

Lawrence E. Larson

*Interview conducted by
Caroline Simard, PhD and Joel West, PhD
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Lawrence E. Larson



Dr. Lawrence E. Larson received the BS in Electrical Engineering from Cornell University, Ithaca, and a PhD from UCLA. From 1980 to 1996 he was at Hughes Research Laboratories in Malibu, CA, where he directed the development of high-frequency microelectronics in GaAs, InP and Si/SiGe and MEMS technologies. He joined the faculty at the University of California - San Diego, in 1996, where he was the inaugural holder of the Communications Industry Chair. He was Director of the UCSD Center for Wireless Communications from 2001-2006 and was Chair of the Department of Electrical and Computer Engineering from 2007-2011. He moved to Brown University in 2011, where he is Founding Dean of the School of Engineering. He has published over 300 papers, received 40 US patents, co-authored three books, graduated 23 PhD students, and is a Fellow of the IEEE.

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12 **SIMARD:** A big part of our interest is the role of university-industry interfaces in the original
13 economy. Obviously I thought that the Center for Wireless Communication was an important
14 component. It wasn't here at the very beginning, but it was created in '95?

15 **LARSON:** Ninety-five. That's exactly right. Yes.

16 **SIMARD:** Do you know how it was created? What was the motivation?

17 **LARSON:** It was like many things here in San Diego. I think Irwin Jacobs had a lot to do with its
18 founding. He had been pushing for UCSD to get something like the Wireless Center going for a
19 number of years. Things move very slowly at universities, and there's a built-in inertia, and it
20 required kind of catalyst on our side to really make that happen. Bob Conn was a fairly recent
21 dean. I believe he joined in '94 or '93, from UCLA. Bob was a very dynamic kind of guy and he liked
22 to form these university-industry partnerships. So he got together with Irwin and they finally
23 decided that, "Yeah, this really would be a great thing to do." And so, Bob started to push it here
24 on this end, and Irwin began to push it from the industry side in the sense that he brought in
25 people from other companies that would step up to the plate and support the Center. I was not

26 here at the time, but there were a whole series of endless meetings, apparently, involving Bob and
27 Irwin, and Larry Milstein, who is the founding director of the Wireless Center. Together they
28 started off with maybe thirty companies that expressed some initial interest, and eventually a deal
29 was struck and the Center was created with five, I think, founding industry partners. And, that got
30 us going. So, I think that, the combination of Irwin's persistence and – [Joel West enters] hi.

31 **SIMARD:** Hi.

32 **WEST:** I'm a bit late.

33 **LARSON:** Oh, that's okay. I'm Larry Larson.

34 **WEST:** Joel West.

35 **LARSON:** Joel. I'm sorry. Have a seat.

36 **SIMARD:** We were just talking about the founding of the Center and how it came about.

37 **LARSON:** I think the combination of the persistence of Irwin and Bob Conn's leadership here at
38 the school, and Larry Milstein's patience and persistence too. And ever since then . . .

39 **WEST:** What year was that?

40 **LARSON:** That was '95.

41 **WEST:** So, this is before the naming grant for the school, is that correct?

42 **LARSON:** The naming grant by the Jacobs?

43 **WEST:** Yes.

44 **LARSON:** That's correct. Yeah.

45 **SIMARD:** Right.

46 **WEST:** Okay.

47 **LARSON:** That was '98, '99, something like that.

48 **WEST:** Other than the fact he used to teach here, what kind of relationship had Irwin Jacobs had
49 with the school before the Center was founded? I'm sure there must have been some sort of
50 informal or ongoing relationship with all his former colleagues, and feeding students, and so on
51 and so forth.

52 **LARSON:** I came here in '96, so this is sort of before my time.

53 **WEST:** Was there an institutional linkage? I mean, was there a precursor to the Center?

54 **LARSON:** I don't believe there was any institutional linkage, formerly.

55 **WEST:** Okay.

56 **LARSON:** There were a lot of informal, ad hoc kinds of things. We have many, many ex-students
57 here that are very high employees at Qualcomm.

58 **WEST:** Right.

59 **SIMARD:** Uhm-hmm.

60 **LARSON:** And Andy Viterbi was here as a faculty member.

61 **WEST:** Really?

62 **LARSON:** And he went on . . .

63 **WEST:** I thought he had been, I thought he went straight from UCLA to Linkabit? So, he actually

64 taught here?

65 **LARSON:** He did. He had a – and once again, this is before my time, so I may be getting the facts
66 slightly off. But, he had a part, not a part-time . . .

67 **WEST:** Maybe adjunct?

68 **LARSON:** It wasn't adjunct even. One could have a full appointment or a half appointment, and
69 he had a half appointment.

70 **WEST:** Oh, because he had been tenure-tracked in the UC system, so probably was using that?

71 **LARSON:** Right. So, he came in and he would teach. He was basically sort of half-time.

72 **WEST:** Okay.

73 **SIMARD:** Right.

74 **WEST:** So, he was teaching here long after Irwin stopped teaching? Right?

75 **LARSON:** That's correct.

76 **WEST:** Okay.

77 **LARSON:** He was. Yeah. Then he sort of switched over to adjunct professor at a point and I think
78 he was an adjunct up until quite recently, maybe just until two or three years ago.

79 **WEST:** Yeah. And as I recall, he was keeping his textbook current through the '90s?

80 **LARSON:** Right.

81 **SIMARD:** Yeah.

82 **LARSON:** Yeah. I think that's right.

83 **WEST:** I hadn't even thought about that. I was thinking, why would somebody who's running a
84 company be keeping their textbook up to date? The only people that keep textbooks up to date
85 are people in the classroom.

86 **LARSON:** Well, he just wrote a book on CDMA that came out two or three years ago, so he's still
87 active, technically. He's still a pretty deep technical guy.

88 **WEST:** Now, did he play any role in the Center, or was it more Irwin and the business?

89 **LARSON:** I think it was more – actually, one of the things about the Center, which I appreciate, is
90 that we are sort of perceived externally as being very heavily tied with Qualcomm. But, that's
91 really not the case. In fact, they're quite hands-off in terms of the administration. They're no
92 different from any other company.

93 **WEST:** But, they did put in a lot of the money to get it started, right?

94 **LARSON:** No more than any other company.

95 **SIMARD:** No more?

96 **WEST:** Okay.

97 **LARSON:** No more than... There were five initial companies, Fuji, Hughes Network Systems, TRW,
98 Nokia, and Qualcomm, and they all put in the same amount of money. Now, Irwin was very . . .

99 **WEST:** Nokia in '95? I didn't know Nokia even knew San Diego existed in '95?

100 **LARSON:** They had a small group.

101 **SIMARD:** Yeah. They already had opened their CDMA group.

102 **LARSON:** Every one of those companies that I mentioned had a group.

103 **SIMARD:** They opened in '91.

104 **LARSON:** They had a strong local presence.

105 **WEST:** Okay. What was Fuji's interest then?

106 **LARSON:** Fuji may have had a local division here at the time. Fuji is very interested in wireless
107 sensors. They do a lot of work on wireless poles, these smartcard types of things, and on
108 smartcards. Actually, I'm not quite sure. They don't have a local presence. They may have had
109 one back in '95 but I don't think they do anymore.

110 **SIMARD:** What was the fifth company? You mentioned Fuji, TRW, Nokia, Qualcomm, and?

111 **LARSON:** And Hughes Network Systems, HNS. Irwin certainly put in a lot of time, but from a
112 corporate perspective, Qualcomm has never put in more than anyone else.

113 **SIMARD:** Do you have the members over time? Lists of the members?

114 **LARSON:** We do. I could get you that.

115 **SIMARD:** That would be great.

116 **LARSON:** I don't have it off the top of my head. We're actually up to, I think, sixteen members
117 right now. We've been as high as sixteen, and then during the downturn it was down to thirteen,
118 and now back up to about sixteen. But, we do have a fair amount of companies that have financial
119 issues that come up that prevent them from continuing. You know, Hughes Network Systems has
120 had a horrible time here locally, financially, and so they were a founding member that finally has
121 left us. Most of our founding members are still with us, and we've grown over time.

122 **SIMARD:** So, what is the model? Companies pay a membership and then what do they get, access
123 to research, or the technology?

124 **LARSON:** Yeah. They get a little bit of everything. They get lots of different things. They get
125 access to the research. There are a couple ways access can come about. One is just through, we
126 have twice-a-year research reviews, which are pretty intense two-day affairs. They send their best
127 engineers to our research reviews and hopefully they get access as they're talking. There's also an
128 IP agreement that we have with our companies, where they get early access to the IP, and nobody
129 else outside the Center gets access to it for a period of time.

130 **WEST:** How long is that period?

131 **LARSON:** It's sort of two and a half to three years. There are some vagaries in the patent process
132 that make it somewhat obscure. And, the patent has to be actually issued. So, if the two and a
133 half year window expires and the patent hasn't been issued, then the window keeps going until
134 the patent is issued.

135 **WEST:** Now when you say "access to IP" . . .

136 **LARSON:** That means patents, usually.

137 **WEST:** Well, I was going to say, the "access to patents" and "access to trade secrets" are very
138 different.

139 **LARSON:** Right. Right.

140 **WEST:** So?

141 **LARSON:** We do not do trade secrets.

142 **WEST:** Okay. So, it would be patents or copyright?

143 **LARSON:** Or a copyright. There has been some software that we have considered copyrighting,
144 but we haven't gone down that path. That would be another possibility.

145 **WEST:** So essentially, they can license the patents before anybody else so that people can't
146 license them until it's issued?

147 **LARSON:** Correct.

148 **WEST:** So, they can license the IP, which is not yet patent granted, before it's patented, whereas
149 everybody else has to wait until the patent's granted?

150 **LARSON:** Or two and a half years.

151 **WEST:** Okay.

152 **LARSON:** If the patent is granted before the two and a half years, they're still the only ones who
153 can get it. So, they get a minimum of two and a half years, and then more if the patent is filed.

154 **WEST:** Who pays for the patent filing?

155 **LARSON:** The companies do, and those who are interested. When we have a patent disclosure we
156 ask them, "Is anyone interested in potentially licensing this?" If they do express an interest then
157 they have to share in the patent costs amongst however many companies. Typically . . .

158 **SIMARD:** But, they do not own the patent in any way during that process?

159 **WEST:** It's still owned by the Regents of . . .

160 **LARSON:** That's right. Yeah. UC always owns the patents.

161 **SIMARD:** Do you go through the TTIPS [Technology Transfer and Intellectual Property Service]
162 Office at all?

163 **LARSON:** Exactly right. Yes. We go through TTIPS.

164 **SIMARD:** So, they work with the companies?

165 **LARSON:** Yes, to license it. Put a license agreement in place. The most common license
166 agreement we strike is a royalty-free nonexclusive, because the companies usually don't want to
167 pay royalties, and if they have early access to it they don't care so much that other people might
168 get access to it a couple years down the road. So, that's a typical agreement that we strike.

169 **WEST:** Essentially what you're doing is generating spillovers for most of the wireless economy and
170 your sponsors get first dibs on the spillovers?

171 **SIMARD:** First dibs? Right.

172 **LARSON:** I think that's a good way to put it. We have a lot of members from Europe and Japan, or
173 the Far East now I should say. They seem to derive more benefit from sending visiting scholars
174 over here. If they send their young engineers here, they spend a year or two, they take the
175 classes, they work with the professors, and then they go back. That's also covered in the member
176 agreement. So, that's how they get the benefit.

177 **WEST:** Are they actually matriculated as degree students, or are in they in a . . .

178 **LARSON:** No. We have a so-called "visiting scholar" designation for them, where they get a desk
179 and computer access, and they get to sit in on the classes.

180 **WEST:** But effectively they're nonmatriculated graduates?

181 **LARSON:** Correct. Yeah.

182 **WEST:** Okay.

183 **LARSON:** Yeah. Also, human resource or recruiting was another benefit of membership. A lot of
184 the students do summer internships for the companies, and the companies were hiring students
185 who became incredibly important to these companies. That was a big benefit. Obviously, when

186 the bubble burst, the hiring was nonexistent and that's slowly being built back up again. But
187 historically, that was always one of our missions, to put our students into these member
188 companies.

189 **SIMARD:** Yeah. That would be a big benefit.

190 **LARSON:** Yeah. Yeah.

191 **SIMARD:** When you decide on your research agenda, do you try to consider commercialization
192 potential? Or do you decide what the Center will research purely in an academic sense, and then if
193 it applies, good for them, if it doesn't . . .

194 **LARSON:** Yeah. No, it's really almost the opposite of the traditional academic sense. We
195 experiment with all kinds of models on how we choose the projects that we work on. When we
196 first started, we tried a lot of things that didn't work terribly well. We finally kind of stumbled onto
197 what works well for our Center, and that is that we run our projects on a two-year cycle. About a
198 year before a new project begins we start talking to the member companies.

199 **WEST:** When you say "a project," how big is a project?

200 **LARSON:** A project is five to seven graduate students and two or three professors. From a
201 monetary perspective that's \$200k-\$300k per year.

202 **WEST:** What percent of man-hours are professors working: quarter-time, half-time on this? And
203 the grad students are working half-time?

204 **LARSON:** Grad students are full-time. We do only PhD students. We don't support masters
205 students. We have twenty professors in the Center, and roughly fifty graduate students at the
206 moment. Graduate students are full-time. The UC counts professor hours strangely. So whatever
207 they can spare, they do. We give each professor about one month of summer salary. They're

208 supposed to spend at least a month in the summer but then when they're not teaching I'm hoping
209 that they're doing the research.

210 **WEST:** My understanding is it's a UC rule, and I don't know how it goes for sponsored research,
211 but for consulting you're limited to essentially one day a week.

212 **LARSON:** That's right.

213 **WEST:** It's your free time. But, that wouldn't apply to doing sponsored on-campus research?

214 **LARSON:** Oh no. No. No.

215 **SIMARD:** No.

216 **WEST:** Okay.

217 **LARSON:** Sponsored on-campus research you should be doing four days a week.

218 **SIMARD:** Yeah.

219 **WEST:** Well, they are supposed to be in the classroom at some point? [Laughter]

220 **LARSON:** I won't touch that one. All I can tell is the more research you do, the better, as far as
221 your career goes.

222 **SIMARD:** Yup. Yeah. Uhm-hmm.

223 **WEST:** So they're working twenty to thirty hours a week then, typically, on that sort of sponsored
224 research?

225 **LARSON:** Well, I'll just tell you my own – when I'm teaching I probably put in ten to fifteen hours
226 teaching and thirty to forty hours research. So that's, three to one, four to one kind of numbers. I
227 don't know if that's typical. My perception is that's pretty typical around here. But, every school

228 is different.

229 **WEST:** And when you say "teaching," that's just standard two-two?

230 **LARSON:** One or two classes per quarter.

231 **WEST:** Okay.

232 **LARSON:** Okay. So, the process for picking up the projects. About a year before a project ends we
233 start to meet with our member companies. Usually this is done at the time of the board meeting.
234 We have board meetings twice a year. We basically say, "Okay, what do you guys think is
235 important, what's important coming up in the future?" And our board members get up and give
236 us presentations on what they think is important. A little more than a year ago, we had this
237 wonderful meeting where everybody gave a ten-minute presentation on the important wireless
238 technologies of the future, from their perspectives, from their corporate perspectives.

239 **WEST:** And when was that?

240 **LARSON:** That was last November 2002.

241 **WEST:** Okay.

242 **LARSON:** For projects that begin in August of 2003, we kind of took that and we distilled it. We
243 took good notes and then we all got together and came up with a bunch of projects that sort of
244 addressed what we thought they told us was important. We came up with probably about eight
245 or nine projects that addressed each one of the key areas. We sort of had to match these to their
246 interests and our interests too.

247 **LARSON:** Right. Right.

248 **LARSON:** But generally speaking, a project that is of no interest to them is a nonstarter. I'll tell

249 you why in just a second. Because, what we do then is we write a bunch of white papers based on
250 these projects that we think are going to be important. In the late winter we send these white
251 papers to our member companies and they vote their dues on the project. So, they choose where
252 they want to put their money.

253 **WEST:** How much are their dues?

254 **LARSON:** \$120k a year.

255 **WEST:** So essentially they could say, "I'll fund \$125k on this project or I can fund five projects at
256 \$25k" or whatever?

257 **LARSON:** Right. And we have both extremes.

258 **WEST:** Okay.

259 **LARSON:** And everything in between.

260 **WEST:** What's the most scattered that somebody would do?

261 **LARSON:** Some companies peanut butter it very evenly amongst every single project.

262 **SIMARD:** Hmm. But then the access to IP they get is not limited to the project that they chose to
263 fund?

264 **LARSON:** Exactly. All members share equally in all graduates. You don't see, "Oh gee, if I don't
265 support this project I don't get access to it." Nobody has that feeling. Everybody shares equally.

266 **SIMARD:** That's kind of like almost a venture capitalist. They won't be worried, "Where should I
267 put my money?"

268 **LARSON:** Yeah.

269 **WEST:** Exactly. So, out of the eight or nine that you propose, how many get funded?

270 **LARSON:** Well, that's interesting. You know, we've been doing this for about six years now and
271 the first time we did it, it was a little bit of a culture shock. We maybe proposed twelve projects
272 and only eight got funded. But, of the four who didn't get funded, nobody wanted to fund it.
273 [Laugh] So, so last November and last spring when we did this, every project got funded. People
274 got a little bit savvy. They realized that they can't be too far in front of the companies or the
275 companies won't support it. So, this works pretty well. The companies seem to be reasonably
276 happy with this model.

277 **WEST:** What about the faculty?

278 **LARSON:** The faculty, I think, are pretty happy too, because it has led to a very healthy Center,
279 financially. I mean we, there was this horrible downturn in the telecom economy. It was just a
280 complete meltdown, and we stayed strong through it. We lost a few members, but by and large,
281 our membership stayed strong.

282 **WEST:** So, they're willing to accept the applied direction in exchange for knowing that this is going
283 to go on?

284 **LARSON:** Right. It's a growing concern.

285 **SIMARD:** And it's a nice way to fund a research project as opposed to writing grant proposals?

286 **LARSON:** Yeah. I don't want to say it's easy money, because actually, there's a lot of interaction
287 that has to be done. These twice-a-year reviews are very intense with the member companies,
288 and there's a lot of overhead. But, I think that the nice thing about it, from the faculty's
289 perspective, is that there's a very high probability that you get funded if you write a proposal.
290 With other funding agencies, like NSF or DARPA, it's very hit and miss. So, it's a good way to get a

291 very stable source of funding for your group. Now, there are very few professors that rely on this
292 exclusively for their funding. Actually I think that's a good thing, although it leads to some faculty
293 disengagement with the Center. And so the problem . . .

294 **WEST:** What do you mean "disengagement?"

295 **LARSON:** I'll explain what I mean by that. I'm sort of the exception as the director, because I was
296 completely consumed by the Wireless Center. But, for any other faculty member, the fact is the
297 Wireless Center can only fund a third to a half of a strong group here. So, you have to be out also
298 developing contacts with funding sources outside of the Wireless Center. What that sort of . . .

299 **WEST:** Is there an overlap? Do they talk to the members outside of the Center or is that
300 forbidden or not going to happen?

301 **LARSON:** You mean the faculty?

302 **WEST:** Yeah.

303 **SIMARD:** Can they have funding outside of the Center?

304 **WEST:** Can they cut a deal with Qualcomm or Nokia separate from going through the Center?

305 **LARSON:** Yeah. In fact, we do that very often. And I'll explain how that happens too. It's fine.
306 I've even done it. It's really not a problem. Tony Acampora was director for many years here, a
307 splendid director. He came from a Center for Telecommunications Research at Columbia. And
308 there, if you were CTR faculty, CTR was all you did. You didn't have any other really funding
309 outside it. So, it was a very tight, faculty were very tight. They met regularly. They brainstormed
310 together constantly. It was a very, very close working relationship. We don't have that. We had
311 that kind of sporadically here, but it's not Wireless Center oriented. It's more sort of just fun
312 oriented. Like the com guys would be very tight, and the circuits guys would be very tight. As a

313 Wireless Center we don't have a kind of a group, you know. There's no kind of group mind that
314 has developed over time.

315 **WEST:** Could you really set up something that tight in the School of Engineering?

316 **LARSON:** It's hard to do. If you go over to the Center for Magnetic Recording, they're a little bit
317 more like that. The reason for that is that there are only four or five professors associated with
318 that Center, and in their own separate building. All they do is get money from the Center for
319 Magnetic Recording. They don't have any other funding sources. So, they're a pretty tight group.
320 That might create its own problems. To me that's not necessarily an ideal.

321 **SIMARD:** No, because you bring in knowledge from all over these networks with different people?

322 **LARSON:** Right. Right. Right.

323 **WEST:** But, it just seems to me that in the UC culture it would be very hard to have a group that's
324 tight.

325 **LARSON:** Right. Yeah.

326 **LARSON:** The other thing that we do that helps a lot is the UC Discovery Grant process. We take
327 these white papers that the companies fund and then we turn them into full-blown proposals.
328 Then we send those proposals off to the UC Discovery Grant people. If they pass a fairly rigorous
329 peer review process, they match the money on sort of a dollar-for-dollar basis. It doesn't really
330 allow us to double our funding, because they strip off the overhead. The company money and the
331 state money are burdened with overhead. Whereas, if we didn't go through the UC Discovery
332 Grant process, there would be no overhead. So, we get about fifty cents on every dollar, from the
333 State. But, that's still a wonderful additional source of money flowing through the Center.

334 **SIMARD:** When did they start that initiative?

335 **LARSON:** About four or five years ago. It's gone through some name changes and things like that,
336 but it's a really great program. I just can't say enough good things about it.

337 **SIMARD:** Is the rule, like "If you find a company, industry funding then we'll match it"? Or is the
338 rule, "Submit anything," and . . .

339 **LARSON:** No. You have to have a match.

340 **SIMARD:** Okay.

341 **LARSON:** So, you can't just submit it.

342 **SIMARD:** From whomever?

343 **LARSON:** From whomever. It has to be a California company.

344 **SIMARD:** But, it has to be in industry?

345 **LARSON:** It has to be in industry.

346 **SIMARD:** Not a research – not . . .

347 **LARSON:** Right. That's a lot of good questions. Yeah, specifically they want electronics, like
348 electronics or telecom manufacturing, or research within the state of California.

349 **SIMARD:** That's interesting.

350 **WEST:** Matching was the problem in Sacramento. I'm surprised it survived.

351 **LARSON:** Yeah. It's taking some hits in this budget. In fact, I've just been on some conference
352 calls about it with some of that Executive Committee. The cuts could be draconian or just painful,
353 and we're not really sure. [Laugh] It will not go away. Apparently, the program will not go away,
354 which is very good news.

355 **SIMARD:** That's good. Yeah. That's really good.

356 **LARSON:** Yeah. But, it does have some implications for us, because it really allowed us to grow
357 our budget by about fifty percent. So, if it goes away we have to plan for that. I've been working
358 with my associate director and the budget people on some of the worst-case scenarios. Of course,
359 the other problem is that next year, tuition goes up dramatically, but our funding doesn't go up
360 dramatically. [Laugh] So, we have to also . . .

361 **SIMARD:** Fund fewer students or . . .

362 **WEST:** Oh, you have to buy off at whatever the going rate is for your students?

363 **LARSON:** Sure. Yeah.

364 **WEST:** Okay.

365 **LARSON:** I think in-state tuition at the graduate school is supposed to go up by forty percent next
366 year.

367 **WEST:** Whew.

368 **SIMARD:** Oh my god. I knew it was bad, but I didn't know it was that bad. [Laugh]

369 **LARSON:** Yeah. I think it is twenty percent for nonresident and forty percent for residents.

370 **WEST:** Well, I had also heard, and I don't know how this applies to engineering, but at least in
371 business schools that nonresident tuition now at UC is higher than USC.

372 **LARSON:** Is that right?

373 **WEST:** Uhm-hmm.

374 **LARSON:** I hadn't heard that. Yeah. Well, it should be really. Or, it should be comparable.

375 **SIMARD:** Right. Right.

376 **WEST:** Which is not a problem for UCLA, but it's a problem for Irvine and Riverside.

377 **LARSON:** Right. Yes. Yes. And we're starting up a business school here. I don't know if you saw
378 that.

379 **WEST:** The Rady School.

380 **LARSON:** There's some press on that recently?

381 **SIMARD:** Next year, right? 2004?

382 **WEST:** Well, they've been hiring. They hired the dean?

383 **LARSON:** Right. It was so funny: there was a long article in the *Economist* on this last week. They
384 had this picture, but the picture was of Harvard. This is an article on the UCSD Business School and
385 they had a picture of Harvard. It made me mad.

386 **SIMARD:** Oh, interesting. [Laugh] Okay.

387 **WEST:** Yeah. Well, the view is much better at this school.

388 **SIMARD:** They want to be the Harvard of the West Coast? Or . . .

389 **LARSON:** Ah. Thank you. Of course.

390 **SIMARD:** Stanford is competing for that already.

391 **WEST:** Just something quick on this matching. With this matching money, this is for grants
392 outside of the Center, is that correct?

393 **LARSON:** No, it's within the Center. So, I mean it's for anything.

394 **WEST:** Okay. So, it applies for a faculty member who gets thirty percent of his or her money from
395 the Center and seventy percent from other deals, then if the other deals involve California
396 companies they do matching?

397 **LARSON:** They do.

398 **SIMARD:** Right. Right.

399 **LARSON:** And, that actually leads into this other question that you brought up about, "Can
400 professors cut separate deals?"

401 **SIMARD:** Right.

402 **LARSON:** So, I don't know if you are going to talk to Larry Smarr or Ramesh Rao?

403 **SIMARD:** Yes. I've talked to them at a previous occasion.

404 **LARSON:** Right. Calit2 has these engagements with companies that they help facilitate. I have
405 one with Intersil and I have one with Ericsson, both of whom are, by the way, members of the
406 Wireless Center. I got separate contracts for some specific research that they wanted to do.
407 Frankly, they didn't want to share the IP with the other members of the Wireless Center, so they
408 had their own separate IP deals for those contracts.

409 **SIMARD:** For the whole Calit2 it's a separate IP project?

410 **LARSON:** Right. And . . .

411 **SIMARD:** Do they have the same members of companies? Or, are some members of both?

412 **LARSON:** Some are members of both.

413 **SIMARD:** Okay.

414 **WEST:** So, this came through Calit2.

415 **LARSON:** This came through Calit2. Right. Almost every Calit2 member is also a member of the
416 Wireless Center.

417 **SIMARD:** Oh, okay.

418 **LARSON:** With very rare exceptions. So, AMCC, Ericsson, Intersil, IBM are all members of Calit2
419 and the Wireless Center, and they've all concluded separate deals for additional research that has
420 separate IP arrangements and separate funding.

421 **WEST:** What would the typical IP relationship be for Calit2?

422 **LARSON:** I actually wasn't involved in negotiating all of those. The Wireless Center IP Agreement
423 is so complicated that I can barely keep that one going. [Laugh] But, at Calit2 there's no one
424 blanket IP agreement. Every company has its own separate agreement that was negotiated
425 separately. Every company wants to do things differently. Very commonly, however, a
426 nonexclusive royalty-free agreement is the way that we do it with these companies and Calit2.

427 **WEST:** Do they get exclusivity?

428 **LARSON:** They get exclusivity for a certain period of time. So, it's not exclusive after Year X, and
429 it's royalty-free in perpetuity. But I have to say that there's no typical agreement in Calit2 because
430 every company has its own peculiarities and pressure points.

431 **WEST:** Will the Regents of University of California grant have permanent exclusive license?

432 **LARSON:** They might. I mean, you've have to talk to Alan Powell about that. I don't see any
433 reason why, in principle, they wouldn't. If it financially makes sense for the university to do that
434 and ensures that the technology is used by society—I think those are the two major criteria—then

435 they probably would.

436 **SIMARD:** For your center, is it royalty-free in perpetuity as well?

437 **LARSON:** Once again, every company is different: some companies want no royalties, so a royalty-

438 free non-exclusive is a great way to go. Other companies, they don't care about that, but they

439 want to pay a certain amount of money up front and then have an exclusive.

440 **SIMARD:** Right.

441 **LARSON:** Right. Just theirs. We've done both. Every company has its own culture and they've all

442 got these big Excel spreadsheets with cost models.

443 **WEST:** Wait. I guess I wasn't clear. I thought you had said that all of the Wireless Center IP was

444 non-exclusive? Or is that just typical?

445 **LARSON:** No. That's not all, but that's typical. I would say that our most common approach is

446 non-exclusive, royalty-free.

447 **WEST:** Okay.

448 **LARSON:** But, some companies actually would prefer to pay money up front and then have

449 exclusive.

450 **SIMARD:** Right.

451 **WEST:** And that's exclusive to all members of the center or that's exclusive to the people who pay

452 for it?

453 **LARSON:** You can't have something exclusive from all the other members of the Center. If

454 another member of the Center wants to participate, then we cannot conclude a license agreement

455 that would exclude anyone else. But, it can be exclusive to people outside the Center.

456 **WEST:** Wait, so Company X says, "I want this exclusive." And Company Y says, "Oh, I hadn't heard
457 about that. I want that too."

458 **LARSON:** And, they're both members of the Center?

459 **WEST:** Both members of the Center.

460 **LARSON:** Right.

461 **SIMARD:** They both . . .

462 **WEST:** They write the same check, cut the same deal, and then those two members get it while
463 the other eleven members don't?

464 **LARSON:** Correct.

465 **SIMARD:** Right.

466 **WEST:** Okay. So, basically any member of the Center can buy into an exclusive deal?

467 **LARSON:** Yeah. Actually the way we have it is that companies have a certain time period where
468 they can jump in and be allowed to license. If they miss that time window, then they can't do it
469 anymore. It's a year or two years, or something.

470 **WEST:** So, in the one case the non-exclusive, they'll get it anyway because it's available to all
471 Center members.

472 **LARSON:** Right.

473 **WEST:** But, in the other case, then, if it's exclusive in perpetuity they'll never get it, and if it's
474 exclusive for some period they'll be treated like an outside company?

475 **LARSON:** That's right. That's right. There was one case where one company wanted it exclusively
476 and no other company in the Center had any interest, and they got it. They got the exclusive
477 license on it.

478 **SIMARD:** Right.

479 **WEST:** I was actually talking to my colleagues at UCI. We're trying to set up a Social Science
480 Research Center, and we have some of these same issues. One of the things that I was wondering
481 about, that they've faced, is that the presentations you were talking about for the stuff they're
482 interested in are very tricky. They're worried that Company X won't want to stand up with the
483 other eleven companies in the room and say, "This is what we think is an interesting area and we'd
484 like you to pursue it."

485 **LARSON:** Yeah. You know, we have been shocked by how open they are around each other. We
486 were worried about the same thing, and we gingerly took the step of asking them to do this. And,
487 not a single one said no. And so, maybe they pulled out all this stuff, which is possible, or maybe .
488 ..

489 **SIMARD:** That would defeat the purpose?

490 **LARSON:** Yeah. Or maybe it's so far out that they'd. . .

491 **SIMARD:** A five-year window?

492 **LARSON:** It's five years away. So, what they're saying isn't on a critical roadmap path for them. I
493 suspect that if they think a really critical thing is super-secret, they will not share.

494 **SIMARD:** They will develop in house?

495 **LARSON:** They'll develop in house. Yeah. I don't know why it's worked so well. I think that our

496 members are a very public-spirited bunch of companies. There's another center that's being set up
497 here on telecommunications, and the – I'm sorry, the – I can't remember the name. But, Andrew
498 Chen is starting it up and his worry was that one company would say, "Okay, I don't want you to
499 let Company X, Y, or Z in. We're Company A and we don't want X, Y, or Z to have anything to do
500 with the Center." I guess he had some hints from some companies that this was an issue. We've
501 never once had any of our companies say that to us. So they . . .

502 **WEST:** Well, you don't have Microsoft in Wireless, you see. [Laugh] That's the company usually
503 people specify most often that they don't want to be let in.

504 **LARSON:** That's a good point. Well, believe me there is no love lost between many of the
505 members of our Center. But . . .

506 **WEST:** And again, Qualcomm comes to mind?

507 **LARSON:** Now, I won't mention any names. [Laughter] There's no love lost between them. These
508 people are tooth-and-nail competitors, and they'll do anything that they can in the business world
509 to take market share. But here, it never comes to mind.

510 **SIMARD:** It's about exchanging ideas?

511 **LARSON:** It's about exchanging ideas.

512 **SIMARD:** And setting up the future?

513 **LARSON:** And idea flow, and educating the students, and doing great research. Sometimes,
514 financially, they just can't hack it. They get to a certain point and they can't afford it anymore. But
515 . . .

516 **SIMARD:** Do you know how much they pay to be in Calit2 as well?

517 **LARSON:** Once again, it varies totally. Sometimes it's quite a bit more than what we charge for
518 the Wireless Center and sometimes it's quite a bit less. They're more open to in-kind
519 contributions and all kinds of creative financing that we can't do.

520 **WEST:** Now, you say that they kind of all pull together and there's almost an identity. Among the
521 representatives in the Wireless Center, is there any sort of sense of loyalty to the cluster, to the
522 San Diego Wireless Community or Industry. Because, it seems to me that if they're doing anything
523 beyond what benefits their company, they're building up the infrastructure and capabilities of this
524 area. Or, is it just more that they're accepting that what they lose to Company X will be matched
525 by what Company X loses to them and it'll all cancel out in the long run?

526 **LARSON:** I think it's more of the latter. Yeah. It's not so much that they're loyal. I think building
527 up the San Diego area is not high in their list of reasons to join the Center and engage with us. I
528 think building up UCSD is pretty high on their list. Getting the good IP and getting good students is
529 also pretty high on their list.

530 **WEST:** Why is building up UCSD high on their list?

531 **LARSON:** I think that they see it as a long-term... I think they sort of bought this argument that
532 Silicon Valley has used for many years, that Stanford and Berkeley were kind of centers of the
533 world.

534 **SIMARD:** The IP? Yeah.

535 **LARSON:** Yeah. And I think that they sort of bought into that argument. I think more at the VP
536 level in a lot of these companies they sort of buy into this. So, they see that, "If we can have a
537 strong university here, we can develop great people here, and great people will want to come
538 here, and the graduates will be the tops in the country, and this will be an international center of

539 excellence.

540 **WEST:** Did somebody explicitly sell this vision or is it just sort of osmosis into their . . .

541 **LARSON:** Bob Conn had to sell his vision constantly. I think Irwin has also, very, very persistently.

542 So, I think that, and I think Frieder Seible, our new dean for UC has. I think if you're a good dean at

543 a major research university you sell this vision. They all sell it now. But Bob was particularly good

544 at it. And, I think it's true. I think so.

545 **SIMARD:** Yeah.

546 **LARSON:** It's not just salesmanship. I think there's an element of truth to it.

547 **WEST:** Have you talked to Bob Conn?

548 **SIMARD:** No.

549 **WEST:** Looks like we need to.

550 **LARSON:** Yeah, you ought to. Yeah.

551 **WEST:** Well, the reason I asked this... Kind of as anthropologists we're not supposed to 'disturb

552 the natives' and tell them about our findings, but this is kind of an interesting feedback loop.

553 Because, we're studying whether this is, in fact, the next Silicon Valley, and the fact that somebody

554 says, "It's going to be the next Silicon Valley. [Laugh] Let's . . ."

555 **LARSON:** It's a self-fulfilling prophecy.

556 **WEST:** Yeah. Exactly.

557 **SIMARD:** Let's do it. Yeah. Exactly.

558 **LARSON:** Yeah, but I don't think these things ever grow organically.

559 **SIMARD:** Except it seems to me as I talk to people from the university inside out, that the
560 university was there first. Here, you have other elements first, but then the industry grew and fed
561 back to the university a lot, which, I guess, happened at Stanford. But when Qualcomm got
562 started, you didn't have the top engineering school here.

563 **LARSON:** Yeah. Right.

564 **WEST:** Well, when I applied to Stanford as an undergraduate in '75, Stanford was not anywhere
565 near the top. They were maybe in the top twenty, but they weren't top five, by any stretch of the
566 imagination.

567 **SIMARD:** Right. Right. So, they did grow too.

568 **WEST:** So, the fact that the semiconductor industry and the PC industry and whatnot grew up, and
569 all the wealth and the resources that came back to it, was really something that happened in the
570 last twenty years. It was a good school. Don't get me wrong. But, people were saying about
571 Stanford, "Harvard is the Stanford of the East," because they were insecure about the fact that
572 they were still thinking of themselves as the Harvard of the West.

573 **SIMARD:** Of the newbies? Yeah. Yeah.

574 **LARSON:** Right.

575 **WEST:** Berkeley was a much better engineering school in '75 than Stanford.

576 **LARSON:** Right. That's right.

577 **SIMARD:** Right.

578 **LARSON:** I think, you're right, San Diego, historically, has this reputation of being kind of a sleepy
579 town that ...

580 **SIMARD:** Uhm-hmm. A sleepy military town.

581 **LARSON:** ... and kind of Navy oriented, and that we're not up at the level of Silicon Valley yet. But,
582 it's improved since I got here. I had lived in L.A. since 1980 and it's improved a lot since the early
583 '80s. The trajectories haven't been a problem.

584 **SIMARD:** Yeah. Yeah.

585 **LARSON:** I think UCSD has not had much to do with that, but I think recently it's starting to
586 become more of an engine for the local economy. We have a lot of people in startups, key
587 positions in startups, who are very interested in startups.

588 **SIMARD:** Do you have any cases of startups emerging from the Center? I'm not sure how that
589 would happen, if the companies do get the IP first. But, let's say then they give it up. Have you
590 had faculty from the Center leave with some of the IP and start a new company?

591 **LARSON:** You know, you couldn't have picked a worse time, because. . .

592 **SIMARD:** Yeah. It doesn't happen right now? [Laugh]

593 **LARSON:** Well, there were some startups and they've all gone under. So, I don't think our record
594 of startups is particularly great. Tony Acampora was involved in a startup known as Air Fiber. They
595 had some IP from the Center that was licensed to them, and that was a great company. I knew
596 many of the founders, and it just was terrible timing.

597 **SIMARD:** I'm meeting with Jim Dunn on Friday.

598 **LARSON:** Right. So, that's one example. It's kind of a sensitive thing, and I don't have much
599 control over it, but I'm uncomfortable with faculty members starting their own companies with
600 Wireless Center IP. The members, in particular, are extremely sensitive about it. I've been

601 codirector or director from May of 2000, and no issue has been more contentious and caused
602 more bad feelings than IP from the Center.

603 **WEST:** IP to startups, or just IP in general?

604 **LARSON:** IP in general.

605 **WEST:** Okay.

606 **SIMARD:** Uhm-hmm.

607 **LARSON:** But, IP to startups too. I don't want to get into all the details of who said what and
608 when, but the companies are really sensitive about this, as they should be. We have to handle IP
609 very carefully. We have to make sure that it's made available to our members equally, at all times,
610 and that nobody gets preferential treatment of any sort. As long as we do that I think we're okay.

611 **SIMARD:** Yeah.

612 **LARSON:** We also had some issues with the licensing. Our original membership agreement states
613 that, "Here's the IP. You've have ninety days to decide if you want to license it." That was way too
614 short of a fuse for these companies to make these decisions. So, that's how we came up with this
615 three-year, two and a half, two-year kind of model, and companies seem very happy with that
616 now. So, we had some fine tuning to do on the IP agreement.

617 **SIMARD:** Uhm-hmm. What about students? Do your graduates frequently go work in industry
618 after they do a PhD, or do they typically go into academia? Do you have a mix?

619 **LARSON:** It's a mix. Most go into industry.

620 **SIMARD:** Most?

621 **LARSON:** Yeah. There are not a lot of faculty jobs. We just couldn't possibly train . . .

622 **SIMARD:** That kind of number? Right.

623 **LARSON:** Yeah. That would go into faculty positions. Actually, I just had one of my PhD students,
624 who worked at Qualcomm towards the end of his PhD, he went to a faculty position back East, but
625 that's the only one I've ever had. It's pretty rare. Larry Milstein has had a couple go to faculty
626 school jobs. Most go into industry. I'd like to say that all of them go to our member companies,
627 but that's not the case. But, it's a good, healthy percentage. It's two-thirds, fifty percent, two-
628 thirds.

629 **SIMARD:** Wow. That's still pretty high.

630 **LARSON:** Which is pretty good. Yeah.

631 **SIMARD:** Yeah. Considering there's a worldwide job market slump.

632 **LARSON:** Right. And we don't track that too carefully, because once graduate students leave, it's
633 a little hard to keep track of them.

634 **SIMARD:** Keep track of them?

635 **LARSON:** They go to a company and then they go to a startup, and then they come back to a
636 company. It's very hard to really track that carefully. But, it seems to be about half to two-thirds
637 that will go to . . .

638 **WEST:** Just out of curiosity, is that because they know these companies, because the companies
639 know them, or is it because once you get past the member companies there aren't a lot of major
640 companies that are playing in the area that they're studying?

641 **LARSON:** I think all of the above. The students really want to stay in San Diego.

642 **LARSON:** I think we have every local company as a member. And so, if you're going to stay in the
643 wireless industry locally you're going to go to a fairly big company.

644 **WEST:** Right.

645 **SIMARD:** So, do many of them start their own, or not?

646 **LARSON:** Yeah. The typical model is they go to a company and they work for a couple of years,
647 and then they do a startup. We have quite a few who have done that. Quite a few. And, I
648 wouldn't say any of them are big hits yet, but, you know . . .

649 **SIMARD:** But, they're out there?

650 **LARSON:** You know the numbers, one out of five will be a big hit. One out of ten.

651 **SIMARD:** Yeah. Yeah. But yeah, they're out there and so they are not just staying with Nokia, or
652 Qualcomm, or the big players? Some actually do startups?

653 **LARSON:** Yeah. It depends on temperament and...

654 **SIMARD:** Yeah. Oh yeah. Absolutely. It's highly individual.

655 **LARSON:** I don't know what the percentage is.

656 **SIMARD:** Yeah.

657 **WEST:** So then, nobody is actually tracking companies founded by UCSD alumni?

658 **LARSON:** The dean's office is.

659 **WEST:** Okay.

660 **LARSON:** I don't have those numbers. But, I bet you that the dean has tracked those very

661 carefully.

662 **WEST:** If for nothing else than to send them a request for a donation?

663 **LARSON:** Of course. Exactly. Yeah. [Laugh] And actually, they had a great – what's her name? I
664 can't remember her name now, I'm sorry. The woman up in the dean's office who is in charge of
665 gift giving for alumni. She has this wonderful history of Irwin Jacobs. He started off giving \$75 in
666 1978 for a library fund or something, and she has records of every gift he's given all the way up to
667 the final gift, which was \$100 million.

668 **SIMARD:** Yeah. One of my colleagues at Stanford used to work in the Business School's
669 Development Office, and the things she knows about people. [Laugh]

670 **LARSON:** Oh yeah.

671 **SIMARD:** It's really unbelievable. She was telling me about they have this database that contains
672 information on every donor, what they like to eat, who are they married to, who are their kids?

673 **WEST:** I thought it was interesting last week, they said, "Mr. Rady, the Budweiser dealer, gave the
674 second largest grant in UCSD's history" and they didn't mention who the largest one is. I was
675 thinking, "Gosh, larger than \$30 million. Who gave more than \$30 million to UCSD? I can only
676 think of one person."

677 **SIMARD:** One person. Yeah.

678 **WEST:** Yeah. I guess they didn't want to steal the thunder from Rady or something.

679 **LARSON:** Yeah. They're very careful about talking about it.

680 **SIMARD:** Mention Jacobs again. Yeah.

681 **LARSON:** Yeah.

682 **WEST:** Yeah. Rady was generous, but he wasn't quite as generous as Irwin. [Laughter]

683 **LARSON:** Yeah. Exactly.

684 **WEST:** So, let's see. Companies founded by UCSD? There was a question here. Right now most
685 of the companies out there were founded by students who came through here well before the
686 Center was established?

687 **LARSON:** Uh . . .

688 **WEST:** We keep running across people like Marco Thompson who is extremely loyal.

689 **LARSON:** Right. Right. Marco's a big supporter. Yeah. I'm trying to think, Anton Monk is a friend
690 of mine, and he's a founder of Entropic. I think he was here at the early days of the Center. I don't
691 know if he was funded by the Center or not. He was Larry Milstein's student. Robert Parra was a
692 recent guy who got his masters here. He was funded by the Center a little bit, and he's starting his
693 own company right now. I don't have any formal networks on this. David Critchlow was a founder
694 of Magis Networks. He went through the program here. Magis just went out of business.

695 **SIMARD:** Yeah. We read that. Right.

696 **LARSON:** I'm trying to think of a really high-profile student who's left who's started their own
697 company and I can't. We didn't really start to graduate a lot of people until fairly recently,
698 because it takes five years to mint a PhD, and we started off with five students. Even after a
699 fourth year we only had about ten. So, we're only now starting to graduate five to ten PhDs a
700 year.

701 **SIMARD:** A year? Yeah.

702 **LARSON:** Which is sort of what we're steadily trying to do. Of course, I have great expectations
703 for the future. But, a lot of the students want to go to the big companies, too, these days, because
704 the perception of startups is that they're very risky, and flaky.

705 **SIMARD:** Getting a good job has regained some value. [Laughter]

706 **LARSON:** Yeah. Yeah. A good job at a stable, big company.

707 **SIMARD:** Exactly. With a steady paycheck.

708 **LARSON:** Yeah. This is attractive now.

709 **SIMARD:** I have so many laid-off friends.

710 **LARSON:** Uhm-hmm. Me too.

711 **SIMARD:** What's interesting in regions like this is that people who get laid off are full of talent.
712 They have PhDs and they have great experience, but they'd rather stay unemployed and stay in
713 the region and live on their meager savings, than pack up and move.

714 **LARSON:** Yeah. I have many, many friends who have been out of work for six months now, and
715 they're not leaving San Diego. They've got a nice house in the hills that they built themselves.

716 **SIMARD:** That gives a lot of hope for the future of the region.

717 **LARSON:** Yeah. Because maybe they'll start their own company or something.

718 **SIMARD:** Yeah. They'll be back. Their talent will be reinfused back here.

719 **WEST:** Well, if they have a nice house in the hills that they built themselves, they're not the hand-
720 to-mouth, two-year out of a bachelor's type of people.

721 **LARSON:** That's right.

722 **SIMARD:** But even people that I know, who certainly don't live in Atherton or anywhere like that,
723 they're still hanging on, having sold their big house, and [Laugh] rented an apartment, and just
724 hanging on by the skin of their teeth until they can find employment in the Valley again.

725 **LARSON:** Oh, really?

726 **SIMARD:** Yeah. Yeah. A lot.

727 **WEST:** Now, I guess one of the questions I would have here, and in Silicon Valley I think I know the
728 answer, but how much of that loyalty of the workforce to the area is professional versus personal?
729 From your observation. . .

730 **LARSON:** I don't understand the question.

731 **WEST:** Yeah. Let me draw this picture, because somebody I knew when I was a kid went to
732 Stanford when I went to MIT. He moved to Stanford from San Diego, and he never left. He
733 basically stayed in the area. When I talked to him about his resume, which was a new job every
734 two years, he said, "Oh, I would never leave the Bay Area, because I can always jump around and
735 find another company if something goes wrong." So, there are people I know in the Bay Area who
736 are there because of the politics or the weather, or the skiing, or whatever. Something about the
737 geography. But then there are other people there that from a professional standpoint say, "I want
738 to have the career flexibility so that if my current employer screws me over, or I don't like how
739 they're treating me, I can jump."

740 **SIMARD:** Yeah. Can go back home.

741 **WEST:** And so these two are related, but they're not the same motivation. Do you have any sense
742 of that in terms of these people you know who are hanging on even though . . .

743 **LARSON:** Yeah. It's much more the former than the latter here. Those people love the region,

744 and professionally I think that they feel, "Well, it's okay here, it's getting better, but it's not Silicon
745 Valley by any stretch of the imagination." So, I think it's much more the weather, and the – the
746 weather. [Laughter]

747 **WEST:** Okay.

748 **SIMARD:** Funny. Because, I was on an Advisory Committee for Canada's R&D, and we were trying
749 to get the input of young people, even those that left. I'm from Canada, and I keep saying, "I'm
750 sorry, but -20. Look at the places that have made it big. They tend to have that quality of life."

751 **LARSON:** Right. Right. And for a while it's a little cheaper here than Silicon Valley. I think it still is,
752 but now it's . . .

753 **SIMARD:** Yeah. But barely. Yeah.

754 **WEST:** Do you think that's going to make a different in the long run? The housing prices?

755 **LARSON:** Yeah. Housing is going up everywhere all over the country. I think in general if we
756 became comparable to Silicon Valley then people would say, "Oh gee. I'll go up to Silicon Valley."
757 But, until it gets to that point we'll be ok.

758 **SIMARD:** Right. We still have the advantage?

759 **LARSON:** And still, I think, cheaper than Orange County.

760 **SIMARD:** Uhm-hmm.

761 **WEST:** Where do people live? Do they live in Del Mar Heights? Do they live in Carmel Mountain?
762 They're obviously not living in La Jolla, or Rancho Santa Fe on a PhD student's, PhD engineer's
763 salary?

764 **LARSON:** Yeah. No. But, Carmel Valley, Encinitas, Carlsbad. Rancho Bernardo. Those kind of
765 places.

766 **WEST:** Okay.

767 **LARSON:** They're pretty nice places to live, you know.

768 **SIMARD:** Yeah. No matter what.

769 **LARSON:** Yeah. Yeah. Even on an engineer, a PhD engineer's salary.

770 **WEST:** Well, I'm a native of San Diego. I lived in Oceanside until a year ago. So, I know the area,
771 but I didn't . . .

772 **LARSON:** Yeah, people don't live in Oceanside, too much.

773 **WEST:** Right. But, you're talking northern . . .

774 **LARSON:** North County is very popular.

775 **WEST:** Generally newer settlements?

776 **LARSON:** Right. North County is very popular.

777 **WEST:** Yeah. Yeah.

778 **LARSON:** I lived in Del Mar. I could never afford it today if I had to buy in today, but I moved here
779 seven years ago.

780 **WEST:** Yeah.

781 **LARSON:** It was okay then.

782 **WEST:** Well, we've talked about your ramping up the production of students. We've talked about

783 sort of the boom and bust of the economy, and effect on startups, and desirability working for
784 startups and the formation of startups. We talked about housing prices. What other kind of sort
785 of broad trends, ebbs and flows, or trends taking off of UC that are changing the way the Center
786 fits in, or UCSD fits into the local industry?

787 **LARSON:** One virtuous thing that we see happening, that I think in the long run will have the
788 biggest impact, is that the quality of our graduate students has just gone through the roof. Well,
789 we've always had a really strong communication theory group here, so they always had a pretty
790 good set of graduate students. But, in the other disciplines, we were perceived as maybe number
791 twenty in the country, and so we wouldn't get the best. The Berkeley, Stanford, Caltech, MIT
792 people would go to Berkeley, Stanford, Caltech, and MIT. When I first came here seven years ago
793 we had maybe sixty applications for the PhD in the Circuits Program, for maybe ten slots a year.
794 This year it's about 800.

795 **SIMARD:** Oh, my god.

796 **WEST:** Wow.

797 **LARSON:** It's gone up by a factor of more than ten. These are all people who are 4.0s from
798 Caltech, from Berkeley, from Stanford, and they'll come here. They come here. We get them all.
799 We're actually starting to steal people from the really good schools.

800 **WEST:** Now . . .

801 **LARSON:** And again, the weather's nice and we're near Qualcomm. So, there are a whole host of
802 reasons, not just that we're such a great school. But, the reputation has gone up. And so, we're
803 now perceived as a kind of borderline Top Ten school, whereas we weren't for the twenty-year
804 period before. That's going to have a huge impact ten years from now.

805 **SIMARD:** You know, that actually . . .

806 **LARSON:** That and the teaching jobs.

807 **SIMARD:** Some people at Berkeley, I've heard through Ollie Williamson, who was on this Dean's
808 Committee of Berkeley, they were extremely nervous because UCSD was very close to surpassing
809 them in the rankings.

810 **LARSON:** Berkeley?

811 **SIMARD:** On some indicators. Yeah.

812 **LARSON:** Really?

813 **SIMARD:** Yeah. They feel very threatened by UCSD, [Laugh] from what I've heard. So, it's a good
814 sign. [Laugh]

815 **WEST:** Yeah. You know the problem here, of course, is the local media and some of the leaders
816 are still prone to sort of small-town boosterism. You know, "Let's cut the NSF funding list to the
817 shortest numbered list that includes UCSD." So, the "Ten most extramurally funded universities,
818 UCSD is number ten." So, they always are kind of really . . .

819 **LARSON:** We're still kind of insecure, right?

820 **WEST:** Yeah.

821 **LARSON:** You can see that in the way that we're portrayed a little bit. Of course the Berkeleys and
822 the Stanfords know they're good so they don't have any occasion for that kind of stuff. But, I think
823 we have to keep doing that for a while. Hopefully by the time I retire from here we will be as good
824 as Berkeley. I think that's all of our goals here. It's going to be hard to get there. But that's . . .

825 **SIMARD:** I spoke to one person, who was talking about the Business School, and she had a nice
826 comment. She said, "We used to send people to Stanford and Berkeley to go to business school,
827 and then they wouldn't come back. So then we realized that it was very important to develop our
828 own so that they would stay in this area."

829 **LARSON:** Oh yeah. Yeah. I think that's true.

830 **SIMARD:** Especially sending those engineers who you want to become entrepreneurs, business
831 people, and that kind of stuff.

832 **LARSON:** Right.

833 **SIMARD:** I think that's why their target student population is strong engineer background.

834 **LARSON:** Especially engineering. Entrepreneurial engineering. Yeah.

835 **SIMARD:** Are you going to have some sort of joint program with them? Or . . .

836 **LARSON:** Supposedly there will be some joint . . .

837 **SIMARD:** It would be on the grad level or at the joint faculty level?

838 **LARSON:** Actually, I have an MBA, and I did a lot of work with UCLA people when I was up in L.A.
839 So, they've sort of talked with me earlier on about what I wanted to do in this area. I've got my
840 hands full as it is. [Laugh] You know, there might be some other people who are recruited,
841 certainly, with that in mind.

842 **WEST:** Can I go back to this increase in the reputation. Your reputation has gone up and obviously
843 you gain better quality students. And with the choice of spending the winter in Boston or San
844 Diego. But has there actually been a change in the substance of the education they're getting, in
845 terms of the quality of the faculty, or the resources, or anything? If you got a PhD here today,

846 versus a PhD ten years ago, then other than this reputational effect, is there any rational reason
847 why you'd be getting a better degree this time than . . .

848 **LARSON:** I don't think so. Well, let me think about it. First of all we have more faculty. It's a
849 bigger . . .

850 **SIMARD:** And more resources?

851 **LARSON:** We were in the high thirties ten years ago. We're now, we're close to fifty.

852 **WEST:** When you say "we" you mean?

853 **LARSON:** The faculty of ECE.

854 **WEST:** Okay. Okay. Okay.

855 **LARSON:** There are more of us, so is it a better degree? It would only be a better degree if the
856 people that we hired in the last ten years are better than the people that we hired before. I don't
857 think that's the case. I think it's just that the program has grown. Bob Conn, Larry Larson, Ramesh
858 Rao, and Tony Acampora are beating the drums for UCSD all the time. We're telling people how
859 great we are. We're getting lots of money in. We're publishing zillions of papers.

860 **SIMARD:** Good.

861 **LARSON:** Is the quality better? I don't think so. In fact, I probably shouldn't say this, [Laugh] but
862 I'm not even sure if the quality isn't worse because the student population has grown much more
863 than the faculty. In this department, in particular, the student-to-faculty ratio is horrible.
864 Especially the undergraduates suffer.

865 **SIMARD:** And with the funding condition of the UC System you're not getting new appointments?

866 **LARSON:** We are.

867 **SIMARD:** You are?

868 **LARSON:** Apparently we're hiring three new faculty this year and we're supposed to hire three
869 new faculty every year until we get up to seventy-five.

870 **SIMARD:** Wow. So, there is some acknowledgement that . . .

871 **LARSON:** Yeah. I think so.

872 **SIMARD:** They need them?

873 **LARSON:** We're on a five-year tenure track here to hire, but the student population doubled in
874 two years, it was almost literally that bad. So there was a huge mismatch between what happens
875 at the student level and what happens at the faculty level.

876 **SIMARD:** Yeah.

877 **WEST:** When did the student population double?

878 **LARSON:** It didn't double, but it grew by eighty percent from 1998 to 2002. Paul Yu, who is our
879 chair, will give you the numbers, but I think we went from 900 undergrads to 1,600, which is
880 where we are today. In ECE.

881 **WEST:** And it hasn't, and it hasn't tapered off?

882 **LARSON:** Right. It has not tapered off.

883 **WEST:** Which is interesting because in a lot of other places a lot of computer jobs and engineering
884 jobs demand has tapered off, because the boom era's over.

885 **LARSON:** Sure. I expect it will taper off. But, first of all, that's perceived as being a high-paying

886 profession during the boom. And, the tenth campus didn't get going. UCSD is really a campus that
887 can grow enrollment, so they're sending the fresh people towards UCSD, because Berkeley and
888 Southern Cal, UCLA can't grow their facilities.

889 **SIMARD:** Right.

890 **WEST:** Okay. So, is it better than it was? Certainly in terms of facilities we're still in the same
891 building that we had ten years. It's not a great building. We're building some nice new ones, but
892 that hasn't . . .

893 **SIMARD:** With so many applicants now, I'm sure the experience for students, by being with high-
894 quality peers, is providing them with a better education as well?

895 **LARSON:** Right. Yeah.

896 **SIMARD:** Because you're learning a lot.

897 **LARSON:** The quality of students has gotten much better since then.

898 **SIMARD:** Yeah. So, that would make a big difference.

899 **LARSON:** Yeah.

900 **SIMARD:** Well, I want to be mindful of your time. Because . . .

901 **LARSON:** Yeah. Well, this is really interesting.

902 **SIMARD:** It's really interesting to hear you and your thoughts on this. It's great.

903 **LARSON:** Yeah.

904 **WEST:** If we were going to explore this issue of linkages between UCSD, particularly the School of
905 Engineering, and the industry prior to '95, whom should we approach? Who would be the most

906 likely to know something about that?

907 **LARSON:** Do you mean in telecommunications in particular?

908 **WEST:** In wireless in particular. Because what we're doing is we're studying wireless.

909 **LARSON:** Larry Milstein. You should talk to Larry Milstein.

910 **WEST:** Okay.

911 **LARSON:** Because, he's been here for twenty, twenty-five years now. He was Mr. Wireless here
912 for as long as anyone can remember.

913 **WEST:** Okay.

914 **SIMARD:** That's great.

915 **END INTERVIEW**

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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.