Laurence B. Milstein

Interview conducted by

Caroline Simard, PhD

January 30, 2004

San Diego Technology Archive

The Library
UC San Diego

Laurence B. Milstein

Larry Milstein joined the UCSD faculty in 1976, and is a former chairman of the Electrical Engineering and Computer Science department. He earned his Ph.D. in 1968 from the Polytechnic Institute of Brooklyn. From 1968-1974, Milstein worked on satellite communications in the Space and Communications Group of Hughes Aircraft Company, and from 1974-1976, he was on the faculty of Rensselaer Polytechnic Institute, NY. An IEEE Fellow, Milstein has served on the Board of Governors of both the IEEE Communications Society and the IEEE Information Theory Society. He has been a consultant to both government and industry in radar and communications. He is also a member of Eta Kappa Nu and Tau Beta Pi.

Source: Bloomberg Businessweek

THE SAN DIEGO TECHNOLOGY ARCHIVE

INTERVIEWEE: **Lawrence Milstein**

INTERVIEWER: **Caroline Simard, PhD**

DATE: **January 30, 2004**

LOCATION: **San Diego, California**

SIMARD: And so you were part of the founding of the Center for Wireless Communications?

MILSTEIN: Yes. I was the founding director of it.

SIMARD: And can you tell me about, a little bit about what led to the founding and what were the kind of relationships between UCSD and Qualcomm, or other industry?

MILSTEIN: As best I can recall, I think the original idea was from former Chancellor Dick Atkinson of UCSD. I believe it was his original idea. But, this is not whom I got the information from. I got it from Lea Rudee, who was the . . .

SIMARD: Lea Rudee?

MILSTEIN: Right. He was the Dean of Engineering at the time. I was asked if I would put such a center together. And, my response was, "Only if there was matching motivation on the part of the industry." I had no interest in twisting peoples' arms to do this, and it's just not my personality anyway. And so, he then arranged a meeting, as best I can recall, with a whole bunch of industry companies, easily twenty-some odd, and most of them were enthusiastic. And, the reality was that maybe a year and a half later, when the center was formed, there were seven members. But, of the twenty-some odd companies that came to this first meeting, some reasonable subset, maybe half, seemed interested and sort of formed like working groups. We'd meet periodically and discuss what the Center should be doing, and how many faculty

should it have, what was the commitment the industry people would make, and so forth. It took pretty close to precisely a year and a half, to actually get it going. The vast majority of the time was interacting with company lawyers on intellectual property rights. Again, I would say we probably spent more time on that than on everything else combined.

SIMARD: Yes. That's always…

MILSTEIN: But, ultimately, seven companies joined. They were the founding members. TRW was one of them. Nokia was one. Fuji Electric, Qualcomm. A small company back east called Steinbrecker. Hughes Network Systems, and Pacific Communications Sciences, Inc. (PCSI).

SIMARD: That was '97, wasn't it?

MILSTEIN: No. No. It was earlier than that. That was from – I don't remember exactly, but it was probably the vicinity of '94, maybe '95. But, that's what got it going. Then we were able to get from the university quite a few faculty positions, especially in communications. We had a group here, just in communications, of roughly a half dozen faculty, myself being one of them. We've doubled it, primarily because of the Wireless Communications Center. That motivated the university itself and higher up, probably all the way up to the university president's office in Oakland to agree to support us. And, we expanded very much in communications. We expanded quite a bit in circuits. Those were probably the single biggest areas of expansion. And so it ended up being very good and we brought in a lot of good people.

SIMARD: Who are the original faculty members? Were there – and I understand now there's twenty faculty members?

MILSTEIN: Yes. That order.

SIMARD: Which is very big. That was still . . .

MILSTEIN: When it was originally founded prior to our recruiting, certainly Ramesh Rao was one of them. And, as best I can recall, Joe Pasquale in Computer Sciences.

SIMARD: Was Tony Acampora one of them early?

MILSTEIN: No.

SIMARD: He came later?

MILSTEIN: Yes. He was brought in as the first permanent director.

SIMARD: Oh, right.

MILSTEIN: He was one of these half dozen people that we brought in. We also brought in Paul Siegel, who's now the Center director for CMRR, the Center for Magnetic Recording Research. So, he actually does research both in magnetic recording and wireless communications. Pam Cosman, she was brought in in the area of image processing. Ken Zeger, he was brought in at the same time we recruited Pam and in an area very close to her, i.e., data compression, source coding. Alon Orlitsky, he was brought in the general area of information theory. That's five we brought in. The sixth person was brought in a few years after that, a fellow named Alex Vardy. He also is a coding theorist, like Paul Siegel. So, those were the six people. And, again, Tony Acampora was brought in as the permanent director.

SIMARD: Permanent director?

MILSTEIN: And we also had an extra slot in communication networks. Rene Cruz, I'm sure, was another original member. Rene Cruz, Ramesh Rao they were the two network people. Tony Acampora, that's his area as well.

SIMARD: And so, well did you always have the same model of intellectual property sharing with the companies?

MILSTEIN: No. That has evolved.

SIMARD: How did it start? Was there . . .

MILSTEIN: I can tell you how it started. The way it started was that anything that appeared to have intellectual property associated with it would be written up and distributed to all the member companies. And then they would have a certain number of days in which to respond as to whether or not they were interested in pursuing it. And, if at least one company was interested in pursuing it, there was then a certain number of additional days whereby faculty would not be able to publish it.

SIMARD: Okay.

MILSTEIN: And, I think the total number of days – now this is going to sound silly, because I'm going to be off by a factor of two here, but I think the total number of days was either forty-five or ninety. I just don't recall which one it was.

SIMARD: Well, the forty-five to ninety. [Laugh]

MILSTEIN: Now, now the general guideline was the following. If the invention was made solely by a university faculty member, in conjunction with a doctoral student, then the university owned it fully. If on the other hand it was made jointly by at least one person from the university, and one member from one company, then it would be owned jointly but even then there was a caveat. It would be owned jointly by the university and those companies that agreed to participate financially in securing and maintaining the patent. So, for example it would be at least possible that the inventing company might not want to pursue this financially. They would not own the patent.

SIMARD: Right.

MILSTEIN: All right? Let me just – wait. That's not correct what I said. No. No. I'm sorry, I said that wrong. Because, that's closer to the model today. The original model was that…

SIMARD: It's complicated always.

MILSTEIN: It's been a moving target. Okay, if it was co-invented by at least one university employee and one employee from one member company, then it would be owned jointly by all member companies and the university. Sorry. I got that wrong.

SIMARD: Okay.

MILSTEIN: The reason I got it wrong is because it was the companies that originally wanted this model, and then after time went on they decided they didn't want this model.

SIMARD: They didn't want to fight among them?

MILSTEIN: Exactly. They didn't want to compete against the other. Company X underbidding Company Y. So, I can't exactly tell you what it is today, but Larry Larson surely can. He'll give you the rest.

SIMARD: Yes. He really explained to us the model today.

MILSTEIN: But, that's not the way it started.

SIMARD: Yes. Now, it's companies put money into something and then they kind of have first dibs on that intellectual property.

MILSTEIN: Right.

SIMARD: And then if it doesn't interest them, then they can –

MILSTEIN: Even then, again, what I told you is at least close to what it was.

SIMARD: Yes. But so, you're talking about some projects were joint. So, did you have company people come and sit here and do joint research?

MILSTEIN: Yes. That was the model, and it was specifically designed to encourage that. It very rarely happened

SIMARD: Right.

MILSTEIN: Because, this is not what companies are paying their employees to do.

SIMARD: Right.

MILSTEIN: Now, when it did work, and I think it still does, is because we had mechanisms whereby we would encourage companies to send what are called "visiting scholars" to the university. The curious thing is that at times we had more interaction in the context that you're talking with the companies who were overseas, who were, you now, 6,000 miles away, than with the companies who were next door.

SIMARD: They were more eager to send someone?

MILSTEIN: They would send someone and that person would be here, and that was real live interaction. The companies that were here I don't think ever sent anyone on campus for any extended period of time, or if they did I don't recall it.

SIMARD: Wow.

MILSTEIN: Now, having said that, the companies are here. You can make a day trip back and forth. So, I'm not suggesting there was no interaction.

SIMARD: Proximity always has some effect?

MILSTEIN: That's exactly correct. So, again, Larry could probably tell you more specifically who has what patents, or how many there are, or anything like that.

SIMARD: Yes. He told us about it all.

SIMARD: Have you spoken to Tony Acampora, or Ramesh Rao?

SIMARD: Well, not yet. That will be another . . .

MILSTEIN: But, you're going to?

SIMARD: Uhm-hmm.

MILSTEIN: Okay. And how about Ramesh Rao?

SIMARD: I think I'll try to contact him. Yes.

MILSTEIN: Okay. So, so like I said, I was the founding director, but Tony was the first permanent director. When he stepped down Ramesh Rao took over, and when Ramesh Rao stepped down Larry Larson took over, and he's the current director.

SIMARD: And before the center, what was your impression of the relationship between UCSD and industry?

MILSTEIN: It was probably extremely individualistic. I.e., Professor X and Company Y thought they had something in common and by the initiation of either one or the other it got started and if they hit it off then Y funded X. I don't think it was anything more than that.

SIMARD: As to the funding . . .

MILSTEIN: Now, of course, CMRR was founded in something like 1985. And so, that was always a model. In fact, when I was trying to design this guy here, I was using lots of pieces of CMRR as the model.

SIMARD: And what is CMRR?

MILSTEIN: It stands for the Center for Magnetic Recording Research.

SIMARD: Ah. Okay.

MILSTEIN: And, in fact, three faculty in this department are intimately associated with it. Paul Seigel, who was the director, and both Jack Wolf, and Niel Bertram, both of whom have endowed chairs in that center.

SIMARD: So, they were establishing some contact with industry with their Center as well?

MILSTEIN: Oh, absolutely. That Center was initiated by industry, and that building was, I think, eighty percent paid for by industry. The university donated the land and that counted for, I believe, roughly twenty percent. And, the other eighty percent came, was industrial money.

SIMARD: Wow.

SIMARD: And so, what industry put money in that?

MILSTEIN: The big player was IBM.

SIMARD: IBM?

MILSTEIN: They were by far the big player. I don't even know the current cast of characters. I think Hitachi is a very big player these days. That industry has had a lot of turnover in the sense that Company X has bought Company . . .

SIMARD: Right.

MILSTEIN: X and Y, let's just say, at a certain point in time were both members of CMRR. X bought Y and suddenly two members became one member. That's been actually the financial headache for CMRR. Because, when X buys Y and becomes Z, Z doesn't pay X's dues plus Y's dues, they pay one or the other but not the sum total. So, that's been a real, nontrivial problem for CMRR.

SIMARD: Absolutely.

MILSTEIN: And, that's just been this . . .

SIMARD: The longevity of the relationship.

MILSTEIN: That's the way that particular industry has gone.

SIMARD: Yes. And so, any salient examples of technology that originated here that went into the industrial world?

MILSTEIN: Probably. Much more so in the circuits area.

SIMARD: Right.

MILSTEIN: And that's much more likely to have a short-term transition that again Larry Larson would have been a great person to talk to about that, or Peter Asbeck would be another person.

SIMARD: We've talked to Larry a little bit about that yesterday and he named some examples of it.

MILSTEIN: Okay. In fact, you were asking about the original faculty, probably Peter was one of them as well. That would be my guess.

SIMARD: Then, so that, when you started the Center it was really first that by Atkinson, and was Irwin Jacobs involved in pushing for it? Or, that's not that you had?

MILSTEIN: Yes. Again, to the best of my knowledge, and this is second-hand information, I believe it was suggested to Lea Rudee, the former dean, by Dick Atkinson. What I can tell you for sure is that Lea Rudee approached me, perhaps in response to my response that I would be willing to do it, but only if I knew a sufficient number of companies were willing to participate. As best I recall he and Jacobs arranged this first joint meeting that I told you about, which probably drew twenty-some odd companies. To the best of my recollection, that was the way it got started. And then Lea Rudee actually stepped down as dean, and Bob Conn took over as dean. He was the one who really made the whole thing happen. He was extremely dynamic, and very much pushed this, and I think more than anyone else he deserves the credit for its formation.

SIMARD: Well, we'll try to talk to him.

MILSTEIN: Yes. He's not with the university now.

SIMARD: Okay.

MILSTEIN: He left maybe a year or two ago. He's in San Diego with some venture capital company.

SIMARD: Oh right. And was access to students a big, already very important to those companies?

MILSTEIN: Yes. I think so.

SIMARD: "We want your graduates?"

MILSTEIN: Yes. I think access to students and the potential for intellectual property, I think those were the two drivers. I don't think, for example, it was research.

SIMARD: Right.

MILSTEIN: That was the driver for the faculty.

SIMARD: Right.

MILSTEIN: I don't think it was the driver for the companies.

SIMARD: Right. And, do you know of many students that left UCSD and then started companies in the area?

MILSTEIN: Yes. I think there's probably a reasonable number of them.

SIMARD: UCSD faculty started companies too, did they not?

MILSTEIN: Yes, that's correct. If not started, certainly been involved in . . .

SIMARD: In the founding?

MILSTEIN: Yes. Exactly.

SIMARD: But, from those you know, the faculty typically stayed one foot in the university, one foot in industry, like kept their university job and then were involved on the side with founding? Or, have many tended to jump ship?

MILSTEIN: Well, when I was here . . .

SIMARD: If you look at biotech and most of them stay in the university.

MILSTEIN: Yes. I think that's the way it's been, at least in this department.

SIMARD: Yes. People tend to stay with the university mainly?

MILSTEIN: Yes. Right.

SIMARD: Well, thank you so much.

MILSTEIN: You're more than welcome.

SIMARD: It's been very helpful. Thank you.

MILSTEIN: Best of luck on your research.

END INTERVIEW

Recommended Citation:

Milstein, Laurence B. Interview conducted by Caroline Simard, January 30, 2004. The San Diego Technology Archive (SDTA), UC San Diego Library, La Jolla, CA.

The San Diego Technology Archive (SDTA), an initiative of the UC San Diego Library**,** documents the history, formation, and evolution of the companies that formed the San Diego region's high-tech cluster, beginning in 1965. The SDTA captures the vision, strategic thinking, and recollections of key technology and business founders, entrepreneurs, academics, venture capitalists, early employees, and service providers, many of whom figured prominently in the development of San Diego's dynamic technology cluster. As these individuals articulate and comment on their contributions, innovations, and entrepreneurial trajectories, a rich living history emerges about the extraordinarily synergistic academic and commercial collaborations that distinguish the San Diego technology community.