An Interview with

OSCAR N. GARCIA, Ph.D.

Conducted by Jeffrey R. Yost, Ph.D.

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Abstract:

In this interview Oscar Garcia discusses his education, his early work for IBM and his various academic faculty posts (at Old Dominion University, University of South Florida, George Washington University, Wright State University, and the Uniersity of North Texas), along with hiswork as a NSF program officer. The bulk of the interview focuses on his various leadership roles with the Computer Society, including as Vice President for Education, Vice President, and his two plus years as Computer Society President. Among the many topics discussed regarding the Computer Society are cooperation with ACM on education, Computer Society conferences, publications, the rapid growth of the society in the 1970s and early 1980s, and governance issues.

Yost: My name is Jeffrey Yost and I'm from the Charles Babbage Institute. I'm in Denton, Texas on September 20, 2013 and I'm with past CS president Dr. Oscar Garcia. Oscar, can you begin by just telling me when and where you were born?

Garcia: I was born in Havana, Cuba in 1936, September 10. I immigrated into the United States as a student. I went to North Carolina State, graduated with a bachelor's and a master's from North Carolina State, and remained in the United States after the Cuban Revolution.

Yost: Prior to college, who were your greatest intellectual influences?

Garcia: I was a lector in high school and I went to Havana University. I decided very young that I was a prime electrical engineer because I put together a little motor that an electrical engineer who lived next door couldn't put together. So I decided that very early that I was a born electrical engineer. Whether that was true or not, I was a good student and went to Havana University, and I spent my first two years with very good math teachers so I kept a love of mathematics.

Yost: Did you have any exposure to computing in Havana?

Garcia: Heavens, no. In those days, there were no computers. It was electrical machinery and communications. While the Cuban Revolution was going on, Havana University was closed and I went to work as a technician in a microwave station and that's where I got my first exposure to higher frequencies and microwaves. And I took some courses that they offered at the station.

Yost: And at NC State did you take courses in computing?

Garcia: Well, actually, at NC State I was majoring in power distribution and we started working on analog computers. Matter of fact, we converted a telephone terminal into an analog computer. Then it became very obvious that analog computers were not capable of

managing the old networks that were too complex, and the university got an IBM 650, one of those machines with a drum. I started programming my programs in FORTRANSIT, which was a derivative of FORTRAN for the drum machine. That was my first exposure to computers.

Yost: And did you go straight from the bachelor to the Master of Science program at NC State?

Garcia: Actually no. I went to work for IBM. After I graduated with my bachelor's I had to finish my master's thesis and I went to work for IBM in Endicott. And that's when I really got exposed to work on the IBM 360, and actually built the science of power supplies for the smaller systems that were being built in England. It was quite an experience. And then all of a sudden, I received this call from my ex-dean at North Carolina State inviting me to visit him; says he wants to start a College of Engineering at Old Dominion University. I told him that I was doing very well at IBM but he insisted, so I said I'd come over and we'll have some good time together. I ended up going and he charmed me. And we decided we would start a College of Engineering. He took me to the place where we were going to build a building and I could see the building going up as he described it. So I left IBM, took a salary cut, and started teaching.

Yost: Had you ever thought about a career as an academic before that?

Garcia: No, as a matter of fact — except that Endicott was very corporate and the weather was cold, and Norfolk was not as cold. Although I really liked my job at IBM, it was not a problem of leaving a job I didn't like; it was just that it sounded like a good opportunity. Actually — unheard of in these days — I became an assistant professor without a Ph.D. After three years of teaching and working and starting the electrical engineering department, we actually wrote a proposal to the National Science Foundation and got an IBM 1620. I was in charge of it and that's where I got in a little deeper with computers, after having worked with IBM. As it turned out, after three years I told my dean that I was going to quit because it was very obvious that I couldn't go very much

further without a Ph.D. Harold Lampe, who was my guru, if you will, told me no, you're not going to quit. You get your Ph.D. So I started applying and the University of Maryland gave me a good offer. And with the help of Old Dominion Foundation and Harold Lampe's support, I went to University of Maryland, taught as a teaching assistant, and after three years received my Ph.D.

Yost: So you were an assistant professor from 1963 to 1966 at ODU?

Garcia: That's correct. And then in addition to that, when I came back I became an associate professor because I had my Ph.D. and I had written a pretty good dissertation. I was very well received at Old Dominion. Except that I had a daughter who was allergic to everything that grew around Norfolk, losing her hearing from ear infections and the doctor recommended a move to a warmer climate. So at that point I moved to a position at the University of South Florida at Tampa. That was after coming back from Maryland and spending some time at Old Dominion. I enjoyed very much Old Dominion and didn't leave for any reason except for the allergies of my daughter, and indeed, she became much less allergic in Florida, in Tampa. But when I went to the University of South Florida, they didn't have much work in computers so I got interested in starting a chapter of the Computer Society.

Yost: Before we get into that I'd like to ask a question about your dissertation. You wrote on "Error Correction for Arithmetic Units and Logical Operations." Can you tell me a bit about that?

Garcia: That was quite an adventure. The first year at the University of Maryland I was a teaching assistant, and I had very little time to do anything other than take the courses necessary, required, and so forth. And then there was a brand new professor who came to Maryland by the name of T.R.N. Rao. And Rao was interested in reliable computing, and so he had me working in the electronic systems ESS number 1, with Bell Labs. There were some very strict requirements on reliability so we started working on those things. The arithmetic units were the most complicated parts of the hardware and the most

unreliable, too. So we decided that we would try to find the codes that would correct hardware failures. It became, actually, a theoretical analysis of group theory. We ended up coming with some partial solutions, but on a Friday afternoon — I'll never forget it — my advisor came up with a problem. He says, I have this conjecture but I haven't been able to prove it. I wonder if you could give it a try. So I very fortunately worked on that conjecture late that Friday night, Saturday, and Sunday I had a solution, which my wife typed. On Monday morning I presented it to my advisor. When he saw that on Monday morning, he was floored and at that point, I persuaded him that I was ready for a Ph.D.

Yost: And your advisor was that Rao, and can you spell it so we know we have it right?

Garcia: T. R. N. Rao, R-A-O. I was his first Ph.D. student so he was very enthusiastic about my work. We published a paper on the transaction and information theory and as a matter of fact, later on, the results that I accomplished and some additional results were the basis of a paper with Jim Massey, who is famous for information theory. [He] just passed away recently, like in the last few days or weeks. But that was the work that we did with Rao, and he was an excellent advisor and very enthusiastic.

Yost: Were there other faculty members at Maryland that were influential too?

Garcia: Actually, not at Maryland but somehow or another, I got to meet C.V. Ramamoorthy. And Ramamoorthy had been, throughout my career and throughout many other peoples' careers, a guidance and a guiding light. He has been absolutely fantastic in keeping us enthusiastic and positive about our work. He has been very encouraging. C.V. Ramamoorthy, and there were a number of people at Maryland. There was chair of the department was Howard Tompkins, and he was also very, very encouraging. There were a number of people. And again, there was a whole gang later on at the Computer Society. I started being aware of the Computer Society when I was at Maryland. And actually, I got Norm Abram to give a lecture for the Computer Society at the University of Maryland. And I was very impressed by Norm and he helped me get my foundations.

Yost: Can you describe your research in your first half decade at the University of South Florida?

Garcia: Actually, my research was in this particular paper on arithmetic codes that, according to Massey himself, was a sort of definitive paper. It was actually published by Julius Tou in his series. The paper was actually a monograph and it was rather extensive. It had to do with finding an arithmetic distance that; in other words, finding a metric that would tell me if I had committed an error. And there were multiple error corrections and multi residue codes. And most recently, I have used some of that in a compression scheme for which we have applied for a patent, but this is very recent. In the early days we were concentrated on trying to find if there was an error in a carry or in one of the summands that was turned into a one or a zero erroneously. So we entered it into metric units but it was a very theoretic coding as a problem. I discovered the metric, and the metric was what allowed me to tell the number of errors and whether there was an error or not. It was intensive work for three years. After that, I attended a meeting in Florida of the Information Theory Society and somebody discouraged me from continued working in that area. And actually, I became interested in computer architecture. We ran a conference in computer architecture — the second conference in computer architecture — it was a major issue in those days because it was not established what were all the issues of virtual memories. And again, that was in the 1970s, perhaps, and there were a lot of possibilities of doing reliability computing with self-diagnosing computers. So there was a lot of potential in the architectural configuration. Of course, everything changed when the microprocessor appeared. But in those days we were talking about minicomputers, the DEC computers, and I worked with a PDP-8, of course, and a DEC-11, but they were somewhat; Gordon Bell was actually the leading architect in digital equipment, and he was a luminary for me. I learned a lot from his early book on processors and there was a lot of activity in architecture in those days.

Yost: And the conference that you mentioned, was this a Computer Society conference or was it [interrupted]

Garcia: It was a Computer Society conference. Actually, I started the chapter of the Computer Society in Tampa and because the section didn't have a chapter.

Yost: Do you recall when that was?

Garcia: That was in the 1970s; 1971 or 1972. And then, somehow or other we became active in the regional activities and they made me regional area chairman. That meant that I kept track of all the other chapters that were in the Florida area that I was in. I think it was Steve Yau who picked me up, nominated me for some offices and that's how I really became involved. I did a lot of consulting. I did some good work for Honeywell, and it wasn't in reliability, it was in testing. I became very interested in testing because it was related to defaults that you were trying to diagnose. And I did some good work for Honeywell and they rewarded me with some grants and I attended some computer Society meetings. Eventually I became a member of the governing board. I don't remember what my first governing board position was, but from there I became vice president. In particular, there was something good to record, in the elections of the Computer Society, they always try to have two candidates for the same position. So I was on very good terms, I was a very good friend of Richard Merwin. And when they put Richard Merwin against me as vice president, I was heartbroken because here was a friend and I was running against him. I went to Richard and I told Richard, Dick, I'll be glad to lose to you. And his answer was I will be honored to lose to you. I never forget that. Dick Merwin passed away when I was vice president, I think that was in 1980. I was First Vice President, so I became Acting President for the last quarter 1980.

Yost: He lost to you as vice president, but then subsequently became president.

Garcia: He became president and I became first vice president, yes. That's right, he was president then, when I was; I think we ran against each other in 1978, or thereabouts.

Yost: Can we return for a second to your being hired at the University of South Florida. Were you the only computer science professor there at that time?

Garcia: No, and as it turned out, there were a few other faculty members who were interested in computing. When we started offering it within electrical engineering, a computer science and engineering program, it grew. Those days were days of growth.

Yost: This was undergraduate?

Garcia: That was an undergraduate program but then we received a program from Florida State, a program that was a doctoral program in computer science and engineering, and it grew and grew. And then one day, the chair of the Electrical Engineering Department — I was an assistant chair — he came around and said Oscar, your program is eating my bread. And he was right. You're taking all the resources and he said you better start out as a separate program so I started the Department of Computer Science and Engineering. I was the first chairman of the department and I got it accredited and everything and we grew like; it was growing in those days like you wouldn't believe. Today it's a very significant department with a large faculty. We started with about five faculty members and we grew. We got new faculty and we got doctoral students, and it was fantastic. And I was at South Florida until about 1975 and then I had a call from a friend from George Washington University. I always change jobs with telephone calls. It's sort of incredible. So he invited me to come and visit and we ended up receiving an offer from George Washington University. I moved and I was in George Washington University for 10 years, and from 1975-1985. And then, during that period of time, I also became acquainted with some people at the National Science Foundation and I was able to get some time off from teaching at . . .

Yost: It's just a few blocks away from the former NSF building.

Garcia: Yes, from George Washington University to NSF. But NSF moved into Alexandria . . .

Yost: Arlington.

Garcia: Arlington, on the other side of the river. It was very enjoyable because it gave me a global picture of what was going on. And at that time, again, I had gone through helping IBM in their internal education and I taught many courses for IBM while I was at George Washington. And I created some intelligent databases, and I became interested in artificial intelligence. So when I went to IBM, I wrote a book — actually not a book, but a collection of articles.

It was a very illuminating experience to work at NSF. I could see the national picture, and even the international picture. I had a student, Alan Goldschen, probably one of the best students I had, who was partially deaf and he got interested in trying to — he was an excellent lip reader and we decided to try to get a computer to lip read. We were very successful. We got a 35 percent ratio in lip reading, and this became an artificial intelligence avenue to learn about speech and how speech recognition took place. So that was an unanticipated change of work. And when I went to the National Science Foundation, I worked in the area of intelligent systems. I was actually the program director for intelligent systems and dealt with the speech recognition community, which was of great interest to the CIA and some other agencies in Washington, and they helped out in getting the University of Pennsylvania funding for a repository of speech in different languages.

Yost: Moving back to your early service for the Computer Society, I understand that you were the student chapter promoter. Can you talk about that?

Garcia: Oh, that was the toughest job. When I took that job I thought it was going to be easy; just call and say hello and try to figure out.

Yost: And is this the early or mid-1970s?

Garcia: It was early. I was not an officer as such, except I had been delegated this through the chapter. And the reason was that I was in academia and I had good

connections in academia. Well, to keep track of the students here and the student advisors, was quite a task and I had never spent so much time at any one job. Again, like anything else, it took making sure that you kept up with the changes that took place and the communications. But it was very rewarding because I kept track of young people, which is always something that has been of interest. They were enthusiastic and everything was, in those days, technology was making great strides. The memories were getting now in the megabits, and there were thousands and thousands of transistors on one chip. It was phenomenal and the students loved it. I tried to attract students to computing and that was very enjoyable and very hard work; quite a bit of hard work in the student chapters area.

Yost: You also became education vice president?

Garcia: That's right. The education area was actually taken over practically by ACM. ACM had made great strides. They had paid a lot of attention to education. One of the things that really made a difference, I think, was the modern curriculum because up to that point, I think mathematicians were so influential — not that it was a bad influence — but it was a dominating influence in the computer science area and there was no attention paid to other areas like architecture, like hardware, like microprocessors. We wrote what we considered to be a computer engineering, computer science and engineering, but with the engineering flavor curriculum. We called it the model curriculum.

Yost: That was a collaboration with [pause]

Garcia: That was a collaboration with everybody, but it was not just a theoretical. It didn't have an emphasis that was developing at the time, on theory of computing. It was actually hardware, software, operating systems, systems to operating systems from hardware, looking at the machine as both hardware and software as an integrated unit, which is a way, I think, you have to look at any machine today. You can't just look at the physical part and forget about the software, and vice versa.

Yost: Can you talk about some of the most influential people in establishing that model curriculum?

Garcia: Again, Ramamoorthy was a leader in that area. The people that were all the leaders, like from the University of Houston… again, I think that Mike Woolser who passed away, was very influential and Ramamoorthy was; Steve Yau was. Steve Yau made a major contribution by starting these sections in software engineering. People didn't know or believe what software engineering was, and the issue of building software from an engineering point of view was actually not included in education. So Steve Yau was very influential; Ramu Yae was also.

Yost: So after the NATO software engineering conference in 1968, it took some time to make its way into the curriculum.

Garcia: Actually, there was a president of ACM, who shall remain nameless, who said that there wasn't such a thing as software engineering. But I think we proved her wrong and software engineering became — if you look at the growth of the Computer Society, the same year that software engineering section was started, the curve went up in membership and it became very obvious to everyone that software engineering was an important part of the education, needed to be an important part of the computer science and engineering education.

Yost: Important both to education and for practical industrial applications?

Garcia: And the application. And there were a number of people who actually started conferences. The conferences were very industry-oriented –COMPSAC [Computer and Software Applications Conference]. There was a group in Chicago at the Bell Laboratories in Chicago — Naperville — that were very good in that area and actually originated the COMPSAC conferences. Steve Yau was a force in that area, and he made major contributions to the growth of the Computer Society.

Yost: You mentioned Steve Yau, who was Computer Society president in 1974 and 1975. I'd like to ask you about several other of the past presidents who preceded you and if you could describe them and give me your impressions: Merlin Smith?

Garcia: Merlin Smith was actually another guidance, and Merlin Smith was probably one of the most systematic. Merlin used to have a metric that judged how good a president was and he said the dimension was a Yau; one Yau was the unit. But everywhere they had to be measuring mlli-Yaus because nobody was as good as Yau was. He was a very dedicated president and made major contributions.

Yost: I interviewed Carl Chang recently and he said that Yau was an important mentor to him not only as a graduate student, but well into his professional career?

Garcia: Absolutely.

Yost: Did you get to know Al Hoagland very well?

Garcia: I used to know Al Hoagland in a number of activities. I used to call him. He was very influential in establishing the Computer Society within the IEEE. The Computer Society and IEEE had some difficulties, and Al Hoagland was a good interface. That's what I remember most is the ability to interface. We did something during my presidency that was incredible. We were able to get two division directors in the board of directors of the IEEE; that was a major recognition of the growth of the Computer Society and the influence of the Computer Society. I think that even today we are the only society with two divisions: division five and division eight. As a matter of fact, Merlin Smith was the first division eight director and he represented us very gloriously.

Yost: What about Dick Simmons?

Garcia: When I took over as president, and now I'm jumping ahead, but when I took over as president, Merwin passed away unexpectedly. He was not considered to be in bad

health, but he passed away and we reorganized the Computer Society. And we actually went in 1981 and created a membership and information infrastructure; we decided that we needed to communicate with the members and Dick Simmons took over and did a very good job. Dick Simmons was — I don't know whether you know this — he was a student of Steve Yau . . .

Yost: I didn't know that.

Garcia: Yes, and he was very active and he was a counselor to me. And during that period of time in the early 1981 period, we decided we wanted to get a position of executive director and we went through a very painful — there were 300 applicants. I went through each one of those 300 applications.

Yost: Executive secretary before . . .

Garcia: That's right, and Harry Hayman was actually an incredible — Harry Hayman was the heart of the Computer Society from the early days. Harry Hayman ran the heart of the Computer Society budget from a Commodore PC, if you remember the early Commodore.

Yost: That's the first PCs I ever used, a Commodore 64, while in junior high.

Garcia: The budget of the Computer Society was run on a PC. By the time I took over the budget was around $7 million and no longer could we do it on a PC. At that time, we hired an executive director and the staff became more rigorously organized. Harry Hayman ran, with his wife Edith — bless her heart — they both ran the Computer Society like they you wouldn't believe it, on a personal basis and . . .

Yost: Very small staff.

Garcia: Very small staff out of his office in Silver Springs. Actually, it was incredible growth that happened and it was impossible to manage, like the way we started buying buildings. We bought the building on Los Alamitos and we bought, later one, the building in Washington. So the growth in the 1980s, Merlin Smith wrote a partial history, and I think he calls it the energetic years. I wrote a little PowerPoint memories, and I call it the golden years, because we couldn't do anything wrong. We started computer graphics when I was vice president for pubs. We started, later on, the sign-on test was Roy Russo. Roy Russo was another influential member and very good at it. We started software engineering. Software engineering was actually a magazine complementing in a less archival way the *Transactions on Software Engineering*. I think it was *IEEE Software* was the magazine. We started magazines. We created an education vice presidential position. Ramamoorthy was the vice president for education. He did a wonderful job. He was the best vice president for education ever. Ramamoorthy knew the whole world; about everybody who was anybody, anywhere. And I'm not talking about just the United States but throughout the world. He was a major influence in the Computer Society and did probably more for the Computer Society than any of us, in a subtle way by attracting people, attracting the best minds and workers. So there were so many good people and I was just talking today with somebody else — it takes a team — and we had a superb team. The hardware development, the microprocessors were getting more powerful, and everything pointed toward growth. The growth in that decade was incredible.

Yost: Were you involved on the standards side prior to becoming president?

Garcia: Actually, I was not as much involved in the standards but Feng was. Feng was a vice president before, and Tse-yun Feng was very much in charge of standards and we created then a vice presidency for standards. And that became very important for IEEE because standards produced a publication of standards. This was before my time. Publication was absolutely the main funding of all our activities, of all the conferences. Three-fourths of our budget was funded from publications. Furthermore, it became obvious that tutorials were very much needed, and we started tutorials not only

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throughout the United States, but in Europe and Asia. We actually had a tutorial program in Asia. Ramon Martin from IBM was actually in Asia and he managed the Asian tutorial and the distinguished visitors, we had a distinguished visitors program. So because we had income in those days, we were able to do many things that perhaps the Computer Society is a little bit more handicapped by the budget now.

Yost: You talked a lot about the many opportunities that the Computer Society had in the 1980s and about a number of the publications and conferences and initiatives. When you became president, did you also see some challenges and what concerned you the most?

Garcia: There were some real challenges. There was the concern about leaking information to countries that were not friendly. At one point, we had a conference and there was a paper that apparently had not been properly cleared and was submitted and was already printed. We want to excise this paper from your proceedings. Well, I wasn't too happy about that. Where do you keep your proceedings? Well I'm not going to tell you, but give me a legal document that gives you have the authority to excise that paper. Well, it didn't happen, but we had to take a strong attitude. And there was an executive order that came out that was a little more restrictive with regard to — but that happened afterwards [after my presidency].

Yost: Was that presented before publication?

Garcia: It had been printed but it hadn't been presented. And it wasn't presented afterwards but it was in the proceedings. The proceedings were distributed so they were not excised. And it turned out that it was clear afterwards it was not a national security threat of any kind. It was just that a procedure had not been followed, and we were saddled. We require the statement that said that the company had authorized the publication and all the papers were signed; so that was a challenge. I'll tell you what really became a challenge. It wasn't so much a challenge as it was, we wanted to get accreditation. We wanted to get a CSAB [Computer Sciences Accreditation Board]. And there were individuals in the ACM that didn't agree with it, so it became a challenge

perhaps to persuade ACM. Finally, they did agree and they thought it was [okay], but it became a challenge to persuade them. But it presented a good opportunity because at the same time that happened, I became acquainted with the president of ACM. Not only that, we had [pause]

Yost: Which president?

Garcia: I can't remember his name right now, but we started exchanging consideration of merging. It was unheard of and it was very appealing to me because I had always proceeded to this idea of merging the theory and the practice, and the implementation, and the software and the hardware. In other words, I think it's an integrated world. We got pretty far down to the point of exchanging editorials in Computer Society and ACM.

Yost: This was before your time as president?

Garcia: No, I was president.

Yost: Because there was an earlier investigation during Hoagland's presidency of possible merger. I think he wrote an editorial in an issue of *Communications of the ACM* and ACM's president in an issue of *IEEE Computer . . .*

Garcia: Right, but it didn't; it depended a lot on the leaders. Adele Goldberg became president of the ACM, and Martha Sloan, and they didn't quite see this as a positive goal. I thought that that was a major undertaking. Had it been fruitful it would have meant that ACM and the Computer Society would have merged. To tell you the truth, as IEEE acted towards the Computer Society it was a good thing they didn't, because IEEE would never have appreciated the fact that computer scientists are as much part of the community of the Computer Society as computer engineers, and they think only of electrical engineers. Talk about challenges, I had the challenge of working with affiliate members who are not quite interested in all the parts of the IEEE that deal with some other aspects of electrical engineering, but they are still interested in the computer business. The affiliates have

been second degree citizens of the IEEE so it's quite sad that I was never able to bring the affiliates to the same standard although they are Ph.D.s like everybody else, and sometimes more notable. Somehow or other it was not; that was a challenge not only when I was president, but also when I was division director later on.

Yost: You mentioned the hiring of the executive director which of course was T. Michael Elliott and that occurred during your presidency.

Garcia: Right. Actually, I was responsible, for better or worse, for Michael Elliott.

Yost: You mentioned that you had 300 applicants.

Garcia: 300 candidates. Unquestionably, he was the outstanding one.

Yost: He had a Ph.D. and some managerial experience?

Garcia: In education. And he had a political situation, and he knew Washington as a matter of fact, and he had good relations. He was a very capable individual. I was very happy with him and he was hard working. He kept a good shop.

Yost: The staff expanded significantly?

Garcia: Tremendously. The staff was, by the end, it was about 80-some, and it had been about four or five during the days of Harry Hayman. Harry did an incredible job. He managed, on the telephone, managed the whole business of the Society. He was very business-minded and he knew what conferences were needing attention and what conferences were doing well, and so on and so forth.

Yost: I went through the archives of the Computer Society business offices in both DC and Los Alamitos this year and did an evaluation. As part of this I went through the files

of Michael Elliott, and it struck me how the staff was very heavily involved in the conferences. I assume that was true during Hayman's time also, and I'm sure is still true?

Garcia: Absolutely. Harry Hayman was a hands-on person and he attended the conferences. He set up a table and sold magazines, and he was a real do-it-all. I always wondered what would have happened if he had been the executive director, but the committee was in favor of Michael Elliott and I had to agree. There was something else I wanted to mention with regard to those days in the Computer Society. There was quite a bit of activity in the tutorial, not only in the United States, we had Tutorial Europe and there were Tutorial Weeks. We actually presented — it was almost like a mini course updating you on what was going on. There were like five, or six, or seven speakers bringing you up to date in one day, or half a day, and it was very well received. It was necessary because there were so many things going on and we owed it to the membership to update them. The publications were helpful but again, not everybody likes to read and people like to ask questions and the Tutorial Weeks did an excellent job of filling that in. True Seaborn was also a strong force. I cannot tell you how critical the major contributions of True Seaborn were as editor-in–chief [of *Computer*]. True Seaborn was dedicated and he worked day and night. The attitude of the staff was we do whatever is necessary and you cannot go wrong with staff like that. So it was a very good team and I'll never forget when Dick Merwin passed away, we wrote an obituary, and the recognition between he and I, and it was quite an emotional time for all of us. Merwin was a very well-loved and very gentle leader.

Yost: I understand in 1982 that key technical committees established boards at that time and the leaders of the boards were elevated to VP status. Can you tell me about the context of that change?

Garcia: Yes. That was in many ways done by Roy Russo and many others. We decided that we had to have a — well what's the equivalent of ACM [SIGS] and not that we were imitating ACM but it was necessary to have groups who were in a given area running conferences, and writing newsletters, and we ended up with 31 committees. A very

diverse group, as you can imagine. In the reorganization we did in 1981 we started what we called a technical activities area, and that's where that group of technical committees [was]. We also had, like IEEE, an area distribution, so the chapters were organized into an area vice president. We divided the whole world for them, just like following IEEE division of areas, and we started trying to promote chapters. We promoted many chapters abroad, which was a major; we started looking not only at the members in United States, but the members in Europe, the members in Asia. And there was quite a bit of activity in membership, particularly in India, we had quite a few chapters, and we also had even student chapters. We actually paid more attention to the chapters and student chapters of the Computer Society. We called them Student Branch Chapters because they were not chapters, they were branch chapters. That took a lot of doing and IEEE helped with that; that's one thing to their credit. We tried to be a world-wide organization rather than an American organization. We had members of the board from abroad. We had members from Japan and India that were called to our board meetings. It was more world-wide than it had been before.

Yost: Was that a major goal of yours for the IEEE CS?

Garcia: Yes. Not only mine, it was a group goal. We decided as a group that we were ready to be world-wide. In many ways we were looked on as an American society. ACM had been American/European, but they weren't looking at Asia, for example, and we did. And now both societies are world-wide so there is no difference.

Yost: At a very early date, during your first or I guess it would be your second year as president, 1982, the Computer Society began to offer e-mail to volunteers. I found some correspondence about all the efforts that went into evaluating and deciding on that. Can you tell me about the decision?

Garcia: Oh, yes. [Laughs.] There was a fellow by the name of Ray Bobbitt , that's the name I remember. He came up with the idea. He said hey, when are you guys going to use this com mail? And I was a little reluctant about getting into a totally new area of

communication. I mean, we weren't talking about 300 baud, we were talking about very, very elementary stuff. But indeed, it solved tremendous problems and it allowed for example, in the executive search, it was a major help in communicating with the committee. There were a number of people that — who was it? — there was a fellow from the National Bureau of Standards who was involved in establishing it. I can't remember his name, but we had a number of people involved and Michael took over, again, and improved on it. It became more sophisticated as time went on but it was very rudimentary when we began. I never forget using my Apple to communicate with my 300 baud modem and that's the way we got started.

Yost: Within a few years I understand that it was offered to the full membership.

Garcia: And that became another service that we provided. Today, of course, there's the internet.

Yost: But at that time, I'm sure it was seen as a real benefit and advance . . .

Garcia: As a real advance in service.

Yost: . . . service as well as symbolic of the Computer Society taking the lead with applying new technology.

Garcia: We took the lead in numerous things that others followed, that actually did better later on. The IEEE were leaders in a lot of things the IEEE did, later on other societies copied from us.

Yost: Can you give examples?

Garcia: The tutorials were an example. The Communication Society perhaps took a lot, for example, the structure of the staff. There was a lot of looser structure in IEEE, and we led in having an executive director and having a more rigorous format. When we

reorganized, we became a little bit more — with a council of vice president and governing board, and we had better defined functions for the different parts [such as] the area committee, and the technical activities board. It was impossible to really keep track of everything because the growth was so large, so you have to delegate into different branches and in structuring that, many other societies took the Computer Society as an example.

Yost: How would you characterize the relationship of the Computer Society to IEEE when you first took office?

Garcia: It was very good when I first took office. Fortunately, there was a very good executive director of the IEEE and he was actually very encouraging of the growth of the Computer Society. By the same token, the growth was such that, as I mentioned, two directors were accepted in place of only one. We only had Division Five, and then we added Division Eight to the board of IEEE, and even today, we have two directors. But there was a new executive director and he actually, around 2000, there were shortages in the IEEE. And the IEEE decided to put their hands into the pockets of the Computer Society. In a very subtle way, and not illegal because they were the parent organization so there was nothing wrong with what they did, but in my opinion — and this is my opinion only — they stymied the growth of the society and the staff became sort of handcuffed. And they started blaming Michael Elliott for things that were not proper and they actually even threatened some members — the president of the Computer Society — with legal action, which was very distasteful. So there were some rough times during Michael Elliott's administration. Unfortunately in the late 1990s was when things got really…the president of the IEEE really raided, in my opinion, again, the Computer Society. Unfortunately, we were not ready for it. We really didn't expect it. Part of the problem was we did not have a true goal. We didn't know exactly how to react, and what we wanted to do to react to the situation. The Computer Society had never been totally accepted in the classical electrical engineering. Somehow or another, it's still [that] there are minds that had not figured out that everything you do today you have a computer inside. Every device that you build, you've got computers all over. That's part of the

system. And they keep on talking about the classical electrical engineering and there is nothing wrong with that, but they haven't figured out that there are people who work with computers that are actually involved with the mechanism of devising machines that act independently and systems that are related to artificial intelligence, and to areas that are not classical engineering. Pattern recognition, for example, is one of the areas that we paid a lot of attention to in the Computer Society. K. S. Fu was vice president of publications when I was president. He did an absolutely fantastic job of organizing the publications area. Somehow or other we have not been good publicizers in IEEE. I'm a little combative and perhaps that was not the best approach. And there are others that have been more integrative, but indeed, the IEEE has tried to manage the Computer Society and not only the Computer Society, but probably the other societies but they don't know it. They do themselves a disservice because the volunteers work best and more creatively when they are left alone to their own devices, and they haven't figures that out somehow or another. And it should be so obvious because the best times have been when the Computer Society has been allowed to try new things. Sometimes, they didn't work, but for example, I was vice president for publications [and] graphics were going gangbusters. The graphics industry, the cinema, the whole business of Hollywood, they had more supercomputers in Hollywood than we had in anywhere, in any university. It became obvious to me that we should have a publication in computer graphics. I was vice president of publications at the time, and I called a meeting of the publication committee and we started looking into starting a new publication. Well, we ran the cost, how much it cost to publish, and it looked positive. I remember banging on the table at the meeting and saying well, look, I don't care what your figures are telling me but, I said, I will finance that publication with my own funds if that is necessary because I really think — but I was totally wrong. The IEEE Computer Graphics was not so good, financially, but it became a wonderful publication. Financially, it turned out that we put too much color into the publication and it became very expensive. But that was what was required. So that was an example where we did things that were not necessarily fund producing but it was good for the membership and they were good for the profession. And that's what many people forgot.

Yost: The Computer Society needs to be forward looking technically, and that clearly is an example.

Garcia: And that was an example in which I was wrong because I thought it was going to make money and quite frankly, I was wrong. But it didn't matter because we had the right idea; we had the right orientation, servicing membership. And this is what IEEE may have forgotten.

Yost: With SIGGRAPH, that's been a major area that ACM has influenced the field of graphics?

Garcia: Absolutely. As a matter of fact, and I became involved in SIGGRAPH. After I was president, I was involved in the nominating committee. I attended SIGGRAPH meetings. To me, SIGGRAPH was absolutely one of the most wonderful conferences. I think I would attend SIGGRAPH even if I didn't present a paper.

Yost: Seems to be one of their model SIGs, beyond just yourself was there much CS graphics researchers and SIGGRAPH collaboration?

Garcia: It's absolutely fantastic, and there was a lot of collaboration, as a matter of fact, between Computer Graphics and SIGGRAPH. Some of the editorial board was coming and there were a number of people in SIGGRAPH who were very happy to have a magazine because they had a very tight publication and a conference. And the conference was overcrowded, as a matter of fact, and they were excellent. I tip my hat to SIGGRAPH. They did a wonderful job of serving the membership in a very pleasant way.

Yost: I understand that in 1985 there was the launch of the Standards Activity Board. Was that something that was in the works during your time as president?

Garcia: Well, as I mentioned, Tse Feng was an advocate. He told me that standards were — I really, personally, didn't know so much about standards. But again, everybody

knows the development and the importance of it for industry and to help industry establish production standards. And Tse Feng was the main advocate and he persuaded me that standards were very important, and we started working on standards. But really, it wasn't until after my presidency that standards became as important. Even today, the Computer Society has a major role in IEEE Standards. There are quite a few members of the Computer Society that pay more attention to Standards than they do to the Computer Society, but that's quite all right because it's an important activity.

Yost: IEEE Standards, was it a revenue generator?

Garcia: It was a very good revenue generator because the sale of Standards was very profitable. And my attitude was the development of the standards was what was very hard, sales came very naturally afterwards. But the development was what took a lot of meetings, and a lot of haggling, and arguing.

Yost: A couple important magazines were started during your time as president, *IEEE Software* and *IEEE Design & Test*. Can you talk about these publications?

Garcia: There was a conference, the Cherry Hill Test Conference that became a major force for *Design & Test*. Usually, whenever there was a group of people that were actively researching and industrially serving the community, we tried to find a channel for them to publish the results. Roy Russo was at IBM, and he was a leader in this area. He was one of the first editors — I don't know if he was the first one — and he was very strong in the testing area. I had done some test work for Honeywell in Tampa, and I saw the merits of that conference in the sense that if we're going to have good computers, we're going to have to have reliable computers, computers that are testable. And the issue of building tests, and so on and so forth, were strong in those days. As it came out, the Cherry Hill Conference was one of the motivations for *Design & Test*. I think *Software* was almost obvious. The — what's his name? — Bruce, I can't remember his last name now. We had a group of people who actually did *Software* and were dissatisfied with having to publish at the level of archival journals. And there was a need for more timely

articles and less archival results. And there were a number of things happening in software. Musa was one of the guys working in Bell Labs doing probabilistic approach to software reliability. And there were a number of others who actually were involved in trying to make software more reliable. There were so many really that it wasn't difficult to start *IEEE Software*. IEEE *Software* was very well received but the beginning pass establishing the breakthrough, actually, came in the *Transactions on Software Engineering*. Actually, *Software* was sort of the baby of *IEEE Transactions on Software Engineering* in a less archival way but with the same thrust, and trying to appeal to and serve the non-academic membership.

Yost: During your tenure the standard term was two years for president, you did it a bit longer because you were interim president before that.

Garcia: Actually, I was probably [pause]

Yost: The longest serving . . .

Garcia: The longest serving president ever, and this is forever because what happened is president Russo had a little health problem, and it became obvious that the job of president was really pretty heavy. And as it turned out, the decision was to make the president a one-year term. I had mixed feelings about this issue of the one-year service.

Yost: Right after your term . . .

Garcia: Right after I was president it became a one-year term, but I have mixed feelings and I'll tell you exactly why. It takes about a year to learn the job and it is in the second year, it's almost like a first term president, second term president. It's actually the second year that you really have a handle. What happens — and this is not faulting anybody but it's a natural result — if you are a one-year president, it takes one year to really learn the ropes. At the end of that year, you go out and you are a senior member but not active, you don't have the power to make decisions. Staff takes over. With a two-year president, staff

doesn't take as much responsibility because you are in charge for two years and you know all the ropes. If you are a one-year president, after you leave, the continuity is kept by the staff. Now, I'm not blaming anybody, any staff, it's just a natural situation. I think I understand the two sides of the coin. On the one side, it is a very tough job. For example, for those two years and a quarter, my publication record became nil. I didn't do any research. I couldn't do anything. But I made a lot of friends.

Yost: Were you either relieved of teaching or teaching reduced load?

Garcia: No, I was doing as [much] teaching as ever and because I was on top of things, I was teaching for IBM also. I was creating new courses. I was doing all this NSF work.

Yost: It must have been a hectic time.

Garcia: Somebody asked me how was it? It wasn't unpleasant, it was very pleasant. Somebody asked me how was it to be president for so long. I said it was almost like a joy ride. It was very strenuous but on the other hand, I was glad I was healthy and could stand it. I traveled a lot. I did a lot of personal contact. It was satisfying work in the sense that I knew I was doing good work for the good of people. In a sense, it was fantastic. I had a bunch of people around me who, all I had to do was call for help and they would help.

Yost: Were there individuals within the Computer Society that you helped mentor that later went on to significant leadership roles?

Garcia: Well, I don't think I can single out those, but there were many who followed me that were very appreciative of a kind word or a word of enthusiasm. Most of the time I concentrated on the students. They are so far back now, but there were a number of students, Ramon Martine for example, was one that I helped orient himself. There were many of the presidents in front of me that were active as members of committees and some of them were actually renowned scientists themselves, like K.S. Fu, for example.

K.S. Fu was one of the pioneers of pattern analysis and machine intelligence. I wouldn't claim that I mentored K.S. Fu but I helped him while he was alive and I felt a lot of admiration for him. I wouldn't dare say that I mentored because I was more like I provided friendly advice, now and then, and mention why don't you look into this, or look into that type of thing. I think it would be presumptuous to say that I mentored so many people; I'm sure that I helped some.

Yost: Now, of course, the presidents are elected well in advance of their presidency. They're President Elect, then President, then Past President. Do you know who implemented that?

Garcia: That was not a particularly good move. It was a compromise, in my opinion, between the fact that one year was not enough to learn the ropes and you didn't want to dispense of the president once he became past president. The problem is that again, the influence of staff became dominant. The same thing that happened in IEEE, the short term presidency of IEEE makes the carry on heavier on the shoulders of staff. Again, I'm not criticizing and I'm just making a managerial observation. Management becomes carried on by those who know the ropes, who know how to do things, and who to contact, and what buttons to push. I think that that was instigated by Michael Elliott and in some ways, I think it dissipated the responsibility of the President. True Seaborn made a comment once that I never forgot. Let me see if I remember the exact words that he used. He said, what is it that makes a president of the Computer Society such a mantle of infallibility, no failing on any decision, that is so prevalent in our environment. And it was true. When the president of the Computer Society made a decision in those days, of course he would say that he had consulted with other people, he didn't make a decision all by himself or herself, but it was a decision. There was no second guessing. Today, staff is very involved, and there is nothing wrong with that but there is not the spontaneity and the daring, perhaps, that we had at one point in initiating new things. We took tremendous chances. Com mail was one of them. I mean, we don't have the foggiest idea how Com mail is going to work. And there were so many others that we took chances, and fortunately I'm glad to say that 90 percent of the time we did the right thing.

The reorganization worked very well, and when you had three people to consult to make a decision, then that becomes a little less spontaneous. We had people who were visionary and when you have three visionaries, they don't have usually the same vision. It's not that they have wrong visions, it's just that they have different visions, and the visions becomes a little mixed and none of them necessarily concentrate in one direction.

Yost: Does that result in being more conservative?

Garcia: I think in general, yes. And not only more conservative, but less definitive in what they want to do. Now, again, this is not a criticism, this is just an observation of how things work in a management situation. You don't have three chief executive officers, you have one, and he or she bears the responsibility. When you have too many opinions you end up making perhaps better decisions, but fewer decisions. In those days, you had to make decisions daily.

Yost: With greater power resting with staff, are there certain guiding philosophies you saw in T. Michael Elliott, in terms of his influence within the society?

Garcia: I think Michael Elliott was a good organizer. He actually rubbed some IEEE people the wrong way and perhaps it was mutual. We always thought of the Computer Society as being a different society from the other societies that were more classical. We were different because we took chances. We would venture into new areas. And Michael Elliott was supportive and he had real insights, but he liked power and he liked to manage his staff. For example, in many revisions of staff the president had a major portion, when Michael Elliott took over as president he took over the reviews of staff. I think that the fact that you had a volunteer review the staff gave a different perspective for somebody who was their boss. I'm not saying it was better or worse, but it was different. Like anything else, there may have been some weak points in Michael Elliott's review. For example, I do remember there were some problems with finances and some records and it's just that it was very difficult to keep records of all the conferences, and registration, and it was a nightmare. There was some problems in that area that perhaps he could have

improved upon, but it was a difficult area so perhaps it was natural that there would be difficulties.

Yost: Did the Computer Society bring in outside consultants, managerial consultants, and did that have an influence?

Garcia: I'm trying to remember. There were a number of people brought in, and Michael Elliott liked people brought in. But quite frankly, I don't think they were effective.

Yost: Seeing things more like a business, rather than an innovative service-oriented nonprofit professional organization?

Garcia: Right. The heart of IEEE, and the heart of the Computer Society, the heart of running an organization is to service the membership. It's not that you don't worry about money because you have to have money to service the membership. But money is not just to make money, money is to serve. And the consultants were more from the point of view of how do you run a business? How do you run a financial situation where you don't spend as much? See, we invested in things like *IEEE Graphics*, I mentioned to you. That is not, at the beginning, anyway, a money making business but it was a service to the membership; it filled a gap.

Yost: Something that is so important to computing today, and very beneficial that the Computer Society got in early.

Garcia: Not only that, it's an area that we were not serving for a long while. So it was not profitable. I mean, it was a good thing that I made a mistake because I thought it was going to be profitable, but it was not. Why? Because of the color. Simple, I should have thought of it, but I didn't. However, it worked.

Yost: You were on the Board of Governors for many years after your presidency, can you describe some of your roles.

Garcia: Yes, I was on the Board of Governors for two years after I was president and then I was again on the Board of Governors later on. Board of Governors was a blessing in disguise but at the same time, because it gave me insight into the inner workings of the IEEE and, again, it was such a massive organization with so many societies. There was for a long while — well, they were not rivals but there was a tension between the area committees and the RAB, the Regional Activities Board, and they both were a part of the Board of Directors. I finally understood the pros and cons of that organization. It took a lot of balancing to work that out and somewhere along the line, I always felt that the Regional Activities Board was more unified than the Technical Activities Board and they worked together a lot better as a group. Usually they got whatever they wanted and, again, they didn't provide — the source of income was publications for a long while. Today, it's still publications, but it's publication and the intellectual property, and it is the sales of access to the publications. So it's now not paper publication but electronic publications that really fuel [it]. And again, the area committees do not contribute so much as the technical activities. So the technical activities people always felt that the regional activities were less important, which was not so because regional activities served the member on the ground. But it took me a little while to figure it all out and here today, I feel that the staff is perhaps trying to…not trying to control but influence in non-innovative ways.

Yost: Staff becomes more important to continuity with one year presidents, but does the Board of Governors also offer some continuity?

Garcia: The Board of Governors does offer continuity, but on the other hand, because the governors are replaced once every — I think it's about a third at a time, which is a good thing. But on the other hand, the major function, when you get down to it, the major function of the Board of Governors is to grow people because they become involved and they understand the workings. The workings of an organization are not self-evident by just reading the bylaws. The bylaws are important and they tell you lots of things, but it is the people and the feeling of progress, and again the issue of are you contributing? Are

you doing something for the benefit of mankind, really? That's subtle. I mean, the words "benefit of mankind" is beautiful but you don't invent anything like penicillin, or anything like that. You make little contributions, one every day, and little by little, and you get along. Creating that environment is very crucial and that is done in the Board of Governors. There are people that get inspired and there are people that get turned off, so you filter those that get inspired and those that get enthusiastic, and get a fire in the belly and want to do something. Those that get a fire in the belly and want to do something, in the Computer Society, we let them loose. You go and bust yourself doing whatever you want to do. Ray Bannon wanted to do the Com mail, well, go ahead and give it a try. We'll back you up as much as we can and we'll keep an eye on you.

Yost: That was a time of rapidly growing membership . . .

Garcia: Absolutely.

Yost: . . . and perhaps offered greater flexibility financially than today.

Garcia: Absolutely, and that's why I call those days the Golden Years, and I was actually extremely lucky to have been chosen. I put a good part of my life into it. I'm not as active today but there is a chunk of my life. My wife knew the members by telephone call [laughs]. This is so-and-so calling, may I talk to Oscar? It was day in and day out.

Yost: Are there leadership skills or practices that you learned at the Computer Society that you were able to apply in leadership roles as a Program Officer at NSF and also in starting the College, becoming the founding dean of engineering at University of North Texas

Garcia: Definitely. I think the major thing is to be straight and to be honest with myself, and to face difficult situations and not try to evade difficult situations. I had a difficult situation in my first few years as dean. The provost who hired me left one year after I was hired. I was hired to start a college and then the president who hired me left two years

after, and a new administration came in and they were more interested in liberal arts than they were in engineering. I felt that after the first initial probably two, three years, I was losing support. And when I mean support, I mean financial, encouragement. And again, it's the same thing, you try new things and whenever you get accepted and supported you either succeed or not but you try new things. I learned to manage difficult situations, perhaps, and I had the same situation at IEEE with the Board of Governors. I didn't find it difficult as president because everything was falling in place. We had, again, I cannot emphasize [enough] what a good team we had. There was not one person, there were hundreds of people who collaborated. That's another thing I learned: that it takes a team. And team building, perhaps, I managed to get good team players and people who earned the trust of people by being straight with them. Straight means not being nice all the time; sometimes it's being a little stern and just call the shots as they are.

Yost: What programs and in what years did you manage those programs at NSF?

Garcia: It was in just one program, Intelligent Systems. I was there almost four years, not quite. The program was oriented towards interfaces and actually there was quite a bit of human-computer interaction, and I found that to be an extremely interesting area. I got interested in voice interaction with computers and I learned a lot. The NSF had a speaker — situation was that they would bring a Nobel Prize winner. And I tell you, I heard Herb Simon. I never forgot that man. I mean, you could almost tell why he deserved [it]. He was not so technical but the breadth of the mind, it was incredible. And I heard a number of people. That was a very mind-enhancing, mental view of what was going on everywhere. And I managed to interact with INRIA , in France, and I met some of the INRIA researchers, and today I keep track of some of them. I attended some conferences that were absolutely fantastic. The European Union had a research group in speech, and of course they were very interested in translation between the different members of the European Union. There were so many things that I would not have had the opportunity to participate in. And some very practical things, like as a program officer I sponsored a number of first researchers that were doing innovative practical things, they were not just theory. And they were actually part of the Small Business SBIRs. It was multifaceted.

During the time I was there — I was really excited — it was going to be the year of the brain. And so I became, since I was in artificial intelligence, too, I came and worked with them, and boy, did I learn things about the human brain that I would not have learned otherwise. So it was a center; NSF has my total respect. It has become a little more bureaucratic but I think it still deserves; I go back there anytime. It was very intellectually challenging.

Yost: We actually have an NSF project to do a history of FastLane, the first electronic grant submission system. FastLane started as a project before Mosaic, and was able to take advantage of the pioneering research they were funding at University of Illinois to create Mosaic. I did about 50 interviews with NSF program officers and just found it really fascinating to find out about how that foundation runs, both technologically and managerially.

Garcia: I have the greatest respect for that organization. I've been very fortunate to work for good people. Y.T. Chen was a very good boss and it was an absolutely fantastic technical environment. Administration was a pain in the neck, but because you had to fill all these forms and all this kind of thing, but hey, that's a minor thing you just live with. But intellectually, it was top of the hill.

Yost: Are there topics I haven't asked about or things you like to discuss a bit more?

Garcia: Well let me see. The years that I was president were, again, as I mentioned, the Golden Years, in my opinion. I have some final notes. For example, the simple things we went through; we had chapter newsletters. Simple things. It wasn't a big breakthrough or anything like that, but we started communicating with members. And there were other things like, for example, the modern curriculum, I think, was a major thrust in trying to bring computer engineering into focus. The affiliates were always a challenge, there's no question. The conference and tutorials were also major accomplishments; and the closeness with ACM. We were actually the promoters of CSAB, the Computer Science Accreditation Board, was a major breakthrough. We tried to bring computer science into

a more formal accreditation. And the fact that we got two directors for the Computer Society was unheard of. I should give credit to Bob Larson and Ted Vaughn for that. It was a pity that we didn't continue the close conversations that we had between the two presidents and we even talked about merging ACM *Communications* and *Computer* magazine, and having one magazine. Can you imagine that? I mean, that would have been a major breakthrough because it would have put two different cultures together in a very productive way. I think we covered pretty much… Merlin Smith's work was absolutely fantastic; and Tse Feng was also; oh, Ron Hoelzeman; Ron Hoelzeman put together the finance committee. Ron Hoelzeman was a major contributor, a quiet, easygoing guy. Tom Cain became IEEE president and in many ways, Tom Cain was more successful in moving up the ranks in IEEE because he got along so well with everybody. There was a lot of this thing with getting along, not because of personalities or anything but just because I was defending the affiliates and the affiliates were unpopular in the IEEE environment. And again, there were good times and bad times in my years as director and times with people that I thought should have been elected and were not. Anyway, I did my job and I felt very comfortable with my performance and very grateful to all those who helped me, which were many.

Yost: Thank you so much for your insights and for helping us document this important period of history of the Computer Society.

Garcia: Well I think the major thing I have is gratitude for all those who contribute in the past and who will contribute in the future.