **more difficult.**

371

372 J: Yes. Probably the log headedness of some of the faculty members presented
373 challenges. When I was the department chair, I took a no nonsense attitude and I
374 probably released more people than I hired, because I didn't want any dead wood
375 around. When it came time for reappointments, they didn't get them, they didn't get
376 tenure, and I tried to build a high quality faculty which I did.

377

378 In fact, I was proud that back in the middle 1990s or late 1990s. My department
379 achieved 50% women and 50% men in our full-time teaching faculty. Although that
380 has subsided again for women not being in the majority or equal, I do have sensitivity
381 to that. As you well know, we have done the 2002 inroads issue on "Women and
382 Computing" (which has taken a few years off my life) and last year we produced the
383 CD called "Pathways: Women in Computing" and so, there is always an interest in
384 trying to obtain a more diverse presence in the classroom. The real challenge is trying
385 to get faculty members, not necessarily within my own faculty, to come around and
386 see the light on some things but some people are just stubborn. In terms of other
387 challenges, I just take them the way they come.

388

389 **A: What compromises have you had to make in the course of your career?**

390

391 J: Sometimes you always have to compromise with what you do with your time.
392 I don't think I compromised any ideals. For the sake of one thing or another, I just do
393 what I do until somebody doesn't like what I'm doing anymore. That's fine. Once
394 the next week or two passes with this Russian conference and in August with the
395 Chilean Conference, I need to focus on the encyclopaedia. I am associate editor of
396 the Encyclopaedia for Computing Science and Engineering. Wiley is the publisher.
397 That work is probably going to be the "magnum opus" of all encyclopaedia's on the
398 subject. It will be six volumes (minimum) in print and with online access. To get all

399 the components in place for the encyclopaedia is a lot of work. I'm one of several
400 associate editors.

401

402 **A: Do you have any strong outside interests that would enable us to**
403 **understand you better?**

404

405 J: Outside interests?

406

407 **A: Or any outside interests that have had a shaping effect on your career?**

408

409 J: No, just music. I always liked music. If there were a second chance around, I
410 might try music again. I always wanted to be a composer and a conductor, I guess
411 since I was a teenager around 15, my ambition was to go to Julliard School of Music
412 and do that. I started doing orchestrations when I was around 16 or 17, 18, but I
413 realised that that career wasn't for me. Music has become a way of relaxation or a
414 mental transport, some of the aesthetical things of art as opposed to just science. To
415 me it is a healthy balance.

416

417 **A: If you could change one decision that you have made along your career**
418 **path, what would it be?**

419

420 J: Gee that's a tough one. Sometimes you don't make decisions, sometimes
421 decisions are made for you, because that's the way life is. I don't know if there is one
422 big thing; I would probably do it again. I can't think of any one thing. If I think of
423 something, I will let you know.

424

425 **A: That's fine. Do you have any advice for young people starting out today,**
426 **thinking about a career in computer science, what would it be?**

427

428 J: Well, I think that they should get away from being geeks. I realise that
429 computer science can be very technical but it's just as technical as let's say chemistry,
430 or physics, or biology. Of course, the use of theory and application emerge in
431 different ways, having done physics and math and engineering and having degrees in
432 them. The thing that I think students should have is an open mind. They should do
433 what they love first of all. Very often computer science is viewed as something that
434 you do to get a job. You don't see people going into physics or biology or chemistry
435 because they are going to get a job. Of course they would all like employment, but
436 they don't study these topics for that reason. However, people seem to study
437 computer science because there is going to be some miraculous job down the road.
438 Of course, reality has hit. I think the attitude should be to do what you love with an
439 open mind about it and be diverse in your thinking and you should always do the best
440 you can do. The motto for the State University of New York is "become all that you
441 are capable of being". If a student chooses to go into computing, notice I say
442 computing not necessarily computer science, it is important for them to see computing
443 in its full context as well as some of the social and ethical issues. I teach the ethics
444 and professionalism course at Hofstra, so it's important that students see computing in
445 its full picture as opposed to just lines of code.

446

447 I think some of the people in computer science have really butchered that area
448 where the focus of computing is on programming at the expense of everything else.
When you think about all the things that are done in computer science, programming

449 is only part of it, and it's not necessarily the major part of it. Many of our students
450 that graduate don't even do programming; they are involved in other things.
451 Programming is only a vehicle for doing some things. What I think some have done
452 is portray this image of geeks, people who work in front of inanimate objects looking
453 at a screen, and hacking out code. It has really turned a part of society against
454 computing. I think computing science itself is in a lot of trouble.

455

456 **A: John if there is one story that you want to tell that will be remembered,**
457 **what would it be?**

458

459 J: Gee, that's a tough one. A story. Probably we can go back to my youth and
460 my parents, sort of where we started out with this discussion. The story would be that
461 education is important, repeating – one can steal everything from you but they can
462 never steal your education. I can still hear the voice of my mother and father "Learn
463 as much as you can and put it in your pocket, you never know when you might need
464 it". Some of the things that we learn, we think we will never need or use and then we
465 realise we need it. So, I think the story from childhood is very simple – and that is, to
466 value education, not necessarily for a job, but because education is important for life.

467

468 Perhaps one of the more moving things is a follows. I have been asked to go
469 to the United Arab Emirates many times to evaluate their universities. I think I have
470 been there eight times over the last four years. There you see a culture where the
471 people are ingrained in a traditional custom that they have had for centuries. In
472 particular, the women, who are basically subservient in their customal ways, do not
473 necessarily have aspirations for a professional future. But it's marvellous to see what
474 is going on there. The women outnumber the men 2 to 1 in engineering, computer
475 science, and in all kinds of technical areas. Because of their traditions, you know that
476 these young women will probably not enter the professional world because the custom
477 is that families have arranged their marriages and they are supposed to have children
478 and raise families. But I could see that their children will be the foundation of a new
479 generation. I can see that their children will value education because their mothers
480 and fathers value education. They will in effect be at least spiritually and mentally
481 liberated. They can then funnel in a more natural way that liberated feeling and then
482 actually become, in some ways, part of the professional surround. You know that it is
483 there; you know they will be working in managerial positions in business and
484 industry.

484

485 Stories like that are good, so I have to thank my parents for instilling that germ
486 in me. I did it on my own, nobody paid for it or anything, I just worked and I paid my
487 tuition and things of that sort. You just do right where life takes you.

487

488 **A: Thank you John. Is there anything else you would like to add while we**
489 **are recording?**

490

491 J: No, there are probably a few other things I could, and probably will think
492 about tonight and tomorrow. We could probably have another discussion another
493 time.

494

495 **A: Thank you John it has been an absolute pleasure to conduct this**
496 **interview. Thank you.**

497

498 J: Thank you, Alison.