An Interview with

JAMES D.
ISAAK

Interview

This oral history is part of the IEEE Computer Society History Committee's
Computer Society Leaders Oral History Project.

Conducted by David Walden.[1]

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[1] Interviewer's note: preparation for this interview included looking at web pages on the Computer Society website and studying Jim Isaak's website (www.JimIsaak.com).

Interviewee background

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James (Jim) Isaak was the 2010 president of the IEEE Computer Society. A career engineer, Jim first became involved with the Computer Society through standards activities. He served in several appointed leadership positions in the Society and also as an elected member of the Board of Governors. Jim ran for Society president several times before being elected. As president, he pioneered the Society's involvement with virtual on-line communities. Since his three years as president-elect, president, and past president, Jim has remained active in IEEE and other professional societies.

Walden: Thank you, Jim, for having me here today. For the record, the recording, this is 15 August 2013. I'm Dave Walden with the Computer Society History Committee and today I'm interviewing 2010 Computer Society President Jim Isaak. We're at Jim's home in Bedford, New Hampshire. Again, Jim, thank you for agreeing to do this interview and for inviting me into your home. As I've previously explained to you in my e-mail, the interview will be recorded. After we're finished, the interview will be transcribed by a professional transcriber; I'll then do a pass over the written transcript, trying to fill in things that the transcriber didn't understand. For instance, I may know what the abbreviation meant but the transcriber didn't. And I'll also get rid of unnecessary things like 'um' and 'ah' and things that we all say when we're talking spontaneously. Then I'm going to pass the interview to you to review. And once you're satisfied, have corrected it, whatever you think is necessary, it will be posted on the website of the Computer Society History Committee in a special category, and in a special category on the website of the IEEE History Committee's Global History Network. Thus, before I leave, I need you to sign a release form, which the IEEE requires so that they can use it without fear. One of the things that makes the point is you can use the interview, which you'll get a copy of, in any way you want although they ask the courtesy of you telling them if you're going to publish it in some significant way. It's all yours, but they need you to say they can have it on the website. In addition to the audio interview I plan to make a photo of you at the end to post with it on the website, if the marketing people from the society happen to want

that. Okay? So I'll start. Oh, one last thing. This is an oral history interview, so it's going to cover your life; it's not just your involvement with the Computer Society.

Isaak: Okay.

Walden: So, please tell me a bit about where you're from, your youth, your hobbies, whatever you're willing to tell me about your youth.

Isaak: Ah. Well, the first I have to tell you is, as an advocate for STEM education. I'm always trying to figure out what it is that causes kids to get engaged or interested in technology so I have to examine my own life that way, too. My father was an electrical engineer and so that was one major factor. He was always doing things when I was a kid. He built sailboats; he built radios; he built Tesla coils; we did Tesla coils when I was a kid. So a variety of things that caught his interest and tried to draw on mine. I was raised in San Diego. My father worked for the Naval Electronics Laboratory there. I didn't find out until many years later what he actually did. I'm still not sure I know what he actually did because it was all confidential. He worked with submarines, sonar, and things like that. So I was raised in a high tech family, I guess is the right way of putting it, and had strong interests in a variety of things; scouting. I do find, oddly enough, that a lot of IEEE leaders historically, have been Boy Scouts, which I didn't realize until I started tripping into people at meetings and we helped produce the more recent computer merit badge for Boy Scouts, which was an activity IEEE got involved in. And when I was doing that I started finding out that a lot of these people were; even in other countries outside of the U.S. were involved in scouting. So, outdoor activities; sailing, swimming, things you associate with San Diego; and then also the technology aspect reflect a lot of my background. And a lot of science fairs. I started doing science fairs as a kid. I went to every one I could; had a lot of fun with it.

Walden: Tell me about your education through high school.

Isaak: San Diego did tracked education, so we had — and I was in one of the advanced tracks — I actually went to different schools than I would've normally. This was before magnet schools. They started some special programs, so I ended up going to a special math and science program 15 miles away from my house and probably 20 or 30 junior highs away from where I might've been because they had that program there and they wanted to have a handful of kids that they thought were good from around the city involved in it. I continued the 15-mile commute to and from school, and all the way through high school staying in a variety of programs, including advanced placement or combined history and English programs, which given that my orientation was science and technology was informative, [laughs] I'll put it that way. Not one of my primary areas of interest but it was good to have that exposure with a different group of kids and different community, just to see how the other half lives.

Walden: Did you have siblings?

Isaak: An older brother and older sister, neither of which is too technology oriented. My brother went into political science and my sister into education.

Walden: In your CV, which is on your website, it notes that you majored in something called Computer Studies at Stanford, and then for a master's degree in Computer Engineering. How did you get interested in computing? It sounds like sailing and Tesla coils and things aren't exactly computing; of course, math is.

Isaak: Right. I went to Stanford in part because my brother went there and it's an excellent school, obviously. The nice thing about it is it's an excellent school in a variety of areas so you can go in without really knowing where you're going and get exposed to a lot of things. My freshman year I was in a dorm and the dorm advisor was a fellow named David Gries, who is a very well-known, now professor emeritus, I think, out of Cornell; but at the time he was a professor out at Stanford. Sitting around the dining room table at the dorm cafeteria, we got to talking; he said well, you should take a class in computer science. He taught introduction to Computer Science, so I took his class and got

totally hooked on the idea of programming and controlling computers, and things like that. So David is responsible for getting me involved. What I then wanted to do was become a computer science major. Well, at that point, Stanford didn't have an undergraduate program in computer science, but what they did have was a 'design your own major' program. So I basically designed my own major, which ended up being called computer studies, and grabbed all the courses out of the graduate schools in computer science that were relevant and interesting, and constructed my own major. There's an interesting anecdote in that, which I had to name all the courses you were to take, not just in major courses and of course, you wanted diversity. So I took things like criminal law: [that] was a course I ended up taking; it was a security and privacy course. It was a legal course — not a course in technology. I also took a course from Joshua Lederberg, who's a Nobel Laureate, which is the basis of current human biology programs but he called it Man as Organism. I was type writing this course list out on a piece of paper and I misspelled the name of that course for some, no doubt Freudian, reason; took it around to the professors that had to sign the thing and say this is a legitimate set of courses. It wasn't until I got to the third professor that somebody realized I had misspelled the name of that particular course and he decided that he really wanted to take that course. I'll let people figure out what that particular misspelling might be. Anyway, I had to go back to all the other professors and change the spelling on the hand-typed piece of paper to get it put into place. That course was fascinating because it was a future of biology at the time, dealing with things like cloning and artificial insemination, and all these other concepts that had not been put in place when I was in college. My submission to the course, the paper I did, was a parallel set of discussions of where technology might go — where high technology might lead. And that's been a theme of my thinking ever since, is where does this stuff take us? Where does it go? What might that mean?

Walden: For the master's degree, it was computer engineering; was it a computer science department by that time or still not?

Isaak: Actually, I was in the electrical engineering department. The computer science department only had a Ph.D. program and the only way to get a master's is if you failed to get a Ph.D. so I went to the electrical engineering department, where they had a lot of computer related courses, and got a EE/Computer Engineering degree. Since I had taken a lot of classes already required for graduation, I was filling in the gaps and then taking a variety of courses that were fun to take. So I got exposed to a lot of non-technology related, or at least non-computer related, activities and that, which has been a lot of fun.

Walden: Your website avoids giving the dates of when you graduated. Are you willing to say when that was?

Isaak: I graduated from high school in 1967 and college in 1972. The reason I don't do that is I also teach my students, when they do resumes, that anything over 10 years old, you drop the dates because you don't want to disclose your age. I'm retired at this point. The probability of people being biased against me by age is probably past. [Laughs.]

Walden: So when you say you graduated from college, that was with the master's degree, that's when you finished college, or when you finished your undergraduate degree?

Isaak: You have to roll back to the late 1960s and early 1970s, and remember where we were. Where you didn't want to be, perhaps, as in my case, was in Vietnam. Stanford had a program where they allowed you to do what they called a co-terminal major. What you could do is not get your bachelor's degree — you could have your student deferment as long as you didn't have your bachelor's degree — and go ahead and earn your master's degree. So I took that course of action and actually got my master's degree at the same time as my bachelor's.

Walden: Okay. I lived through that era as well, and went to college, and then I got a job with a defense contractor. That worked quite well too, as a path. Did you already begin to

get practical experience in the computing field while you were in college or did that come later?

Isaak: No, I did; and that was delightful. My sophomore year I said I'm going to try and get a summer job. And so I applied both to local offices and then national offices of a number of computer companies, and I ended up getting a job with IBM locally, in Palo Alto. IBM had what they called their IBM Palo Alto Scientific Center, tied to Stanford. They hired mostly … it was associated closely with graduate students and professors, but they hired a handful of summer interns from the college. So I applied and got a job there. I worked actually developing software for an IBM 1800 computer, and that was a great experience because it was practical. It was hands-on: solve a real problem in a real world context; something that you don't get out of coursework. I continued working there part time all the rest of my time in college.

Walden: And the rest of the summers, as well?

Isaak: Summers, and part time during the school year as well.

Walden: All the way until you finished the dual degrees?

Isaak: That's right.

Walden: I'm trying to understand the job list on your resume. Did you continued at IBM after college, or then you went on to someplace else and IBM was your college job?

Isaak: I tried desperately; and they actually wanted to hire me; but they don't ever actually hire into the scientific centers. That was an elite group at IBM like the research labs are; and they didn't have any openings. They were under a national no-hire umbrella at that time so I couldn't get in at IBM. I ended up at a small company called CALMA Corporation, which may not show up on the resume.

Walden: It does, actually.

Isaak: Oh, all right. And into the area of CAD/CAM design using Data General Nova computers, with assembly code level. This is back in the days when 16,000 bytes of memory was a large computer and we actually ran six CAD stations doing digital design of integrated circuits of 16,000 byte, literally, core memory machines.

Walden: What year was this?

Isaak: 1971, 1972; probably started working there in the fall of 1972.

Walden: I know that class of machine.

Isaak: Yes, the DEC PDP-11 was in that category, and so forth.

Walden: Where was CALMA?

Isaak: They're located in Sunnyvale.

Walden: So you stayed in what's now Silicon Valley.

Isaak: Right. Then, I actually had a child, and a house, and a wife, and other things gave us a lot of incentive to try and make sure we had our [pause]

Walden: What was your role at this company?

Isaak: Started out as a programmer, the term they use as a member of technical staff, that was sort of catchall phrase, writing code to actually implement a windowing system. It's actually kind of funny when you look back at it. They wanted an ability to have a virtual window into the integrated circuit rather than the default, which would've been a one-to-one representation on the display they had, which was a storage tube. So we actually

created a windowing structure that could be overlaid on top of that and gave virtual representation so you could zoom in and zoom out to the various levels of view of the diagrams, and so forth.

Walden: Fascinating. The next point on your resume is Intel. How did you make that transition and what did you do at Intel? Was Intel still at Silicon Valley; of course they are.

Isaak: Well they started there. CALMA sold their systems to integrated circuit designers and many of there were right there in Silicon Valley — which is the reason it's called Silicon Valley — really?! Intel was one of the customers and I got to know people in the various customer sites because of the contacts I had. Basically, when something went wrong we'd go off to the site and try and figure out what went wrong, and maybe bring back tapes to try and diagnose the problem. And I got involved very heavily in that particular aspect of the work because I understood the system fairly well and I guess the reality was that I had an orientation toward debugging problems and I went to work for the fellow who was in control of the design systems there and ended up in the test automation group.

Walden: What year was that, roughly?

Isaak: 1976 I'm guessing. 1977.

Walden: Okay. It says you ended up as supervisor in the test automation group.

Isaak: Yes. Intel is a very interesting company. At the time, whenever they had to reduce head count, they would go through and methodically get rid of people. They did what they call the lifeboat ranking and so they ranked people in the lifeboat ranking. And some of the credits you got for where you stood in the lifeboat was what your job role was. My manager realized they were coming up to a layoff and so he elevated me to supervisor, because I was a fairly recent hire and might've gotten cut otherwise. So I managed to

avoid getting cut at that point by being in the right lifeboat. They actually took an entire department out. It was … [interrupted]

Walden: Were you in fact involved in management, by that time; first time management?

Isaak: No, I actually was involved when I was at CALMA. When I was at CALMA I had one person working for me; two people at one point; and when I went over to Intel I quickly moved into a situation with three or four people working for me. Supervision as opposed to managing; I typically didn't have hire/fire responsibility but I would have oversight of their schedules and dealing with all the personnel issues.

Walden: Then you went on to Data General?

Isaak: Data General; my rationale at the point, because Intel essentially invented the microprocessor and I tried to get Intel to become a computer company. I actually had a great opportunity to talk to Bob Noyce.

Walden: If I may just interrupt, one of our history committee members is Stan Mazor, who is one of the co-owners of the patent on the original four-bit ...

Isaak: Intel 4004.

Walden: Right.

Isaak: Yeah. Ted Hoff and he, and I think, Les Valdez got his name in there somehow. Yeah, it was a great opportunity and Intel had, at that time, a very small company; had periodic meetings between their exempt employees and Bob Noyes, who was president. So I had lunch with Bob Noyce and 10 other people. The Singapore fabrication facility had just burned down and they had just come in to notify Bob Noyce and before anybody could take action, he had to stay in the room with us for two hours while they notified the

market, which gave us two additional hours to talk to him and I mentioned the idea of turning Intel into a computer company. He thought that might be a long term model, but at the time Intel made memory, that was their primary profit device and they made computers to sell more memory chips. I knew that down the road, Data General had a computer semiconductor facility to make computer chips and Data General ended up making the first 16-bit microprocessor, the Micro Nova, at that facility. I knew it was there because I lived in the valley and you got these things, and so I decided that working for Data General might have an advantage over working for Intel because I knew computers were where I really wanted to have my focus. So I ended up working for Data General Palo Alto, and then moved back to the East coast to work for Data General, actually working for a fellow named Ed Zander, who left Data General after a while, and ended up president of Sun Microsystems, and then ended up president of Motorola for a short while. But it was a fascinating experience. Again, Data General made some really neat computers but didn't understand what that opportunity was for real low end systems. I had actually published an article in *Computer* Magazine — my first publication — was on standards for the personal computing world. This is before Apple, we'll put it that way. [Laughs.] I was trying to figure out how do you get computers into people's houses? You know, what are the killer apps, as it were, the phrase we use today. What does the price point have to be? What are the capabilities? So that article explored that set of issues and then when the Altair came out, and some of those other systems, it became a lot of fun to see that market go. By that time, I was out on the East coast; or very soon thereafter on the East coast.

Walden: And you wrote an article based on what you were doing in the company or this is sort of you musing on the side about how the field was going to move or should move?

Isaak: This was musing on the side of what we should do to create a personal computing environment. I think the target system was an 8080, at the time, but then actually, a lot of the micros were 8080-based. It just; you know, PC-DOS; and there were other things that were available at the time — created the opportunity; but you had to network them

together. You had to have a communications network to make a network viable. At the time I suggested X-25. Today's world, you use internet.

Walden: And what were the various roles you had at Data General?

Isaak: I started out in field support, in the field working with customers, debugging problems, helping install systems, and trying to get the sales force to be honest, which was always a challenge. And then moved to the East coast and became a product marketing manager for the Micro Nova line of computers. That system actually became real, Ed Zander was actually head of that market group, I had already been sending comments in saying if we ever decide to release a microprocessor we should do this and that [laughs] knowing full well that there was a microprocessor facility down the street. So he eventually interviewed me and hired me to head up that product marketing activity.

Walden: Neat. How did you make it to Charles River Data Systems?

Isaak: I was sort of in a transition. When I was at Data General our sales force would come in and say, well, our biggest problem is the Motorola 68000. I started analyzing it and then I realized that Motorola did not know they had created a 32-bit computer. They thought it was 16-bit. But Charles River was in the process of taking that processor and turning it in to a real computer so I joined them as product marketing manager for the 32-bit computer line. It was funny because we started advertising it as a 32-bit computer and people would say no, the Motorola 68000 is only 16 bits. We actually flew out to Motorola and sat down with people there to get them to agree with them that this is a 32-bit computer. The sales manager of the 68000 did some research on it and what he discovered was that when they had heard rumors that Intel was going to come out with a 16-bit computer — good grief, what was it called — 286 was a marginal 16-bit and then the 386 was the full 16-bit system. So they turned to their engineering staff and said well, if Intel has a 16-bit machine, we need one too. Well what they didn't know is that the engineering staff had been looking at the VAX, and they said wow, the VAX is really neat. You know, 32 bits and all these other things. They had already started designing a

32-bit computer. So what they did was they gave it to the marketing people and didn't tell them it was 32 bits, they told them it was 16. It worked just fine for 16-bit operations. It had a 32-bit address, it had 32-bit accumulators and 32-bit operations built in. So it was a whole 32-bit system except for the number of pins that went out to the memory, and that was 16-bit, so if you transferred to a 32-bit object you had to do two cycles to transfer. The 68020, I think, was the first one that actually had 32 pins on the outside. But it was funny that they didn't know what they had, which was significantly better than what Intel had.

Walden: And what was Charles River using this 32-bit computer for?

Isaak: They tried to build a general purpose computing system in competition with DEC and competition with Sun. Sun, of course, was workstation oriented.

Walden: So they were OEM-ing the processor, in effect.

Isaak: They were OEMing the processor and then created units to sell in high volume to OEM buyers. Never really took off, unfortunately, but they had some really great opportunities go by. (OEM stands for Original Equipment Manufacturer, essentially a wholesale business.)

Walden: And they were based where? In Cambridge?

Isaak: They were located in Framingham.

Walden: The Charles River goes there too, I guess.

Isaak: Well yeah. The firm actually preceded the creation of this computer. It was a startup based on actually building knockoff memory boards for DEC VAX, and DEC PDP-11s, I think, was the original business.

Walden: And then, you transitioned to Digital, where you were for a long time.

Isaak: That's true. Well, Charles River, there were two things that they had. They had a 68000-based processor, and they had done something that today sounds really arcane; they had written their own operating system. It was actually an operating system written by a fellow from Bell Labs and he knew about UNIX, so he made a system like UNIX. I was the marketing manager for this thing and I said well, it would be really good if there was some standard for UNIX that we could refer to so when we said it's like UNIX, we say we adhere to the same standard that UNIX does so you could have a competing alternative. So we got involved in early activities with the user groups /usr/grp organization to create a standard for UNIX, which then moved into IEEE six months after I got involved. IEEE had started a standards activity on UNIX and the fellow who started it wasn't able to take it on and really carry it forward so the group in slash-user-slash-group basically said well — what I did is I called up the IEEE and said you've got this thing, is there anybody doing it and how can I contact them? — Well, they said, no, we actually don't have a chair for the committee and I said okay, I'll chair the committee but here's the deal. If the /usr/grp decides to keep the standards activity we'll kill the IEEE activity. If they decide to move it to IEEE then we'll work with IEEE. That's what they did. The group moved the work into IEEE and I ended up chairing the committee in IEEE, which is my first volunteer work with IEEE. We created the POSIX standard, which, when we started to look at the impact it had on the market, we were estimating that — this was back in the late 1990s — the market impact as being around $30 billion that it had gained for the companies who had chosen to go with that standard. That was before Linux, before Apple adopted the free BSD version of Linux for their operating system; before Apache started building on top of UNIX servers for the internet web and before cell phones all started using versions of Linux or Android systems; are all using variations on that. So the market impact of that activity was much much greater than the $30 billion we estimated in the late 1990s.

Walden: Let me get my timing straight. This original IEEE standards activity took place while you were at Digital.

Isaak: No, it started at Charles River.

Walden: At Charles River, I see.

Isaak: 1984 is actually when we got off the ground and started doing it. The first standard came out in 1988 and then the official version, by 1990, we had a solid approved standard that we could use for reference and everything, and it got adopted by the federal government as a procurement guide.

Walden: So Charles River saw the benefit to them of you participating in this standards activity or you just sort of did it?

Isaak: No, they actually recognized the benefit because what happened is that; first, it's a small company, so we had every interest and need to be visible to the public. You get into a large company, if I were at IBM at the time — and I knew people at IBM at the time who were very active in this — if they wanted to communicate with the press they would have to go through their appropriate channels. Well, I was the channel at Charles River so I put up a newsletter and every quarter I would send out a newsletter to all the people in the press I could find who cared. We talked about the standard, what it was doing, what the progress was, what the issues were. They would call me and the result was that Charles River kept getting bylines in all these articles, you know. The trade journals would then say that Charles River Data Systems says the standard is going to create billions of dollars of new opportunity for the market, you know, and UNIX will become the standard operating system or the POSIX, you know, because I was careful to use the trademark UNIX. And that was of high value to Charles River. It gave visibility to our customers; it gave leads into accounts; we could go into places and talk about the standards in an objective way and it was really hard for a major corporation to not, you know, where UNIX was such high visibility at the time, to not have the standards committee chair to come in and tell them about the standard, which is what I did. And

then, mind you, I might also tell them about Charles River products. It was a great opportunity, and Digital saw the same thing.

Walden: So how did that transition to Digital happen?

Isaak: Well, basically I realized that I was putting in full time on standards and Charles River, as a small company, really couldn't afford it. The president of the company really didn't want me to leave. Digital and I had talked about me coming over to work for them and so I became a director for UNIX product marketing at Digital, left Charles River and continued doing much of the same thing. Since I already had the momentum of contact with the press, I had a lot more freedom at Digital than most employees would. I was talking to the press all the time; they knew who I was and was able to continue that. And Digital found the same thing; it was a great opportunity to get in to talk to customers. And by the time I got to Digital, I wasn't even pitching hardware, I was just pitching software. I wasn't even pitching their software, I was pitching UNIX because they had it and [pause]

Walden: And Digital was okay with your focus on UNIX rather than VMS, say, or [pause]

Isaak: [Laughs.] You have to realize that Digital was schizophrenic. They were the original vendor of the UNIX, it was built for their system and at one point, AT&T had actually offered it to them. They said look, guys, if you'll make it available on our switching systems, we'll let you take the operating system. Digital turned it down. The other thing is that reality is that VMS is probably a better operating system, but better was not the issue with the UNIX community. They wanted, essentially, a standard. They wanted a common base they could use in multiple environments. They wanted the kind of thing [pause]

Walden: Not proprietary.

Isaak: Well, UNIX was proprietary. AT&T owned UNIX and it wasn't until Linux came out, and free BSD, that you could actually have the non-proprietary versions of these things, the open source versions.

Walden: But UNIX was running on lots of different computers from vendors all over the place.

Isaak: It was platform independent, if that's what you mean.

Walden: Yes, platform independent, and that's a better phrase. Users wanted a platform independent operating system.

Isaak: I recall a lawsuit when Digital lost a contract with the U.S. government trying to bid their version of UNIX instead of AT&T's System V version of UNIX. Digital was promoting BSD and paying licensing fees to AT&T. It wasn't that it was not proprietary, it was still AT&T's system but I got called in on the lawsuit because of the question of what is proprietary, what is standard, what is UNIX? In fact, it was funny; the AT&T lawyers were saying well, what is UNIX? I said UNIX is a registered trademark of AT&T Corporation. They said what is UNIX? I said it's a proprietary operating system from AT&T. They kept asking the question, what is UNIX? I finally said well, UNIX is a homonym for males incapable of having children and they stopped the questioning at that point but, of course, one of the original sources of the term UNIX in AT&T was that it was a castrated version of Multics — suddenly, the history of that was leading into their suit and I don't think their lawyer knew that history. [Laughs.]

Walden: So you were at Digital from when to when, roughly?

Isaak: Probably 1979, 1980 to 1999. Somewhere in that window of time.

Walden: I find it on another CV, 1987 to 1999.

Isaak: That sounds about right. I think that's just about what I said.

Walden: Yes. Let me continue with the job sequence first, then we'll get to the professional society sequence. At some point, you left Digital and, according to this page, you ended up at Southern New Hampshire University. How did that transition happen?

Isaak: If you look at Digital in 1999, they got acquired by Compaq. Compaq had no idea what they got. Think about Digital, for a second, as the creators of the first 64-bit computer. The creators of AltaVista, which was the first web search engine, and the creators of the first hand held personal device, which never saw the light of day. Hewlett Packard actually issued a version of it. They had actually created Strong Arm, which was a 32-bit version of the ARM chip, with very low power and very high performance. It got caught up in all these legal and marketing things but it made a really great device for hand held things. It was a precursor to the Smart Phone type things, and that was what Digital had built some sample products on it. It had some really delightful products coming down the road. Compaq acquired them with the idea that the world of PCs, that's all run on an 86-compatible processors running on MS DOS and there's nothing else of any interest in the world. So when Compaq took over they just started cutting left and right, different parts of the organization, and UNIX was not of interest to them so the UNIX activities we were involved with were just like out the window. So I got laid off — 'compacted' is another way of phrasing that — and it turned out to be an ideal time. I got stock options while I was there and they had revalued the stock options as the market price of Digital stock had dropped, so they were in a reasonably good price range. You can't exercise your stock options while you're an employee, but if you get laid off you can exercise your stock options. I exercised my options and it sold almost immediately. That was money for my retirement. [Laughs.] So I went to Southern New Hampshire University a little while after that.

Walden: I misspoke before, and said you went to Daniel Webster College first, and then Southern New Hampshire.

Isaak: Yes, I started doing adjunct instructing at the community college at Nashua; at Daniel Webster, and then I took a full time job at Southern New Hampshire after I realized I was doing as much teaching per term as a full time instructor or professor was but I wasn't getting paid as much and I got no benefits.

Walden: Yeah.

Isaak: And since Southern New Hampshire was hiring I said okay, I'll apply for that. So I got a job there. It was really sort of; I want to say fun, but that's not true; it was very sort of interesting being on the academic side of the equation. IEEE and the Computer Society both have an academic segment and a professional or practitioner segment. I had been a practitioner all that time and it was a chance to see how the academic world lives, and I really am glad I didn't become an academician. It just wasn't my bailiwick. The kinds of things people do there, the values they have, I learned a lot about what that was. I have a great deal of respect for the people who do academic work because I think it's very demanding in quite different ways than the industry world is. It's measured in radically different ways. Some day when I have nothing better to do, I'll write a paper called "The Academic Economy" because it's not measured the way you would in industry. Industry almost always solves any problem with money. If two companies disagree; in fact, one of the great UNIX battles is around the windowing system that UNIX would use. Everybody agreed on X windows, but there are two different versions; Sun Microsystems and AT&T had one system; Hewlett Packard, IBM and Digital had another one; Motif versus Overlook, and it was tearing the industry apart because until there was a standard, an agreed reference point for windowing, you didn't know how to build that next generation of applications. Ed Zander, at Sun Microsystems at the time, finally went in and said we can't have this battle anymore, it's costing us business. We've got to stop doing this. They conceded. It wasn't of question of which was better, it was a question of the market; what does the market need; how do we build our sales? Money answered the question that we couldn't resolve technically and we certainly couldn't resolve politically. In the academic world you never see that. There's no way to resolve academic differences monetarily. Peoples' reputations, their entire publication career —

their academic CV — is built around what they've done and if somebody pulls the carpet out from under them, they've lost everything. They've lost themselves, as they have built it over time. So you're fighting with a different set of things, and at the same time, very few times do those things get challenged. What we're really dealing with is who gets the corner office and things like that, and unfortunately, it has very little to do with what students need, and what the curriculum should be, and how do they do a better job of educating kids.

Walden: Interesting. Well, let's move over to the professional side of things; the professional society side of things. You already stated that you began to get involved with professional society activities through following POSIX and Charles River to where it led to what turned out to be the IEEE. Was that in the IEEE Computer Society or just in the IEEE more generally?

Isaak: Well, IEEE's standards model has the standards broken out to societies. So the IEEE does very little with standards. If there's a society to take the lead, they will. The Computer Society had some excellent people running their standards activities. In fact, a lot of people in IEEE Computer Society standards ended up becoming president of the Computer Society. Helen Wood was an example, Leonard Tripp was an example, myself, Steve Diamond, Kathy Land, and John Walz all are people that came out of that standards group and became the president of the CS. Interesting group. And, of course, Computer Society gets nothing out of the standards. We coordinate the activities, we don't get any revenue out of them, and we don't get anything to put in our digital library out of them. A couple of the standards had spinoffs that the Computer Society could leverage, and software engineering work generated a whole variety of things that came out of that. A lot of it just is work done for the industry, for the benefit of professionals and IEEE gets whatever benefits come out financially from it and usually, visibility for it. But the 802 standards, which are the Ethernet standards and subsequent Wi-Fi, there's a real frustration. The subsequent standard, which is 802.11, which is now known as Wi-Fi, which has no IEEE in the title at all, is a great example of very high impact standards that have come out of the Computer Society. POSIX is probably second or third tier software

engineering, certainly has had a huge impact. There are a lot of high impact standards that have come out from there.

Walden: So you got involved in POSIX and it says in your CV that that was both with the IEEE and ISO. What's the ISO involvement?

Isaak: As we got our hands around the POSIX activity, it became evident that you wanted both the U.S. and an international standard. IEEE already has a relationship with ANSI; they actually founded the organization ANSI, to establish U.S. standards. So getting an ANSI designation was trivial for IEEE; it happened automatically. However, to get ISO standard, you actually had to create an international standards committee and coordinate that at the international level, so we built; we got that activity going at the ISO level. One of the advantages of digital is they were heavily engaged in international standards. So we had people in the U.K. dealing with standards; people in France dealing with standards; people in Japan and Australia; Italy; all dealing with standards at the international level. So when we wanted to bring this to the international level, actually occurred before I moved to Digital, but essentially, it was a natural path with companies like IBM and Digital supporting it, to take it international. ISO is the forum for doing that and I chaired — the technical term in ISO lexicon is I was the 'convener' — of the working group responsible for that at ISO. Basically, we wanted to make sure that the international committee had a chance to vet the work that was being done at IEEE. There were improvements made to it through that community. There were some areas where they really wanted things that just weren't practical for a variety of reasons, so we tried to figure out how do you handle that? And so it's a diplomatic task. It is even at the national level because you want to get IBM, and Hewlett Packard, and Digital Equipment, and Sun Microsystems, and AT&T to all in the same room and agree to a standard. That takes a fair amount of concessions on everybody's part, dialog, you have to think how does this work, and find those paths forward. The same thing happens at the international level. Part of the problem at the international level is that a lot of the technology standards are so dominated by the U.S. or sometimes, another country, that the people with good ideas who are not tied to corporations out of those countries have a real difficulty getting this

ability for their ideas and their needs. It can create a great deal of frustration. I saw some very good ideas coming out of the international community, not so much for the POSIX standard, there are some areas that just simply never got traction because they didn't have the corporate momentum behind them to carry it forward.

Walden: When you're working with ISO are you representing IEEE or are you representing DEC?

Isaak: The United States. Actually as a convener, you don't represent anybody because the United States delegation is there, the Japanese delegation is here; it was rather funny, the U.K. delegation was actually lead by a lady who is a U.S. citizen. The Danish? delegation was led by a gentleman who was Polish. The French delegation was led by a gentleman who was German. The U.S. delegation — not the lead, but the second guy in charge — actually was a guy who had a very strong British accent, but he was German. It just [laughs]; even the surface level about who was who; got to be rather humorous. What we all had was a common interest in UNIX, and an awareness of it, and involvement with it.

Walden: What other, let's say standards policy committees, were you on with the Computer Society or the IEEE?

Isaak: Well, it goes two directions. There is the hierarchy of committees involved with standards. I chaired the POSIX committee and that put me on, automatically, the standards coordinating committee at the Computer Society. I then got selected as Vice President of Standards for the Computer Society. I was also involved with the standards board at IEEE. I ended up on the Standards Board of Governors for IEEE when the Standards Association was formed. So those are all sort of management committee levels inside the standards process. [Pause.] The technical path, perhaps [pause]

The other thing that happens is that there are other standards besides POSIX. So, well, I know what I was going to comment on. One of the advantages of Digital, which is

radically different from Charles River — the small company versus the large company — I would even have to designate historical large companies versus today because Digital looked at standards as a long term business strategy. They wanted to be involved with the activity at all levels — local, international, IEEE, ANSI, ISO — so they very carefully made sure that they had people placed all around the world engaged in standards so when an issue would come up, we would have somebody in the Irish standards organization who could help Ireland establish the standards in Ireland. In Japan, we had people involved with Japanese standards organization who could help Japan establish positions. Now, most of the time, Digital didn't have any strong corporate interest, they wanted to do the right thing, as with Digital's model. Occasionally they did have strong corporate interest and that would come up. You'd have people advocating for that. And IBM was doing the same thing; and so forth. That world of corporate involvement in standards in the computer industry doesn't exist anymore. It's very hard to find who the corporate leaders are. IBM still has some of it; Hewlett Packard still has some; but at that point in time, back in the early 1990s, the IBM lead person in standards, and the Digital person in standards, and the person from Unisys all knew each other, they all interacted on a regular basis, they engaged to help make things happen. And after that, subsequently, it became very difficult to get a lot of standards work done because the large corporations weren't prepared, didn't have assets to put into it. They didn't have the same perspective of let us build the standards that help build our industry's next generation. A lot of that was the PC. The PC industry went off standard free. Microsoft set the standards and there was nobody to tell them what to do. The second thing that affected that was the internet. The internet engineering task force set a model for independent standards operations, actually very similar to IEEE, in many ways but they weren't part of the historical model. The web consortium created another variation of those standards models, of how to build standards for the web, and corporations started investing in that, maybe we can buy our way into something — to put it bluntly — less formally organized activities because you have more control over it. So that changed the model of standards at that level. I did get involved in both web site engineering standards; what should a good web site include? That became an ISO standard, as well; just undergoing revision now. I also got involved when the Clinton-Gore team announced the information superhighway industry, and this

is industry in many areas, popped up their ears and said oh! Anytime the federal government starts talking with some kind of coherent voice about something, industry gets paranoid that the government's going to do it to them. So ANSI formed a committee to provide industry input to government on how an information superhighway might emerge, and IEEE joined that activity. I was the lead in IEEE in that activity and that was a delightful activity as well, because we had IEEE at one side of it, we had the cable industry, we had the telephone industry, we had power industry, people from areas that outside of IEEE you never see in the same room talking about what did these standards mean? What do they do? It's really too bad that the focus didn't remain there for a little bit longer because we've ended up trying to solve all those problems, a lot of it through the web consortium, and a lot of it through trial and error. How do you put these things together to make a more comprehensive system? But, you know, that's sort of the way we stumbled forward in these areas.

Walden: Let's step back, before we go on to the government's path of this Computer Society they were involved in. Had you been involved in the Computer Society of IEEE before you went with the POSIX effort into the IEEE?

Isaak: Not really. I was involved in the sense that I was a member. I had published a paper or two and had some very minimal things at that level, but it was the POSIX activity that drew me into the volunteer role at IEEE. And while I'm there, I just want to point out, it also created the opportunity for any new job transitions that I took. So if you listen carefully to my job history you realize that somewhere after I joined IEEE, or somewhere after the POSIX standards started occurring, my job opportunities always emerged as a result of my involvement with IEEE. So being active in standards involved me with not only an opportunity to understand the competition but opportunities to go to look for new jobs and see what the opportunities were.

Walden: Please remind me; a little bit ago you mentioned that as you worked in standards, you eventually became the vice president for the Computer Society of . . .

Isaak: Standards, Vice President for Standards.

Walden: So that led to a greater involvement in governance of the whole society, or how did it go from there to what happened later with you and society governance?

Isaak: The Vice President of Standards is appointed by the president. I think Helen Wood was the president of the IEEE. The Computer Society appointed me to be Vice President for Standards, so I had three years I spent as Vice President of Standards, which also puts you on the Board of Governors. So I started learning about the Board of Governors. After about the second year on the Board of Governors as Vice President of Standards, I actually ran for a seat on the Board of Governors, as opposed to being an appointed position. I got elected to the Board of Governors and was essentially elected again and again.

Walden: How many are running for a seat? Are there just seats at large, or [pause]

Isaak: There are specific seats. There are seats at large. If you are one the presidents: president elect, past president; one of the VPs: standards, technical activities, education, so forth; you automatically have a seat on the Board of Governors but not necessarily a voting seat. So the Vice President of Standards did not have a vote on the Board of Governors but had a seat on the Board of Governors. Whereas, as a member of the Board of Governors elected, you had a vote. An elected office essentially had a vote, and an appointed office did not have a vote.

Walden: And so you gained visibility, let's say, through your standards activities, which eventually allowed you to get elected for office.

Isaak: Right. Part of the problem IEEE faces; and a lot of IEEE members I don't think realize, this tendency to view it as an old boys' club. The reason that happens is they nominate — and this happens anywhere — you nominate people you know. So if you see people come forward and nobody in the group knows them, it's hard to decide if that

person should be nominated for a board position or whatever. But if you've worked with them before, served on a board, you say oh yeah, I know George or Mary, whatever.

Walden: Just like industry.

Isaak: Just like industry. And engineers and technologists don't fully understand that networking world. But, yeah, once I got on the Board of Governors, people said oh yeah, we know Jim. He's, you know; I guess they must have decided I was a good guy because they kept nominating me for positions. So I got nominated into various roles and elected to some, and you work your way through that. Now I know a lot of people in IEEE because I got into IEEE through; I was on the Board of Directors in 2003 and 2004 so I got to know a lot of people at the IEEE level, so I started getting nominated for positions there. Currently, you may know, I'm a Vice President for Technical Activities candidate for IEEE, which is simply a result from knowing the people and having experience with them. They say yeah, okay, this is a person you would trust with that role. I do know I have somethings figured out here [laughs.] under campaign statements; I think printed out here. Yeah, there we go. Quite likely.

Walden: So eventually you entered the progression that took you to the presidency. What were the steps along the way to that?

Isaak: Losing. [Laughs.] I ran for President of the Computer Society in 1999, against Guylaine Pollock and she won; which was great for me for a lot of reasons. And then in that same time frame, 1999-2000, I was changing jobs and all sorts of other things started to happen so it wasn't a really good time for me to run for that. I was asked to run for the IEEE Board of Directors. It's a little uncommon to have somebody run for the Board of Directors who's not been a president, but IEEE Computer Society does it periodically. And so I was asked to run and I actually won the Board of Directors seat, so I was on the Board of Directors for two years, which got me a good exposure to IEEE. And then came back; I was still on the Board of Governors of the Computer Society for a couple more years, and then ran for President of the Computer Society. I ran against Kathy Land and

lost, and then I ran against Sorel Reisman and won. And then Sorel won the next year. So my strategy [interrupted]

Walden: And when you say you run for president, I guess you run for next year's president is what you've run for.

Isaak: Yes, you run for President Elect. You'd get elected to the President Elect position, and then you serve as President Elect. The Computer Society is pretty well organized; there are definite roles for the President, President Elect, and Past President. So that works very well in terms of orchestrating activities. There's a triumvirate of people who are involved in leadership and you always have a little bit of background ahead of you and you're always training the next guy who's coming in.

Walden: And how do you think that works? As a distant observer, and having been involved in industry where you get asked to take over some group, and it takes you several years just to sort it out. The fact that you're only there, really, as the president for one year, and you're phasing in or you're phasing out the other two years. What's your view? Can you really get things done as the President of the Computer Society?

Isaak: You have to pick people. As soon as I got elected people started giving me suggestions, good ones, and some not so good ones. You really have to focus on what you want to accomplish as president. You have to start setting up your cards for that as president elect and try and pull it through. So there's a limited amount of stuff you can do. The good news is the Computer Society has a very competent staff so there's a momentum of the Society that you can just simply hop on board and 99 percent of what occurs is being managed through staff and carries forward very nicely. I'm also on the Board of Governors of the Society of Social Implications of Technology. That group has no staff; it's a very small society; I got on the Board of Governors there in 2003; in fact, I nominated myself to be on the board there when I was a Director for the Computer Society; and comparing to a staff meeting, because the only saving grace in the Society for the Social Implications of Technology is they don't have term limits. So we actually

have people who've been involved with their leadership for the last 10 or 20 years. There are some people who have 20 years of experience with the group; and others who have only two or three years. So we can maintain some momentum and continuity through that. In the Computer Society, the president only has three years to influence things and only one year as president, and he can't run again. In the Society for the Social Implications of Technology people only have a one year term, but they can run again. People get elected two, three, four, five times in a row, so you maintain continuity that way. Other societies often have two-year terms for president; so president elect, two year president, and then president emeritus or past president, depending on they call that role. But maintaining continuity is a very important thing. IEEE has the same problem with its organizational structure; the president only serves one year and it probably should be a two-year term, or maybe even a three-year term. But it's really hard if you're try and take people; and these jobs are close to full time, especially if you don't have a lot of staff support; or if you have to train and manage staff, which some of these people have to do; so if you are taking time off from a job; yeah, industry doesn't know what to do with this. Some of the past presidents of IEEE, where I've seen this in spades, are self-employed and have the assets and essentially commitment of their own corporation to back them up. If they're self-employed, they're the president of their company, or they're retired. But yeah, it's difficult to get the time cycles to do it. On the other hand, we have a lot of very good volunteers. You really want to take advantage of that.

Walden: Say another word about the Society for the Social Implications of Technology. What does that do? And what do you do in it?

Isaak: The dialog within that society is okay, we have all this technology stuff, is that good? Is it bad? How is that impacting society? So they deal with questions like; well, one that immediately comes to mind was a paper done on an analysis of rape and virtual reality, in a virtual world, and an analysis of that in a context of can that happen and what does it mean? There's an actual incidence of that. But also, what is privacy? What are the technology implications for privacy? What do RFID [Radio-frequency Identification] chips do, in terms of exposing your whereabouts, your activities? Face recognition, all the

other things that are coming into play. So just an ongoing dialog about what are the technologies? What might they do? How are they being used? How might they be abused? But the good side, too; how do we use this technology to improve things for third world countries? So, yeah, that dialog. So it's a very interesting society. It's hard to envision, in some ways, the engineering or technology field without that introspection, without that discussion. And yet, very few people are actually involved in that dialog, which is too bad. Software engineering would be a classic example. We very rarely get into the question of why; software engineers, people heavily involved in that, understand that engineering applied to software means a quality level that protects human safety and health but we rarely state that unambiguously. The idea that we're actually writing software for x-ray machines, or airplanes, or these other complex devices that is not well engineered is very disturbing and very few people think about it. Software engineers do; and the Society for the Social Implications of Technology does. Unfortunately, the governments, and corporations, and policy makers don't, so they're very happy to buy software without thinking about whether this is an issue or not. Most of the time it isn't, but every once in a while it really is.

Walden: Thank you for that aside. Back to when you were the president. What was your view of the society as you phased in as president and what did you try to accomplish as president?

Isaak: My number one objective was to develop virtual communities.

Walden: What are those?

Isaak: There it is; that is the rub. Think LinkedIn and Facebook are examples today of places where you interact with other professionals. Google groups, Yahoo groups, and the predecessor of Yahoo groups which was called e-groups; when that first became available I said we should use this.

Walden: That was very early.

Isaak: Yes, that was. You know, the BBS bulletin board systems, and newsgroups, were early versions of that. The e-groups technology, which is Yahoo groups currently, was really a breakthrough because it really helped you instantly create groups and have not just the discussion threads, which are the predecessor concept, but have storage areas, documents you could collaborate on. You could actually start doing a lot of interesting things with a virtual group in that world. And it's something that; for example, we'll pick on RFID. When that technology started to emerge, questions of where does it belong in IEEE? Who should handle it? Is it a computer technology? Sort of. Is it a communications technology? Sort of. What is it? Okay. But then IEEE processes and the Computer Society's processes for deciding how to manage activities all lead to the question of who does it, what formalities, is this a technical committee, is it a, you know, whatever. What you really want to do is walk in and say here's our RFID, let's start a virtual community, get the interest of professionals into the discussion, if they decide they want a conference we can help make a conference. If they want publication, let's see what we can do for publication. And you don't have to ask the question where does it go? Start the discussion, and then later work out the formalities.

Walden: Figure out what you're doing and then you'll later you'll know what your mission is.

Isaak: Something like that, yeah. IEEE and the Computer Society both lack that capability so what I wanted to do was bring the virtual communities' capability in. We tried; there was a serious attempt to make it work that transitioned under Sorel Reisman to the STCs, the Special Technical Communities, which utilized that same technology concept and had a little bit more formality around them. But we still had not developed a good set of tools that makes it easy to make it happen, easy to manage, easy to get in and get out. IEEE has been going through the exact same efforts for about 10 years. They started back in 2002, 2003 with some capabilities, which were very limited. I actually chaired a committee on IT technical strategy. Neither the Computer Society nor IEEE has been able to land that fish. Our most successful virtual communities are on LinkedIn and

Google groups, and Yahoo groups. Not ones that have been developed internally or outgrowth of our internal activities, which is, in my opinion, very frustrating. We need that ability for that dialog inside.

[NOTE: Walden instructed no transcription of following remark.]
[Off-the-topic remark by Walden]
[NOTE: Walden instructed picking up transcription.]

Walden: Another thing you did was the presidential blog. How did that go?

Isaak: Well it was fun. I'm not sure we got a lot of traction with it. I tried to continue it after I was president, and now blogging with the Society for the Social Implications of Technology, I'm one of the lead bloggers there, which is also very low visibility. The place where we have high visibility is in things like LinkedIn, where we have groups that communicate. As I said, I have a group, and IEEE has a group, and the Society for the Social Implications of Technology has groups, and there we're seeing dialog, there we're seeing interactions. We actually have controversies with people disagreeing and agreeing, and those things. And that's what you need, actually, for that kind of thing. Of course, realistically, as President of the Computer Society, there's not a lot of controversy you want to get into. There are some things worthy of raising as a society with that hat on, most of the stuff is more informative and inspirational, hopefully, and things like that. I noticed that Sorel Reisman and David Grier have gone to video blog-type things, which, I think, in a way may be good because you don't expect in a video to be able to respond. And for the president, I think you need to be able to say what you need to say, help people get the message, and if they want to provide feedback you welcome it but the blog begs the more interactive situation.

Walden: The first year I was the Chair of the History Committee, I was interacting with Sorel all the time, since he had invited me to be the Chair of the History Committee. It seemed like he was traveling all over the world all that time. I presume that you had a lot of travel as well, while you were president?

Isaak: Oh, yes.

Walden: Tell me about how you view the international aspect of the Computer Society.

Isaak: Well, in many ways, of the two most obvious international engagements we have, one is conferences because we take our conferences everywhere. Not all of our conferences are clearly aligned with Computer Society in a way that makes the Computer Society visible, remotely; quite often it's just the conference and not the society. But if the president goes, you actually are clearly carrying a banner for the Computer Society and that's highly valued internationally, in ways, I think, we underestimate, for those of us in the U.S. There is an annual … the Japanese Computer Information Processing Association always invites the president of the computer society to come and talk at their annual event. We always accept. There're very good relationships between the two organizations as a result of that, among other things. But the Computer Society maintains a visibility and credibility in Japan through that, that it wouldn't have otherwise. I went to the IFIP Conference in Australia, and we subsequently withdrew from IFIP; but a lot of that was to understand what is IFIP doing? How do we relate to it? How does it relate to us? Does it make sense to be involved? Are we complementing each other's missions or are we really not in the same space? It turns out that the conclusion was that we really aren't in the same space. We could've invested more resources to try and align the groups more closely, and I think IFIP would've welcomed it; I think they viewed the Computer Society as an important asset that if we had been willing to invest to help bring them where we needed to go or where we wanted to go, they would've gone with us. But at the point, we just didn't have the assets to invest in that so we had to back away and say hey, we really can't take the lead here. But it's that kind of thing. A lot of our presidents have focused on China, or on India. I didn't do either of those but others have, and you need to be visible in these areas. It's back to that network and the people you know, and contacts. And having been to those places you say oh, I know those folks, they know me, and we can now carry on our activities with that understanding.

Walden: You've received a number of IEEE and Computer Society awards. I'll actually write them into the transcript so they're on record as part of this transcript. But I am interested, in particular, in what is a Stanford Computing Pioneer?
[From http://www.jimisaak.com/bio:

- **1994 Recipient of the IEEE Computer Society "Hans Karlsson Award" for "Outstanding Leadership and achievement though cooperation"**
- **2000 Recipient of IEEE Third Millennium Medal**
- **IEEE Computer Society "Golden Core" recipient, 1997**
- **Outstanding Contribution Award; IEEE Computer Society,**
- **July 1989. "For outstanding technical achievement in the development of the POSIX Standard (P1003)"**
- **IEEE CS Technical Committee on Operating Systems, POSIX Pioneer recognition (1988), "For contribution to the formation, growth, and adoption, of the IEEE P1003.1 Standard."**
- **Stanford Computing Pioneer, 1987**

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Isaak: Jim Bell, who was at Hewlett Packard at the time — I was on a board of directors with him, some small consortia — decided that there were people involved in computing at Stanford, early in Stanford's computing history; and since Hewlett Packard's headquarters were right next to Stanford and there was a strong relationship, he wanted to tout the flag and talk about computing pioneers at Stanford, and he knew I was an early graduate out of the program there, so he identified this community of people who got that designation, of which I was one. That, and $10 will get you a cup of coffee nowadays.

Walden: And Jim Bell, who is he?

Isaak: He was the Director of Collaborative Activities at Hewlett Packard a thousand years ago; in the late 1980s, mid-1990s; 1995, 1997, that time frame.

Walden: Had he been at Digital at some point?

Isaak: Probably. Everybody was.

Walden: You were the president; you've continued in activity in professional societies, and now you're running for the IEEE Technical Activities Vice President, or have you won it? You're a candidate?

Isaak: I'm a candidate. The election actually starts today so I will know in about six weeks whether I've won.

Walden: I'll vote for you.

Isaak: Oh good.

Walden: Why are you doing that?

Isaak: Well, two things. First of all, IEEE and the Computer Society … the Computer Society is so large it almost tends to ignore IEEE and that's not wise. IEEE is our parent organization and a lot of what we do in the future in not isolated into a single field. If you look at something like Smart Grid, crossing electrical control and power and computing, you see that there's a huge impact across more than one field and IEEE is one of the few places where that dialog can take place. So people in the Computer Society need to be involved in IEEE leadership and so forth. So that's good; we occasionally do it; we always have people on the board of directors, but we rarely have people actually taking on the IEEE lead roles. The last Computer Society president to become an IEEE president, I believe was Martha Sloan. I don't aspire to become IEEE president. That is a thankless task in many ways, but the Vice President of Technical Activities is a place to really impact how IEEE thinks about managing its technology and where historically we have fought each other about who owns — RFID, I'll go back to that example — that's not the right way to move forward. We've got to work on the basis that yes, this is a field that belongs to us, let's embrace it and discuss later how to manage it. So I think I can contribute to IEEE's technical activities in that area; of course advocating for virtual communities. [Laughs.]

Walden: You've written on your web site —you have several pages that relate to what I assess as the value of professional societies. Say a few more words about that.

Isaak: Sure. I think, again, people do not understand what they can get out of the Computer Society or any of these societies. If you get involved with these people, first of all, you build a network and we alluded earlier to how that network can get you jobs, how that network can get you visibility within the society, for advancement. I've had opportunities; the Computer Society; I had a free trip sponsored by the U.S. government to Hungary some years ago, just because of the network of people and the fellow who was involved in the Computer Society said yeah, that Isaak guy, he might be able to contribute something to the discussion, let's invite him to join us. So if you're not there, you don't have the opportunities. So that's one thing. The second one is problem solving. You sit down and you start talking to people; and one of many who quite often finds it easier to solve a problem when you're sitting there talking about it. The perspective that comes from outside of your own workplace can really be important. Classic example of that with standards activity, it's not totally from outside the workplace, but we had battled in POSIX standards about a particular feature in the standard for probably two or three years and finally had said we're going to take it this way, not because we're convinced it's the right answer but we know we need to answer this question and move on. So we did. And then about six months later somebody walked in the door with a different perspective and said I want to join this activity but you've done it this way and it's wrong. Oh my God, three years of battling and here's this guy going to open up a bag of worms. Five minutes later, we were all convinced we were wrong. He came in with a perspective, we looked at that, we said you're right, we've got it wrong, we have to fix it. Everybody agreed and we went on in a different direction. You can get into a community that's so isolated that you don't see another view and with engagement with these activities, professional activities, local society activities at the chapter level, section level, conferences. If you talk to people who understand conferences they'll tell you the important thing about conferences is not what's being presented, it's the discussion in the hallways. That discussion in the hallway occurs at every IEEE activity, whether it's a section meeting, whether it's a Board of Governors meeting of the Computer Society, they're constantly having a discussion in the hallway. The discussion in the hallway gives you insight into where you need to go; what you need to do; it gives you contacts to help you solve a problem. So when I figured that out. I started calling people saying I have a

problem. People would say, I know somebody who knows something about that; let me call George, or Martha, or Mary; and lo and behold, I'd have an answer that might've taken me days or months to find on my own. In innovation, I've walked away from activities and discussions and you start thinking about it; you go in and you say, you know, here's an idea and we could tap into that. The only patent I actually have was generated from that kind of interaction, thinking about it. It's really your idea; it's not that you're getting … but it's then triggered by the dialog, by the problem awareness that's come out of these discussions. But people don't realize that; industry doesn't realize that. If industry really understood what these activities did, they'd be getting their people out there because they'd know that they'd expand their effective employee base by a factor of two or three because each person that's out there has these additional contacts that they can leverage to solve the problems a company faces.

Walden: Over the course of your career, you've done a lot of writing. I have your papers, and publications, and presentations list here. Not every engineer is a productive writer. How does writing fit in with the rest of your career?

Isaak: Actually, probably the first paper I ever wrote was that one on professional; or Personal Computing, Standards for the Personal Computer and I learned a lot from doing that because I submitted it for peer review and got rejected with comments back. I revised it and re-edited it; I actually submitted a copy to Bob Noyce and got his comments back; revised it and edited it as well. Writing with impact, I think, is a critical aspect for anybody in technology. Even an e-mail is a written communication. I learned at some point; in fact, when I left Intel the group asked me what would you like as a going away present? I got a pen on a little marble base with a little label. The little label, I said, I want it to say "Think Pen." Now, the reason I had it say that is, think before you write pen. With e-mail you have to think twice before you hit send, so you develop a discipline of both trying to think about what you write before you write it, or even after you've written it before you hit the send button; and then also, the second stage of that is what do you want to accomplish? Why are you writing this and what do you want? If you look at my list of publications, most of them are actually practitioner publications and a lot of what I

was doing was effectively infomercials. Now, that sounds horrible; sounds like the TV QVS channel promoting ginsu knives. Pascal is a classic example. When I was at Data General I was the product manager for Pascal, the computing language. And Pascal is a deliberately defective language; there were things that were not put into the language because it was not intended to be a production language, it was intended to be an educational tool. But it was a very good language and so I wrote an article about the pitfalls of Pascal, in which I documented out what those pitfalls were, you know, what was wrong with the language. Well, it turns out, of course, Data General's product addressed all those; but I didn't say that. I just simply laid out the story and people started contacting me and saying how do you deal with this problem; you can't build a real system without this capability. Well, you need this kind of functionality added to it, which is Data General's; well of course, Data General's has it. So that was informative, visible, and had fairly good impact. Did the same thing with the UNIX community, as well.

Walden: These days you maintain a blog more general than for the Society for Activities … Implications; I can't remember the title of it.

Isaak: Society for the Social Implications of Technology, that's my primary blogging activity. It's fun because you get to talk about NSA and what are they doing recently; or what does this lawsuit do; or what does this technology mean; is this a privacy issue; and so forth. So they get a lot of chances to throw that out and get a lot of people talking about it. I've also done a couple blog entries recently related to the technical activities candidacy and to help outline some of the problems I think people are dealing with there. And then also I try to maintain the interaction with LinkedIn, which is not exactly a blog. There's a group there and there are discussion threads; there are some threads I've tried to be sure are kept active and visible and, for that matter, civil; occasionally you get somebody who's out of line in those kinds of environments and you want to try and bring them back in or delete the entries. So those are activities I've been trying to maintain.

Walden: You also say you write science fiction.

Isaak: Yes.

Walden: Where does this urge come from?

Isaak: Well, it's the same exact urge as that I had when I wrote my article for *Computer* Magazine on the future of personal computer, only looking a little further forward and with less technical awareness of what's actually going to go on there. This is August of 2013; I mention that because the *Proceedings of IEEE* this month has an article by me, and it's a science fiction story. I envision in that what the world of IEEE look like in the year 2063, which is the 100th anniversary of the merger of IRE and AIEE, forming the IEEE. So I created a hypothetical awards ceremony, taking the traditional electrical awards ceremony, and then laying it out with a few new awards because after all, things will change; I've taken some of the awards and naming them for specific people. There's an IEEE Entrepreneurial Award; I decided that should be the Elon Musk Entrepreneurial Award, naming it for the founder of Tesla/PayPal/all his other things; he's in SpaceX, too, now that I think of it. So it seemed like an appropriate award to name after him. Vint Cerf [is the namesake] for the Social Impact Award because he has a very strong interest in that area. So I have named some things after some people, but then I designated what the awards were and who got them for what reason. Now, the people are all hypothetical but the reason that they received the award; this person invented this, or something, or do this, is sort of a fun thing to look at because it gives you a way to look forward 50 years and say what might be happening out there and what does it feel like for us at this point. So it was fun. And, by the way, the president of IEEE of that year is a machine intelligence. [Laughs.]

Walden: And is what you're describing here part of what you're calling "predictive" science fiction?

Isaak: Yes, exactly. The idea is if you write science fiction "hard," that is to say, applied to scientific reality as we understand it, and look forward I would say 50 years but maybe

as much as 300, you start then saying well, what does that mean, and what did that do, and should we really go there? The things we face over the next 50 or 100 years in terms of technology are both exciting and frightening. And if you don't feel both of those you probably haven't looked closely enough at what's going on. But the only way we can manage it, at the rate of technology advancement right now, and think about it, is to think in advance. After somebody introduces the whatever-it-is, it's going to be too late; that cat's out of the bag. So we have to see some of this in advance to be able to think about it. Is that a good way to go? Or how do we manage that? Or what will we do when that gets here? Asimov did that with his rules for robotics, his infamous Three Laws, I guess.

Walden: Three Laws. You say you don't aspire to be a bestselling author, yet you suggest maybe your daughter is or does. Who is your daughter?

Isaak: Oh, yes. She's a serious…; well now there's an interesting question. She just published a book this last month.

Walden: What's her name?

Isaak: Well, under the name of E.C. Ambrose, and that's a pen name because she's writing in a dark fiction genre, which is not — it's not nice [laughs]— dark fiction, dark fantasy is uncomfortable for me but there are a lot of people like that. Stephen King is in that space. She'd love to be in Stephen King's league. But she does that under a pen name because that's different from, for example, she's now editing a romance magazine. Needless to say, if you build a visibility as a romance author and somebody reads some of your dark fantasy, they're going [to say] "hold on, I'm in the wrong place." So you use different names for different purposes. I guess she does that, too, out on the internet, now that I think about it. But, yeah, the first book is called "Elisha Barber"; takes place in the 1300s in England. Barber is a barber/surgeon, which is a person who does both medical procedures and, I suppose, cuts hair, although I'm not sure how much haircutting takes place in the story. It's a dark time frame, and she throws a little magic in on the side. So she's the serious author. It's interesting; my daughters have all become members of

professional societies in their professions. She's a member of the professional society in terms of a romance writer; she's a member of the professional society for novelists and for fiction writers; and attends the conferences for those organizations, and so forth. So she's professionally engaged as an author, just as I'm professionally engaged as a computer person. My other daughter is a lab manager for animal testing labs, testing with experimental labs, and she's involved with professional societies and goes to her conferences, and does those things.

Walden: Do you have other children?

Isaak: No, just two daughters; and I have grandchildren, which are too young to be professionally involved, yet.

Walden: Aside from all these other things you're doing in your so-called retirement years, what else? Do you have other hobbies, and so on?

Isaak: Traveling cross country has become one of them. We have a cabin in Colorado where you first contacted me; I think I was in Colorado. So we go there every year at least once, and drive across country. It's a fascinating thing to do. It's actually fun driving around other countries, too. When I was in Australia we had a chance to take another week off and just drove north out of Brisbane to other parts of Australia. Seeing countries at the foot-on-the-ground level is fascinating. You run into people, you run into the culture, the agriculture — the kangaroos, in that case — and just; the same thing in Europe. I've had a chance to drive around Europe, a bit. I had more difficulty in a country where I couldn't interpret the character set. I would be concerned about trying to drive around Japan or China.

Walden: Whose vegetable garden is this outside your garage door?

Isaak: Oh, my daughter and wife both do some [gardening].

Walden: You're not a vegetable gardener?

Isaak: Not seriously. I participate.

Walden: So, is there something you think I should've asked you about that you want to talk about? If so, please do.

Isaak: Ah. I guess the only thing that immediately comes to mind is that I think that one of the other activities that I've been involved with that we didn't discuss at all, is IEEE USA. I mention that because that's the policy body in IEEE that tries to influence U.S. policy and industries like power and telephone industry that are regulated by the government both at the state and federal level. Professionals in those industries understand the role the government has and the impact it has on their professions, and are typically involved. The computer industry doesn't and that's a great deficit for the computer industry, both as an industry and for the professionals. We are not involved in the dialog of policy the way we should be and I worry a lot about individual professionals in our field being caught in what is essentially other peoples' interpretations of how computing should be managed. A classic example is the transformations taking place in patent law over the last five years. I think in the computer world; first of all, you can argue whether software should be patentable or not. It's a dialog with the computer society and computing officials should be aware of and patents may be, patentability of software may be eliminated in the near future and that may be good or bad. But if professionals aren't involved in that discussion they won't have anything to say about it; and they won't be because the computing professionals simply don't think in those terms. The flip side of that is if you invent something we really neat, the cost for filing a patent has just gone up dramatically and that's going to discourage entrepreneurs in the computing industry, among others, and it's a dialog I don't think our members and our professionals have been in or aware. They'll trip into it one of these days and say, I didn't think a patent cost that much or that it takes that much effort to get it put in place. And it's like, oops. The fee to enter has just gone up, and it's not to the advantage of the

individual professional, in my opinion. So we need to keep our eyes on those things and keep people involved, and we aren't doing it.

Walden: Well thank you for inviting me to your home and taking the time to do this interview. It's been really interesting and I've enjoyed it.

Isaak: Thank you for coming out, Dave, and having such interesting questions to throw out.