Oral History of Benny Lau and Lee Lau

Interviewed by:
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Fairbairn: Okay, we're beginning the session. My name is Doug Fairbairn. I'm conducting an oral history with Lee Lau and Benny Lau, two of the three primary founders of a company that's' variously been known as Array Technology, Array Technologies, ATI Technologies and perhaps other names along the way. Just for clarification, Benny and Lee, although they share a common last name are not related. And we're delighted to have you here. It's July 13th, 2021 and we're recording this oral history for the benefit of the Computer History Museum in Mountain View, California. So, welcome. Delighted to have you both with us and look forward to an interesting conversation.

The first thing I'd like to do is ask each of you to spend a little time giving a little background on your own individual, on your personal history, and to learn when and where you were born, what kind of environment you grew up in, what kind of educational environment, what brought you to Canada where you co-founded the company and how you met. And at that point, we'll switch to the other one and do the similar story. Then we'll get into more of a back and forth in terms of the actual history of the company itself. So Lee, let's start with you. Can you give me some of your personal background, when and where you were born, some of your early remembrances and people who influenced your life and how you found yourself in Canada.

L. Lau: Sure. Well, thank you for the interview. I'm really honored to be part of the Computer Museum. I'm born in Hong Kong. Born and grew up in Hong Kong. I was a really poor student when I was young, kind of a real goof off. Didn't learn anything until I come to Canada.

Fairbairn: <laughs>

L. Lau: When I come to Canada, but normally when people think that, "Oh, this Chinese kid from Hong Kong, he must be really smart in math, physics and stuff like that," but I was the opposite. I'm a blank sheet of paper. I learned everything in Canada down to the basic math, algebra and everything.

Fairbairn: Tell me about your family. How did you grow up? What was it like growing up in Hong Kong and so forth?

L. Lau: I come from a really big family. I have five brothers and sisters and my parents were, as with most parents in those days in Hong Kong, rather typically poor, poor but happy, right. Financially they improved every year. Every year they got better. Every year we got better. And my father is in textile business. He has a factory to make denim, the material for jeans. And he worked but I hardly got to see him, both my father and my mother. They were out before I wake up and when they come back I was already sleeping, so basically, We grew up looking after ourselves.

Fairbairn: Were you an older child and helping take care of the younger ones? Or vice versa?

L. Lau: No, I'm the lucky one. I'm the youngest and I don't look after anyone.

Fairbairn: <laughs>

L. Lau: Don't have to look after anyone. But there's a big age gap between me and my, the second eldest brother. But when I was young, they were away to U.S. to study, to U.S. and to Toronto to study. When they come back, I left, so we don't meet each other that much.

Fairbairn: So was education important? You said you were screwing off. Did your parents try to get you to study harder or what?

L. Lau: Oh, yeah, all the time. All the time. So it was very difficult. Every time I have to show them the report card because it was all red. At that time when you fail, it's red. They write the number in red.

Fairbairn: <laughs>

L. Lau: The thing is, I don't know, as a kid, I don't like to study. I don't like to do anything. The only thing I want to do is to play and just watch TV. And I think the biggest change, what caused the change is so I was already doomed because my father is already planning. When I was around 15 Form 4, which is high school, my father already know that I'm not going to make it into any university in Hong Kong, so he's already planning to send me to Toronto to be with my eldest brother so that I can somehow go to university in Toronto. So, before that we went on a trip. He took me on a trip to Toronto to visit my brother and I was supposed to be the interpreter because he felt that I'd been studying English lessons all these years, so I must know English. But on that trip is when I find out that I don't know any, that I don't know-- I don't know what people are talking about or the signs in the airport, I don't understand. So that's when I realized that, "Oh, shit. I mean, I'm in trouble." So, when I come back from Toronto, I started really learning English. So, my plan is to learn 10 words a day every day. So, my time was consumed with remembering words. So, I would pick up a *Newsweek* magazine to read through the sentences and almost every other word I have to look up in the dictionary. At that time there's no Google, right, so you have to carry around a dictionary. So, six months to nine months later I think, I don't remember exactly how long, I was able to read through a *Newsweek* article.

Fairbairn: Did you also become more serious about your other studies at that time?

L. Lau: Oh, yeah, big time. Big time. So roughly around the same time, I got really interested in, well, how does radio work, how does TV work, how does telephone work. So that is what started me to-- what makes me want to study engineering when I come to Toronto. So, When I arrived in Canada, I went to high school near where my brother lived, Lawrence Park Collegiate, and that's where I learned within one year I catch up. Just a really hard worker. Basically, I have no social life. Seven days a week from the time I wake up till the time I go to bed, I'll be studying math, algebra, calculus, function and relation, physics, algebra, biology and stuff like that. So, for some reason I was really focused on studying.

Fairbairn: What grade did you enter in high school? Is it just your senior year or had you started a younger--?

L. Lau: So I think I came to Canada around 16. The first grade I went to is grade 12. At that time there's still grade 13, but grade 12 turns out to be way more difficult than grade 13 because grade 12 I have to

learn math and algebra and calculus so I can catch up because it's just numbers. But in grade 12 I also have to study geography, history, English and it turns out to be really difficult, right. So, the principal, my brother talked with the principal so we decided that maybe it's easier to go straight to grade 13 where I can only study function and relation, algebra, calculus, physics and biology … all science subjects. So that worked and I got pretty good marks and I was accepted into U of T Engineering.

Fairbairn: You said you came to Toronto because your elder brother was there. Why had your brother gone there? What was the connection to Toronto?

L. Lau: My brother came here to study as well. He studied pharmacy and after he got his pharmacy degree and then he studied medicine. So when I came here he was interning as a doctor.

Fairbairn: Okay. Do you know why he went to Toronto rather than some other location?

L. Lau: I'm not sure. I think probably because the popular choices at that time is U.S. and Toronto, I think. Somehow, he picked Toronto.

Fairbairn: Was there a large Chinese community in Toronto?

L. Lau: Not at that time. There's still a lot of Chinese but not like today where there are a lot of Chinese. But at that time just the number of Chinese were not as much as today.

Fairbairn: Okay. Going back to the beginning that we didn't get, what year were you born?

L. Lau: 1956.

Fairbairn: Okay.

L. Lau: May.

Fairbairn: Okay.

L. Lau: May 16th, yeah.

Fairbairn: Just want to get that information down. So you went to University of Toronto. You went to the Engineering School.

L. Lau: Yeah.

Fairbairn: Were you immediately drawn to electrical engineering? Is that what you're telling us?

L. Lau: Yes. Yes. I was really attracted to electrical engineering. And I became a really good student at U of T, a top student.

Fairbairn: What kind of interests did you develop there? Any specific area? Did you learn more about computers? Was there a professor that particularly interested you or acted as a mentor? Tell us a little bit about your university education.

L. Lau: The thing is it's kind of like my best educational time in my life. Learned a lot. At that time, I think the year that I started they just stopped teaching vacuum tubes. And computer is not like today where everywhere is a computer. At that time, they're using computer mainframe and hard drive is something is a luxury. So, I didn't really learn much about computers. We mainly learned basic electronic principle, circuitry, transistors, operational amplifiers, filters, analog filters and stuff like that. And I still remember the second year engineering is the first time they allowed the use of electronic scientific calculator and stopped using slide rules. The first year we're still using slide rules.

Fairbairn: <laughs> So what degree did you graduate with? Did you get a bachelor's or a master's or what was your--?

L. Lau: Yeah I got a Bachelor Degree of Applied Science and then I went on to same, also U of T, Master of Engineering.

Fairbairn: And did you write a thesis or have any special studies as part of your Master's degree?

L. Lau: My Master degree was in-- what was it in? Filter. At that time you still, we still have analog filter, capacitor inductor and stuff like that, so my degree was in making filter better or something like that, I forgot what it is.

Fairbairn: Right. So you had a lot of circuit theory and building things from individual components.

L. Lau: Oh, yeah. But I still remember at that time I was fascinated by the Fourier transform. It turns out that everything, all the signal processing is based on really simple theory, right? Bandwidth, how you transmit-- how you transmit a radio signal; how do you modulate; when you modulate? So a lot of things that's based on some really basic fundamental principle. I was fascinated at that time. And even when I graduated, we were still using punched cards. And I still remember at that time I'm one of those people that you would call a nerd, so a lot of students went after school they would go to watch hockey or baseball, whatever. Then me and a few, we have about a group of about five, five classmates, yeah. So instead of going to watch hockey, we would be, we would go back too someone's apartment and start building a timer or a frequency counter, a frequency generator and stuff like that. Or we would buy --- at that time there's S100 bus computer, right, with a paddle switch at the front. So, we would be building computer, toggling in a program by all these little switches. And that would be our hobby, our entertainment.

Fairbairn: What year did you complete your master's degree?

L. Lau: 1980 I think.

Fairbairn: 1980.

L. Lau: Yeah. And I did in '77, I got my bachelor; in 1980, my master.

Fairbairn: And then you went to work? Where did you go to work or what was the next step?

L. Lau: I went to work for a company, it's a division of Motorola. It's called Plessey. P-L-E-S-S-E-Y, Plessey. I forgot what's after that. But they make telephone equipment, modems and stuff like that. And after that I worked for Mitel. Oh, actually, before Plessey I worked for a little startup that make communication equipment and stuff like that. And then I went to actually that little startup and then I went to Mitel. But I live in Toronto, Mitel is in Ottawa. The driving back and forth is too much for me so I come back to Toronto and work for Plessey. After Plessey I started Comway, which is a precursor to ATI.

Fairbairn: Where did you meet Benny?

L. Lau: So I started Comway and then we designed some graphics card and we have it manufactured by a contractor in Hong Kong. So it's at this contractor where I met K.Y., which everybody knows is President of ATI. And then K.Y. introduced us to Benny and Benny's our first real full-time designer, design engineer.

Fairbairn: Okay. Well, let's, we'll pick that up in a little bit. Why don't we switch over to Benny, Benny Lau. Give me also a little bit about your upbringing, where you were born and when you were born, what your family life was like and how you found your way to Toronto.

B. Lau: Well, I was born in 1956, also May.

Fairbairn: <laughs>

B. Lau: Lee is one week older than me.

<laughter>

B. Lau: I was born in a family with five children and we were extremely poor in those times in Hong Kong, right.

Fairbairn: So you were born in Hong Kong within a few days of your friend here, huh?

B. Lau: Oh, yeah. <laughs> And my father was from a rich family, but then my grandfather died when he was a teenager, so he had to quit school and go out and work. Later he started a family and have five children, so we were very poor in those days. But he worked very hard and eventually he had his own company and kind of worked his way up. That gave me a lot of inspiration. I always tell myself that I want to do something myself, too, when I grow up.

I finished my high school Form 4, also similar to Lee, my father's friend sent his kids to Toronto and my father thought, "Oh, maybe it's a good idea," so he decided to send me over to Toronto as well.

Fairbairn: What were your interests then growing up and were you a better student than Lee was in Hong Kong?

B. Lau: I think I was. <laughs> At least I'm not a blank sheet of paper.

<laughter>

B. Lau: I came here and I study grade 12 and grade 13 and I was the valedictorian of the school when I graduated.

Fairbairn: But you went to a different school than Lee?

B. Lau: That is true. I went to a school in Niagara Falls, which is about one and a half hour drive from Toronto. I came here as a foreign student.

Fairbairn: Now were you interested in science and electronics and math before you came to Canada?

B. Lau: Actually, I always wanted to study medicine, but unfortunately when I came, in those days, I came as a foreign student and Canada put a restriction not allowing foreign students to study medicine. So I ended up studying electrical engineering. Because in those days they still accept about 10 percent of the applicants from foreign students. I got in the U of T Electrical Engineering program.

Fairbairn: And had you been building any electronic projects or anything like that before getting into engineering school?

B. Lau: No, not really. Like I said before, I wasn't really-- <laughs> interested in engineering or circuitry or whatever.

Fairbairn: <laughs>

B. Lau: And I know I'm lacking that kind of experience. So when I was in my third year, the summer, like because as a foreign student I cannot work or find summer job.

Fairbairn: Okay.

B. Lau: So I went to the Engineering Department and talked to my professor, professor Cousin. I said, can I work for you for free? I just want to learn how to, like, build a circuit board and build a counter or build whatever project you have in mind, I can work for you for free. He hired me and that's how I got the actual physical experience of touching a transistor, touching a resister and things like that.

Fairbairn: At what point did you decide that engineering was really worth pursuing as opposed to really still wanting to pursue medicine?

B. Lau: Well, after I finished my Bachelor degree in Applied Science, I continue to my Master degree. One of the field of the Electrical Engineering is the Biomedical Engineering. It's like it has some flavor in biology or medicine, so that's why I selected that as the field of study for my master degree. And the thesis for my master degree was using ultrasound to diagnose atherosclerosis which is the narrowing of the blood vessels using ultrasound to measure the speed of the red blood cells moving through the vessels and based on the Doppler effect and develop a profile of the red blood cells going through the vessels. And from that profile, you can diagnose whether there is a narrowing or hardening of the artery. That system was later used by the doctors in the Toronto General Hospital.

Fairbairn: Yeah. That sounds like a pretty important useful diagnosis.

B. Lau: Yeah. I got my master's degree after two years. I graduated in 1979 with my bachelor and then 1981 with my masters degree.

Fairbairn: And then you went off. Did you ever think about going back to Hong Kong or you always assumed you would stay in Canada?

B. Lau: Well, actually, I was thinking of going back to Hong Kong after my study but then I met my wife.

<laughter>

B. Lau: And then I decided to stay. She immigrated to Toronto from Hong Kong as well. And her family was here and so I decided to apply for the permanent residence and stay.

Fairbairn: And so then what was your first job there in Canada?

B. Lau: My first job was working for a military company called Litton Industries, as a circuit designer. They were doing a system that was an anti-aircraft missile system. The topic seems to be very interesting, but actually I was just working on one little circuitry. <laughs>

Fairbairn: Yeah.

B. Lau: And they give you three weeks to do a project that realistically you only take one day to finish so the rest of the three weeks I was just counting my fingers.

Fairbairn: <laughs>

B. Lau: And so I got bored after a few months and I said, "I can't stand it. It's just too boring." So I quit and I went to a company called Andicom, which was later acquired by a bigger company called NABU. What they developed were ahead of their time. They were developing a terminal computer that hooked up

to the cable through a cable modem. There was no internet at the time, but they have this idea of at the head end of the cable company, storing all the news and stocks quotes and games that people [want]. If you buy this terminal and hook it up to your cable, you can download games, news and whatever they have and use it. I was hired to develop that terminal for them.

Fairbairn: What was the name of the company and what was the company that got-- that did the acquisition?

B. Lau: Well, the company it's NABU, N-A-B-U.

Fairbairn: Okay.

B. Lau: And they basically were like a shell company. They acquire companies. They acquired a company in Ottawa that specialized in making cable modems. And Andicom, it specialized in designing computers. So, they got all these companies with expertise in different area and they put them together to provide a service. But the problem with this company was they spent money as quickly as they raised it. This little company had about 40-something vice presidents. <laughs> I don't know why.

Fairbairn: <laughs>

B. Lau: When they go to a convention in Toronto they sent 40 VPs. They were burning money like crazy. After a while, my manager and a few staff at Andicom decided to quit and start another company called Semi-Tech. And one of the founders of Semi-Tech just happened to be Lee's university classmate called James Ting. And so, I joined as a design engineer. We designed the first, I believe that was the first transportable computer. You can carry the computer like a laptop but it's more heavy than a laptop in those days.

Fairbairn: What year was that?

B. Lau: Oh. That was 1983, I think. And--

Fairbairn: What processor was it based on?

B. Lau: It was based on Intel 8088. Semi-Tech was where I met K.Y. and Lee. James Ting, one of the founder of Semi-Tech, also knew K.Y. from Hong Kong. At that time, K.Y. just immigrated to Canada and James asked K.Y. to do some business proposal for him. Sometimes K.Y. would come to Semi-Tech's office and that's how I met him. And like Lee mentioned he had his company called Comway making graphics card. Occaionally Lee came to visit Semi-Tech because he also knew James. And so, I met Lee while I was working there as well, that's how the three of us met.

Fairbairn: Well, what year did you first meet and how long was it then before you actually decided to go off and start a company?

B. Lau: I think we met 1983, Lee, yeah?

L. Lau: Around that time.

B. Lau: Yeah.

Fairbairn: Yeah.

B. Lau: Lee had Comway running at the time. So Lee asked K.Y. and myself to join him. And Lee suggested that maybe we incorporate a new company and start from scratch.

Fairbairn: So Lee, what was your motivation? What were you doing at the time exactly and why did you think it was the best thing to start a new company? Were you frustrated with what you were doing, or you thought there was an opportunity? Tell me about that.

L. Lau: I think it's' all of the above. But it's funny that I knew Benny for so long, this is the first time I heard of his family, his background.

<laughter>

L. Lau: What he was doing in Hong Kong, it was even his high school. It's funny. And also Professor Cousin, I also worked with him as a research assistant. So I learned a lot from him, from building circuit, debugging circuit and stuff like that. It's funny that two separate individuals just our path crosses without knowing so many times.

Fairbairn: And with so much similarity in terms of when and size of family and--

L. Lau: Yeah.

Fairbairn: When you were born and it's remarkable, the similarities. And did you discover this immediately or did you just discover it over time that there was this similarity between your backgrounds?

L. Lau: I think, after we met and we worked together, we were so busy we never really talked about, okay, where we come from, what did we do before we do this.

Fairbairn: Right.

L. Lau: We were actually so busy that we got up in the morning and go straight to work, and when we come home at night, we're so tired and then just it was just go to sleep. But the precursor to ATI was Comway. We made some graphics card, memory card, mostly copycat, nothing special. We had a little bit of feature like graphics card with parallel port and serial port.

Fairbairn: These were all for, like, IBM PC compatible machines?

L. Lau: Yeah. So, at that time the biggest company is AST in California. Everybody knows them. They sell graphics card, memory card, anything that plugs into the IBM PC, they make it. Let me go back a little bit. So Benny mentioned James Ting. Well, James Ting, we were in the same class since undergraduate school, all four years, and graduate school. Same supervisor. James Ting is one of the nerds that we don't watch hockey game, but we go and build stuff after school. He's also extremely resourceful, super good at writing proposal and he's also very entrepreneurial.

Directly before Comway, Andicom was started by James Ting, me and a couple other U of T students. I left Andicom after two years because at that time, when we first started our agreement was okay. Five founders, each one has 20 percent, so that's the engineering mindset, right. After a while, James was saying, "Okay, that's not--" I think he said that everyone equal share is not that fair because, "I contribute a lot more. I find all the contracts and you are just designing, so I want more shares, you guys." So thinking back, he's right. We are four engineers designing stuff and it's one, he's the only one raising money and finding contracts. But at that time I said, "Oh, no way. I mean, we said we are all equal shareholder and I don't want to give up any."

So I left. So Andicom went on to become NABU and then Semi-Tech, right, as Benny said. And he was an extremely resourceful guy and he kind of inspired me to start Comway. The funny story was before at the time I started Comway, before I started Comway, so after a long time after Andicom, we never really talked again, but one day I received a phone call, an email from James, right. I forgot whether it's an email or a phone call. And then he said, "Lee, come and check out my new company, Semi-Tech. We have a huge building in Highway 7 and Warden, and we are doing really interesting stuff like personal computer and stuff like that." So I went and see him and then I saw that building, right. And he said, "Wow. This is my building. This is my mainframe room. And you will come and work for me. You'll have your own secretary and your office." So that inspired me. So at that time I was working for this Motorola Toronto company, and then when I went home I was thinking about it. "Wow, that was really interesting. That was great. But I think I can do it, too." Then one week later, one week later I quit my job without even any penny. I have no capital. I don't know anything about financing, starting a company or anything. But it was just stupid. So, after I quit my job, when I was driving home, I was crying.

Fairbairn: <laughs>

L. Lau: "Oh, shit. What do I do tomorrow? No place to go to." But I already quit my job so that's how Comway-- That's how Comway got started. Then we jump to ATI, right. So I think Comway, so in the beginning it was just me, my father at that time already doing quite well. He has a small office building in Toronto renting out offices. So my father gave me a tiny little office as my first office. But it wasn't doing well and there was another shareholder which is James Ting's brother, Alan Ting. Alan Ting is also a really good-- I mean, he's a really smart guy. Somehow it runs in the family. He's also an extremely good writer and a good salesman.

But then his idea is marketing, right. He would always say, "Coca-Cola can sell sugar water. So marketing is everything." But I kind of disagree, I think that with my engineering background, I think product is everything. Marketing would help if you have a good product. And Coca-Cola actually is a very good

product, not just sugar water. So we disagreed. So we split up and at that time, there's also K.Y. and Benny, so we started a new company. I think Alan think doesn't bother to [ph?] join me. He went his own way, that's how ….?.

Fairbairn: Now had KY done anything like this before? Was it hard to convince KY and Benny to go off and do this?

L. Lau: Not that. I think KY came as a permanent resident, so he was-- I think he was the general manager with a really big, with an electronics sub-contractor in Hong Kong. So, he is looking for opportunity. Before he even joined formally, he was already working. We were already working. We would go out. He also was staying at my home at that time, because he hasn't found a place yet. So we go out, seven in the morning, come home midnight. We were doing that day in and day out. So from Comway to ATI, it's just a name change, technically. So I think it's also-- I think-- I don't remember exactly, but I think Benny's also like-- he's already married, so we don't live together. But he's also working like from sunrise to midnight.

Fairbairn: So Benny, tell me your side of the story. Did they have to convince you to join this new company? And did you quit, or did you try to do both at the same time? And you were married, so did you worry about a paycheck?

B. Lau: Well, not at all. I mean, I just say yes right away. But like I said earlier, I always wanted to, while I was young and I can afford to lose. If it didn't work out, I can go back and find a job. So that's why, I mean, I wanted to do something instead of working for somebody. It's what I'm looking for. At that time, I already had experience in designing computers, different parts of a computer when I was at Andicom and Semi-tech. I'm pretty experienced in designing and I didn't worry about not able to do the job. So when the opportunity comes, I just jump in.

Fairbairn: So how did you all decide what product to develop? What was your first--

B. Lau: Should I answer that?

Fairbairn: Yeah, go ahead. We'll get both answers, see if they're the same.

B. Lau: Should we get Lee out of the room? At first we were just continuing what Lee's been doing with Comway, but we saw an opportunity. As Lee mentioned earlier, what Comway did was basically a clone of the IBM graphics adapter. The IBM graphics adapter's resolution is very low. It's 320 by 200 in 16 colors or 640 by 200 in 4 colors. IBM also had another adapter which can display monochrome with higher resolution, 720 by 348. So for someone who purchase an IBM computer, they have to make a decision at the time of purchase, whether they want color but with lower resolution or monochrome with higher resolution. Later there was a third-party graphics company called Plantronics which improved over the IBM color adapter and can display 640x480 in16 colors. So it's kind of like-- the adapter were segmented by the features. And the user has to decide from the beginning what they want, and which card to buy

So we saw an opportunity. Why don't we combine all these features into one card, and then the user don't need to make that choice? They can buy this ATI graphics card, plug it in, and it doesn't matter what they want later, they can always use the same card. We saw that oh, this would be a good product. But then when we look at it in detail, if you put all these features into one card—at that time, the graphics cards were still using discreet devices called TTL, like discreet chips, we might exceed the form factor of how big you can plug into an ISA slot in a computer. It requires a lot of chips, a lot of discreet chips.

Luckily at the time, the gate array technology becomes-- starting to become popular. I believe Lee suggested, why don't we use the gate array technology and put all this discreet logic into one chip? That's a great idea. Use this gate array technology. There is a company in California which is offering this technology, the company called CDI, California Device Inc --

Fairbairn: California Devices.

B. Lau: Yeah, California Devices. And so we use their gate array technology. And at the same time, we were trying to figure out what to name the company. And like from marketing point of view, we wanted to start from the letter A, because you will be first in a list. So, we say, how about call it Array Technologies Inc.? Array Technologies Inc. But when we started to market the product like in PC Week and PC Magazines, very quickly we received a legal letter from a company also called Array Technologies Inc, from California. And say oh, you can't use this name, it's very confusing. So, KY suggested how about we just take the first letter from Array Technologies Inc and call ATI Technologies Inc. That would be the least kind of interruption to the marketing which were already going up at that time. So that's how we got the name.

Fairbairn: So Lee, does that correspond with your memory of how things developed?

L. Lau: Yeah, pretty accurate. I want to just add that the inspiration of using gate array actually came from another company. So, at that time, there was always paranoid about competition, I was always looking PC Magazine, PC World. And one day, I was scanning the magazine and there was this ad from a company called Hercules. Hercules usually was just making regular graphics card, monochrome card, color card, using discreet logic chips. And then one day I saw this ad from them showing a half card -- so one gate array and a CRT controller and some RAM…and crystal. I said, wow, shit. Really sexy. So then I talked with Benny, right?

At that time, we would always eat lunch and dinner together. So over dinner or-- lunch or dinner, I don't remember, we were talking, well, how about we use gate array? And then, oh, yeah. So that's how we got our first home run product-- decided on our first home run product. And there's a funny story to CDI, California Device Inc, for gate array. So that's not our first choice. Obviously, when you want to do a gate array, you look at magazine and you find a— pick a player, right? So the company that I called was LSI Logic. And also called CDI as a backup. A smaller company. So the salesman from LSI Logic shows up one day. At that time, we had a tiny little office. At the back is warehouse, and there's small office in front. And this salesman come in. I already see this look in his eye. He's looking around. What? I mean, where is this place? Why am I here?

So, we introduced ourselves and then sit down with him and say okay, we have this product, and we want to turn it into gate array. And then asked me about volume. At that time we were thinking, okay, maybe 10,000 chip a year or a month. I don't remember what I told him. After a little while, he said he wanted to go to the washroom. So I showed him where the washroom is, and I waited in the meeting room and then he never came back. So, it turns out that he left without saying goodbye. Can you believe that? Don't even have the courtesy to say, okay, I think you're too small for us. He just left.

But the California Device salesman, he was selling me. He come in, he was showing me all this …and this is how we route the chip and then we can really pack the chip in and stuff like that. So I think it ended up being a really beneficial business relationship, right? But 10,000 chip a month turns out to be 100,000 chip a month, or even more.

Fairbairn: That's a very interesting story. So, tell me about how you raised money for this. You aren't in Silicon Valley, you aren't going to venture capitalists. How did you raise money and how much did you need?

L. Lau: Well, [???]. So I think the time where you can just start a company without a lot of capital is over a long time ago. So, at that time, it's basically from-- how shall I call it? The first money came from my parents, right? So they didn't really give us a lot of money, so it's also from-- it's mainly come from people. But Benny is not paid for a long time. KY is not paid. There's also another person that was with us from day one. I mean, day minus. He's Arthur Lai, he's the programmer. He has a full-time job and also do programming for us. So he also not being paid. And I'm not being paid. The office that we used is from my family building, so there's no rent to be paid. So expense is near zero. And I think there's also Francis Lau, right, my uncle. So, at that time, he just emigrated to Canada as an investor, as somebody who will invest money. And then he got his permanent residence status. So he's looking for investment and I needed the money, so he invested I think around $200,000. So that's how we got our capital.

Fairbairn: So when did you form the company? What was the formation date?

B. Lau: '85.

L. Lau: Officially, I believe, it's 1985.

Fairbairn: And had you been working on the product and so forth before then?

B. Lau: Yes.

L. Lau: Probably about six months to nine months before then. So when ATI was formed, we were about half a year from a real product. Is that right, Benny?

B. Lau: Yeah, something like that.

L. Lau: Yeah. So half a year after we formed, we are ready to ship the first graphics card.

Fairbairn: In doing some research, it mentioned that you worked with the Microelectronics Development Center at the U of T, this is the chip design. Is that-- tell me a little bit about that.

L. Lau: You want to do it?

B. Lau: I can. I can talk. Actually, it was also one of the reasons why our overhead was so low at the time. It was because when we did the design with CDI, we didn't have money to purchase workstations or the CAD software. We're just a small startup. So, we found that this Microelectronic Division from the University of Toronto, which was funded by the Canadian government. They provided service for small company like us, that-- they would allow us to use their workstations to design-- to convert our logic design into whatever necessary format for CDI to make the chip for us. So they already had the workstation, the CAD software, and the people who had the expertise to do the conversion.

Fairbairn: And that was part of the University of Toronto, also? Is that correct?

B. Lau: Yeah, they are under the University of Toronto umbrella.

Fairbairn: And did you have any other cooperation or get students or whatever from the university?

B. Lau: Well, it's interesting. I designed the circuitry. I spent quite a lot of time working at the Microelectronics Center to do the porting. And at that time, Adrian Hartog, who was in charge of that center-- so we worked very closely porting the design to CDI. And he was very instrumental to the making the first chip. I was very impressed with Adrian. I remember one day I came back to the office and talked to Lee. I said this guy is really good. We should hire him; we should get him onboard. So and then Lee talked to Adrian and convinced him to quit Microelectronics and join us.

L. Lau: It's more than just talking to him. I think I courted Adrian for about three months. Met his wife, oh, I don't know how many times. It's a long process before he's willing to quit and come and join us.

Fairbairn: By that time, were you paying salaries? Was that one of his concerns, is being able to be paid?

L. Lau: I think Adrian's also very entrepreneurial. I don't even believe we paid him that much. But we can't afford to pay anybody much money at that time.

B. Lau: I think also, at that time, like the first product-- the first chip came back and we called it the Graphics Solution add-in card. And I remembered Lee and KY went to Las Vegas to attend the COMDEX show, to announce the product. And I remembered I was still working in the middle of the night in Toronto and Lee called and said you cannot believe the line. People were lining up at our tiny Canadian booth, wrapped around the building, and trying to find out more about the product. So in a sense that-- Adrian also saw that the risk, I guess the risk is not as high as then when we just have a concept. I think he saw the product and saw the demand. And I believe he felt more comfortable joining.

Fairbairn: Doing any kind of custom chip at that time was still a novel, risky kind of thing. It must have been a little scary for you, waiting to get the chip back. Were you nervous and did the first one work? Tell me a little bit about that experience.

B. Lau: Well, it's not just that one. It's like every one. Every chip coming back, you almost have a heart attack when you turn on the power and the screen is black. So, it was a very stressful moment. And in those days, the worst thing in those days, the design cycle for the PC is really tight. Almost every year you have two design-in cycles, the back to school cycle and then the Christmas cycle. You have to have a new product every year, and this year's product has to be faster, better, cheaper than the last year. So, it put a lot of-- there's a lot of stress in coming out with new chips. And if the chips come back, doesn't work, need to do a revision, it's another three months. So, it's really nerve-racking, to make sure the first chip come back, work, and that you can demonstrate.

Fairbairn: And you were able to do that with the first chip in this case?

B. Lau: Oh yeah. Yeah, the first chip. I believe the first chip worked.

Fairbairn: Had you done any simulation or was it all just hand-checking?

B. Lau: Well, in those days, like when we first started, it's a limited simulation. It's not like later on, that we can basically write all the software models for everything you can think of and actually do the simulation 100 percent. But in those days, you can write some files to exercise it and then look at the output bits. And actually scanning. I remember a lot of nights, late night, just scanning the screen with ones and zero coming down the screen and make sure that there's no funny thing. So it was almost like working in the machine language at the time. But later on, it's a lot better, with all the software modeling.

Fairbairn: So you plug the first chip in, you had the board ready to go at the time, and was that right before Comdex, that you had to kind of get it going and go to Comdex?

B. Lau: Oh, I'm trying to remember what it is.

L. Lau: I think it's summertime.

B. Lau: Summertime?

L. Lau: Yeah, I think summertime.

Fairbairn: Well, you started in October. The company was established in October, but you'd already done six months of work before then. That's okay. It's not important. I was just curious as to whether there-- sometimes there are these panic days when you're working day and night to get something ready for a show, and I was just curious as to whether that was the case in this particular--

B. Lau: Well, we worked day and night for the first few years, like Lee mentioned earlier. Like our day start from maybe nine or ten 'til two A.M. We go home, sleep, and then come back again. So seven days a week for first few years. So it was pretty crazy at that time.

Fairbairn: So the first year, I understand you did perhaps like $10 million worth of business. Is that--

B. Lau: Yeah. I think so. Either $10 million or $20 million. It was pretty remarkable. Like I always tell my kids, remember the cartoon that the phone ring and ring-- the phone handle just ring and bouncing off the hook? Like that's what happened, when we first announced the product. And the phone just keep on ringing, and people calling from these big companies, calling us, with us being little-known and never been to Silicon Valley. So, we were pretty amazed by the response.

Fairbairn: Did you have manufacturing problems? Who was responsible for manufacturing? You've only got a handful of people and all of a sudden you've got to make tens of thousands of boards and chips, right?

B. Lau: I think Lee is handling that, isn't it?

Fairbairn: Is that your job, Lee?

L. Lau: Mainly me and KY. I mean, KY background is from contract manufacturing. Because of KY, I never really have to worry about manufacturing problems, stuff like that. So he believe handled all that.

Fairbairn: So it sounds like the three of you got along quite well. That you each had your own areas of contribution and just worked day and night to make it successful.

L. Lau: Yeah. I think we have a really good team. And we--

Fairbairn: So now you've got one product out there, as Benny alluded to, there's-- okay, it's always a challenge to then keep up with the market and come out with the next product. So tell me about that. You have a big success on your hands, now you start panicking and say, what do we do next?

L. Lau: It's funny, the way you describe it, it's actually that way. I mean, the life of a graphics solution is actually, after we have a product, it's probably one to two years. So even while we're shipping, we were worried about what next. What should be next, what should be next? And it's like that for us forever. What's the next product, what's the next product? And then the next product is-- our product cycle basically follow a IBM product cycle. So the next computer that they introduced-- is it-- are they already went to micro-channel at that time, VGA? Or was still ISA? I forgot. Anyway.

B. Lau: EGA, I believe.

L. Lau: IBM came out with the EGA card, which basically has a high-resolution color mode. Basically obsolete the graphics solution. And EGA is also a much more complicated chip. I mean, by today's

standards, it's nothing, but at that time is a lot more complicated. And it's not discreet. It's based on a custom chip. But it's fairly well-documented. And so, then another big problem is, at that time, there's a company called Chips and Technologies. I think, about three months after they introduced EGA card, it's already been cloned by Chips and Technologies, and they're selling a chip set, a EGA chip set that anybody can buy, can make a EGA graphics card.

So, to us, it was, oh, it's a big problem, right? I mean, how do you differentiate from all these other graphics card company that buy the chip, assemble it, and sell-- markup 5 percent, 10 percent, and then sell? So it's always on our mind, what do we do next, what do we do next? How do we differentiate? So I think that it was Christmas, one night, and then Francis, my uncle, said okay, let's go out and have a good time. So I think we went out, we have dinner, and then, while I was dancing with a girl that Francis-- somehow he got a girl for me. We were dancing, and then I was thinking about, okay, we can make shades of gray from a black and white monochrome. So if we modulate the color, red, green, blue, into shades of red, green, blue, so we can make-- can basically convert a color monitor into-- which only can display 16 color into a color monitor that can display 64 color. So I thought, that's a great idea. It would basically give us some differentiation. And then I think I remember I called and then asked Benny. And he said oh yeah, of course, we can do it. So that's how we arrive at the second product, which sold pretty well. It's called EGA Wonder. And then we also had an advertising company which is also a single-man company, and he came up with a slogan, EGA Wonder, any software, any monitor, any time. Which give us the differentiation, right? I thought very much that people would use the color monitor interlaced to become a EGA monitor. But it gave us differentiation, I think.

Fairbairn: So good thing you went dancing, huh?

L. Lau: Yeah. I don't know whether-- tell me if I remember correctly.

B. Lau: I don't remember the dancing with girl, but--

Fairbairn: So you went off and designed that. Now, were you using gate arrays still? Or did you use just the standard chips? How did you implement your next chip?

B. Lau: I think looking back, it is one of the first mistakes we made, We kept on using the gate array technology for too long. I think. But yes, to answer your question, yes. For that product, we were still using gate arrays.

Fairbairn: So you used a gate array in this EGA Wonder product. That looks like it was a big success for you. Your revenue kept growing very rapidly, at that point. And the next thing I noticed, there was-- so were there other major competition? You were the leader in this market at that time for several years, is that correct?

B. Lau: Yeah, I believe so. I believe, when we first started, we did count. There were about 50-plus graphics card manufacturers at that time. So it's a really, very competitive field. And like I always quote the past CEO of Intel, Andy Grove. He said that only the paranoid will survive. And like Lee said, we were

very paranoid. We always read magazines or whatever, trying to look at what our competitors were doing, what customer wants, and want this, want that. We're always trying to find what feature we should put into the product for us to survive.

Fairbairn: Now, during this same time, Silicon Graphics was going after the high end of the graphics business and developing their high-end workstation. Did you pay any attention to them or did you get ideas from them to bring down to the PC? Did you fear them coming into the PC market?

B. Lau: Well, kind of yes and no, because, at that time, the workstations that we've been using, like the Apollo workstation, and their graphics capability was years ahead of what Windows can offer. But unfortunately, in those days-- in the early days, the graphics was really dictated by IBM, in terms of what EGA is, what VGA is, and the software need to be compatible with the IBM standard, and their register sets. So there wasn't much room to deviate from that. Not until IBM came up with the 8514 Adaptor, it had an acceleration mode, and very much depended on software drivers. And the drivers became a shield and the hardware can become much more independent. So after that, we moved to real graphics acceleration, and leave the VGA compatibility behind.

Fairbairn: Now, I understand in 1989 you helped establish the VESA, Video Electronics Standards Association, to standardize graphics formats, is that correct?

B. Lau: Yeah, we were part of that effort. At the time, people wanted to play video on a computer, to watch movies on computer. So playback video became another feature that the user like to have, besides graphics.

Fairbairn: So you were continuing to grow in Toronto. By this time, you must have been growing very rapidly. You must have been hiring engineers. And did you pay a lot of attention to marketing or did you feel that it was the technology that was the driving force here? How did you manage that, Lee?

L. Lau: I think there's an advantage and disadvantage of being in Toronto. Obviously, the advantage is the cost of living is much lower than the Valley. People don't move around as much. It's easier to attract talent, and once they work here, they stay. But the disadvantage is obviously the pool of talent is much smaller.

So I want to go back to-- Benny was mentioning about we were too late in switching away from gate array. That's as a result-- that's partly the result of being in Toronto, that the talent to do a full custom chip or a standard cell or mixed-signal IC is just not there. So I just want to go back a little with the-- so we're happy with the EGA, and then IBM introduced VGA, which is basically no longer text-based graphics chip, but everything is graphics. So, they have a RAMDAC chip, but they still use crystal as clock to control the timing. So we're happy being where we were, without worrying about there's a big black cloud coming in the horizon.

For one year, when I was at Comdex show, at the end of the show, I normally would walk every aisle, the whole Comdex. I would walk every aisle, just so that I don't miss anyone. So at the end of-- the last day of

the show, I was out walking by a tiny little booth. And then there was a tiny little card, a VGA card, with just one chip. No RAMDAC, no crystal. Just one chip. Not even a clock chip. And I'm not sure whether it's real or not. So I go in and I ask, and they show me a demo, and it's a real VGA chip. Single chip with RAMDAC and clock chip. And then I thought, okay, this is our end. I mean, we can't compete with that. RAMDAC we said was like five bucks for a chip. And their card chip is about $1.50. Right there, it's already like almost $8 in material costs. We can't compete. And we have no capability of doing a full-custom mixed-signal chip. So, when we go back and say oh, this is shit. We have to develop that capability. So that's where we really started developing that ability to do full-custom chip in-house. To make a long story short, by the time we have our first full-custom mixed-signal chip, I think we were about two years late. So at that time, we're already a public company. So two years late. I'm not sure if it was one or two years late. But our stock already crashed once, I think, because of that.

Fairbairn: So was this company NVIDIA? Was that the company that had this one chip?

L. Lau: That company is called Acumos. I still remember, 'til the end of my life, Acumos. Then, a year later, they were acquired by Cirrus Logic-- no, not Cirrus Logic. Yeah, Cirrus Logic, for $60 million. So wow. $60 million at that time was a lot of money.

Fairbairn: Yeah, that was a big acquisition.

L. Lau: Yeah, it was so much money. But I think it was the right acquisition for Cirrus Logic. They shipped tons of product. Tons of product.

Fairbairn: So did you ever talk to venture capitalists about investment? They must have come looking for you after you had this big ramp-up in revenue. I think there would be a lot of people--

L. Lau: Oh, not really. We never really go and look for capital because I think we were self-sustaining at that time. It's not like today, where people, before they do anything, they go and raise money. At that time, we kind of thought, okay, we can manage. The only time we went out and raised money is I think KY know a supplier in Taiwan. They had been supplying this PCB, IC sockets, capacitors, and stuff like that. So they invested-- I don't remember. Is it $10 million? Or $20 million? I don't remember how many. For a big chunk of our-- of ATI. I think they made a really good investment. But that's the only time we raised outside money.

Fairbairn: So do you remember what Comdex it was that you saw this Acumos chip? What year?

L. Lau: I don't remember. It was in Las Vegas. It was in Las Vegas. Acumos, yeah. I don't know who--

Fairbairn: Is it before or after you went public?

L. Lau: Before or after. I don't even remember. Probably-- do you remember, Benny?

B. Lau: No.

L. Lau: Before of after. I think after.

Fairbairn: You went public in November of '93.

L. Lau: Oh, I don't know.

B. Lau: I think before, then.

L. Lau: Before?

Fairbairn: Yeah, you had a big-- it said you had a loss, or the stock really tanked, in August of '94. Went from 20 to 5 or something.

L. Lau: That might be around-- I think probably even before-- maybe around the same time. Because I remember, we were late with this one integrated single chip solution and then we were stuck with a lot of inventory, right? When we were late with the integrated chip and we were shipping graphics card with the graphics chip, RAMDAC, and clock chip. So our stock tanked. That was our first tank after we went public, I think.

Fairbairn: And what do you remember about the process of going public? Was everybody-- did you all agree that was the thing to do? And did KY take the lead on that or did you play a significant role? How did that all go?

L. Lau: I think we all liked the idea of going public. And KY took the lead. He basically went on the roadshow and stuff like that. So he-- KY is our front man for ATI.

Fairbairn: Was it a big celebration, on the day you went public?

L. Lau: I think so. I don't remember now.

Fairbairn: Benny, do you remember?

L. Lau: I think so. Do you remember?

B. Lau: I think so.

Fairbairn: Usually, that's a big huge party and everybody's drinking champagne. You guys were too busy working.

L. Lau: I don't remember if we celebrated. Yeah.

Fairbairn: For most companies--

L. Lau: I think we should have remembered.

Fairbairn: Yeah, you would think.

L. Lau: I think it was a big IPO by Canadian standard at that time, yeah.

Fairbairn: Now, how important was the integration of video and graphics together? Did that become a major opportunity for you? And how did you get into the Set Top Box business? I'm not sure if I'm putting them in the wrong order, but it's a very different business than the one you'd been pursuing as part of PCs.

L. Lau: You want to answer that, Benny?

B. Lau: Video-- it was like a natural extension, together with graphics, on the graphics card. As I mentioned earlier, that people demanding to play video on the computer. And in those days, we had accumulated a lot of customers. And especially customers in the Far East, like in Taiwan. People really like playing video on their computer to replace the TV. It's an important feature for that market. We had a lot of customer feedback on this feature. In general, when we started to think about what the product feature list should be for the next product, we talked to our customers and also talked to Microsoft. Microsoft had a big part in it, because everything needs to have the Windows to support it. And so we put staff stationed in Microsoft. Every year, we would discuss with the Microsoft team and came up with the spec for the next product. And regarding the Set Top Box, it's really a-- I mean, as the company became public company, then one of the goals is to increase revenue and everything. So, we looked at the Set Top Box as another market that we already had the technology to make product for that space. And although the Set Top Box business has a long design in cycle. But once it's designed in, you stay there for a long time. It's not as sensitive as-- to the PC, that you need to change your graphics card every year and have to be the best in terms of the benchmark test and whatever. So we thought that the Set Top Box would be a good business, and the volume was good, so that's why we got into that as well.

Fairbairn: And did you have a marketing department that was driving this? Or was this sort of you-- the three of you? How did new product decisions get made, especially to enter new markets? Strategic decisions to enter new markets, how was that done?

B. Lau: I think, as the company grew, like the marketing department also grew. And they were responsible-- the marketing department was tasked with coming up the product features. And then we as a company-- have meetings to review it and things like that.

Fairbairn: So it was no longer Lee going off on the dance floor and coming up with the idea for the next product.

B. Lau: I think, after we moved into the graphics accelerator, like I mean, those type of product. We let the marketing do the job.

L. Lau: But I want to add that I used to-- when we were smaller, I used to think when people asked us if we have a marketing department, you know, some say, okay, we don't really have one. And we always feel self-conscious, right, that we don't have a proper marketing department. But when I look back after all these years, it has this advantage and disadvantage. The thing was-- I was thinking back. I think, in the beginning, we had the best marketing department of any company because the designer, right? Benny, Adrian], myself. We were so close to the market. We know everything about the graphics market. What's coming, what's next, who is doing what. So if I go back to the time when we were smaller, when people asked us do we have a marketing department, I don't have to feel ashamed at all.

But at that time, I don't know any better, right? And I kind of think that a big company that has a dedicated marketing department who has to send memo between marketing and engineering, it's not working efficiently. And we were-- as Benny say, we were always paranoid about-- the biggest fear at that time, we were always concerned about Intel integrating graphics chip into their processor or into their core logic. I mean, that's keeping us at night, all the time. Are we going to be integrated out of business next year? And what do we do if Intel does this and Intel does that? But all those fears, now that you look back, despite Intel being the biggest company in the world-- semiconductor company in the world with resource beyond our imagination, the fact is, good people-- talented people are always in limited supply, regardless of whether you're Intel or IBM. And wherever you put your best people is-- if I were Intel, I would put them in the processor, because they also have competition. But the processor is making huge margin. And we just have to increase the clock speed from-- I think when they started it was four megahertz, now they're talking gigahertz. But had I known any better, we don't have to worry about Intel that much, because I think being big is the biggest impediment to being-- to innovate. And also, they have a brand and butter product, which is going to pull all the talent into the product. So we were worried, all these years, for nothing.

Fairbairn: The competition is going to come from somewhere else, not from Intel.

L. Lau: Yep, from smaller companies than from Intel.

Fairbairn: So, speaking of that, you mentioned the fact that not being in Silicon Valley caused you to stay with gate arrays. When did you establish a significant presence in Silicon Valley, and what was the driving force in doing that, and how did that come to be?

L. Lau: Actually, we developed our capability with mixed-signal chip in Toronto. We didn't actually have to go to the Valley for that. But that's why we were late, because we were developing a fairly difficult competence, right? From scratch. So we started with hiring somebody from Bell Northern Research, which is the biggest research organization in Canada. So, we hired one person, Roger Colback], to do mixed-signal chip. Roger Colback, by the way, was my supervisor when I worked in Mitel. At that time, they were working on the switched capacitor filter chip for telephone. So telephone was just starting being digitized at that time, so all the analog line going to the central office would be digitized. But before they do that, they need to have a really nice sharp roll-off filter that roll off at three kilohertz. And they want to make it into one chip without inductor, without capacitor. One single chip. So they were expert in doing that. But that gives them the technological background to do a clock chip, to do a RAMDAC. But it's not

direct experience. So, it took us a while to have that capability in house, to design a clock chip that doesn't jitter when you display graphics on a monitor, and a RAMDAC chip that runs at 80 megahertz. So, it was painful, but we did it, and I'm glad we did it. Because with that capability, we're basically set for-- we're not relying on anybody else for this key feature of our product.

Fairbairn: So I have a note here, it says you worked with United Microelectronics, UMC, to develop a semiconductor plant in Taiwan? Can you tell me about that?

L. Lau: Oh, yeah. The semiconductor cycle-- it goes in cycles, right? Every four years you have a shortage, and every four years you have an excess. And you can tell that from the pricing of the RAM chip. So at the peak of the cycle, you cannot buy any RAM. The price would be like triple. And then four years later, they would be dirt cheap and they have RAM chip coming out of their ears. So at that time, we were beginning to be a big customer of wafers. And TSMC is-- everybody go to TSMC, even at that time, 20 years ago. So we felt that we need to have better relationship with another fab. It so happened that UMC is building a new fab at that time, and they're looking for partners to help fund the fab. It is a billion-dollar fab. So at that time, you can buy 5 percent of the fab. I don't remember how much. twenty million, fifty million dollars or something like that, to guarantee capacity. So that's why we got involved with UMC.

Fairbairn: And did that work out? Were you able to utilize that capacity and did that help minimize the disruption in your wafer sourcing?

L. Lau: I think we did. We had a really good relationship with UMC. We bought a lot of wafers from them. I don't know-- I don't remember-- I think they're still a pretty big factory in Taiwan, I think. Even today.

Fairbairn: Okay. So in 1997 you acquired Tseng Labs. What was the motivation for that and what was the key advantage of that acquisition?

B. Lau: I don't think we acquired Tseng Labs.

Fairbairn: You didn't?

B. Lau: No, we didn't acquire Tseng Labs. We acquired [inaudible]

L. Lau: I think we did. We also acquired Tseng Labs.

B. Lau: We did?

L. Lau: Yeah.

Fairbairn: You got [inaudible] out of that?

L. Lau: Remember Frank Lin [ph?]? I think we acquired that too. At that time, I think they have some type of new rendering technology. I think we did. But I'm not 100 percent sure though.

B. Lau: I don't remember that.

L. Lau: I kind of vaguely remember we acquired Tseng Labs.

Fairbairn: It looked like a major advantage was getting 40 engineers from them?

L. Lau: Yeah. They're going under, and basically we acquired the team. Basically.

Fairbairn: And where they based in Toronto also, or somewhere else?

L. Lau: No, in the Valley.

Fairbairn: Nice. So was that your first major acquisition or position in Silicon Valley?

L. Lau: No, I think before that we were acquiring another company that kind of bring us-- that brought us a 3D technology. We acquired company in Boston. It's a Japanese company division, it's called Kobuta. They are going to close down. They are going to close down that division. And at that time, we happened to just starting to focus on 3D. And then there's a team right there, ready to do 3D for a really good price. So that's our first acquisition.

Fairbairn: And that was in 1995?

L. Lau: I don't remember which year. But the team was a really good team.

Fairbairn: But that team was in Boston not in Silicon Valley, correct?

L. Lau: Yep, that team is in Boston.

Fairbairn: So was Tseng Labs the first one in Silicon Valley?

L. Lau: Yep, I think so.

Fairbairn: So while we're talking about acquisitions, the next one looks like it came in 2000 when you acquired ArtX, A-R-T-X?

L. Lau: Yep.

Fairbairn: And maybe Benny, you had left. You said you left in 1999?

B. Lau: Yeah.

Fairbairn: So you were gone by that time. So before we get to that, Benny, were you running engineering throughout this period? What was your--

B. Lau: No, I believe-- no, Adrian is running the engineering.

Fairbairn: Okay. So were you doing actual design work? Or were you like--

B. Lau: No, I kind of like liaising between the engineering and the customers in the Far East. In the early days, when we first started, I visited customers in the Far East, in Taiwan, mainly, and Japan and Korea. So there was kind of a relationship there. So I go to visit them regularly and talk to them about finding out what they need and things like that.

Fairbairn: So what led to your departure in 1999?

B. Lau: What led to the departure?

Fairbairn: Why did you leave the company?

B. Lau: I think I was tired.

Fairbairn: Fourteen years.

B. Lau: Yeah.

Fairbairn: All right, well, we'll get back to that in a few minutes. So in 2000, you acquired ArtX, which also brought in a future CEO, Dave Orton? I presume you were still with the company at that time, Lee?

L. Lau: I was in the middle of leaving as the deal was being negotiated. I left December-- I left just before the year 2000, January year 2000, when everybody think the sky is falling down because it's rolling over, from 1999 to 2000. The plane is going to fall out of the sky, everybody is going to stop running, and all that shit. And there's consultant everywhere helping people solve their problem. And the crazy thing is, everyone want a-- want to release their own liability so they want the indemnity from supplier, or the suppliers want indemnity from the supplier. So way down the chain, everyone, when there's nothing to worry about, it becomes a big issue. People kept discussing the Board meeting and shit like that. It turns out that it's nothing. Which is really should be a nothing. Anyway. But yeah, that's-- so ArtX kind of like a-- by the time we-- me and Benny was always concerned about, okay, shit, I mean, how do we protect ourselves from Intel? How do we protect ourselves? And then we think of doing processor, and then later on we're thinking, the best place to integrate a graphics chip maybe is the chipset, not the processor. So I believe, half a year before I left, this ArtX opportunity came up. I think I learned-- also learned about ArtX from our fab supplier. They kind of tipped me off, wow, this could be really smart. They have a smart way to prototype their core logic chip and stuff like that. And I think we were discussion with ArtX, and then we even have a code name for that. I forgot what is the code name for this project. But I left before ArtX was formally acquired.

Fairbairn: So both of you had left by the time that sort of the next major crisis hit, when Nvidia appeared and started taking major marketshare. Did you remain on the board of directors at all or were you completely disconnected from the company?

L. Lau: Oh, I was completely disconnected from the company. Actually, Nvidia appeared on our radar screen way earlier than the year 2000. We were always neck and neck. But I hate to admit this, but I think that hardware, we are pretty much even. I think we are neck and neck. But driver, I think they have a better driver team. So I don't know. We always leapfrog-- we always try to leapfrog each other. And they turned out to be our biggest threat, Nvidia.

Fairbairn: Yeah, it seemed like there was a period of time in the early 2000s where each one would take the lead from the other, every other year or something like that, that there was a leapfrogging--

L. Lau: Oh yeah, painful. Painful.

Fairbairn: So, is there anything more that you would like to say or can say about ATI, given that you both left in 1999 or 2000? I think we've covered the important points, but you both put in 14, 15 years of incredible hard work. What are your reflections? What are your most memorable thoughts about your experience doing that? First, Lee?

L. Lau: Okay, maybe I'll go first.

Fairbairn: Yeah.

L. Lau: I think that, at the time I left ATI, one of the main reasons I left is I thought that we're doing all this products, mainly for games. We're developing-- we have thousands of engineers designing 3D accelerator for playing games, and I thought, oh, come on. What's the point? This is already beyond-- the capability is already beyond what you need to run a spread sheet or whatever you need to do with your everyday office work. This is just mainly for games, and you have no idea, today-- oh, it's also great for AIs. It's great for parallel processing. But what makes me really happy is we built something really enduring. Even 20 years after we left ATI, the core competence, the capability that we built, is still useful. So with that, I don't even know what AMD, the latest processor-- graphics processor from AMD can do, right? But they all built on what we started with. And we have a great patent portfolio, which, by itself, is very valuable. I think, today, if you have a new startup doing graphics chip, not to mention the cost to the designing a complex 3D or whatever chips, the IP required, the patent-- you probably be sued-- you may be sued by everyone. The existing player, or patent violation, you violate this or violate that. So the patent portfolio in itself is really valuable. That's all I want to say.

Fairbairn: Yeah, you mentioned the machine learning artificial intelligence work, and I thought it was-- in sort of doing the research here, I was struck by the fact that the guy who really made the breakthrough in using-- developing machine learning was right there at the University of Toronto, Geoffrey Hinton. And I thought, boy, you're right there under his nose and developing chips that eventually would become a critical element in this new machine learning-based revolution in AI.

L. Lau: Yeah. And I understand a lot of new startup, AI startup, some of them have got alumni from ATI.

Fairbairn: Yeah, I'm actually investigating many of those for another job that I have, so yeah, there's probably literally 100 different companies starting up, trying to do some sort of AI accelerator capability. So Benny, what is your-- you said you were tired. In reflecting back, what do you take away from your experience at ATI?

B. Lau: Well, I think it was a good run for me. And like I mentioned earlier, when we first started, there were about 50 competitors in the graphics arena. And today, we are still one of the two people that's still standing.

Fairbairn: You're a survivor.

B. Lau: Yeah. So I've been-- so I'm very proud of the team, basically. And like I was recently talking about the company that used to be ex-ATI team in Shanghai. And they just announced their first AI processor from that same team. So--

Fairbairn: Now, what company is that? I'm interested.

B. Lau: I don't quite remember the name.

Fairbairn: That's okay, maybe you can send it to me later.

B. Lau: Yeah.

Fairbairn: Yeah, so a lot of the technology and architecture that went into the chips you were designing, I'm sure are directly applicable to what's needed to accelerate machine learning.

B. Lau: It's kind of like built as a foundation, and then it built on top of it. And although I share Lee's point of view, I mean, sentiment, that when we-- at the time, like in 1999, before I left, we were doing this graphics 3D acceleration. And every year-- next year's product need to do how many-- tens of thousands of polygons. And so, it become kind of boring to me. It was just every year, new product would be-- you do more polygons, you do more layer of shading and whatever. But then, I don't really see anything interesting from it.

Fairbairn: Mm-hm, nothing really new.

B. Lau: Yeah. And not until like later that, then, the parallel feature-- parallel architecture of the graphics processor become kind of an architecture that can be useful. The AI processing. And sometimes I wonder why the guy you mentioned from U of T, working with Nvidia and not ATI. But looking back, right, there were two-- like two things that really, I mean, give me joy. In the early days we had a product called Graphics Ultra. It's based on the 8514 architecture. One day I went to visit customer in the US. As I was going through the US custom. And the officer asked me what company you work for? I said ATI. He said

oh, Graphics Ultra! And that was-- he knew our product. I was kind of happy to know that. And another instance was I was touring a small island somewhere in the-- I think in the Mediterranean. And then I went to this-- went to the window of a computer shop and I saw our product there. So I said wow. It's good that when you design something and then you actually see that product is actually being displayed and available for sale, was some nice feeling.

Fairbairn: Yeah, people are buying your product. That's always a great reward. So, I'm going to ask both of you-- I'll start with you, Benny, because we're talking now. Okay, you sort of got-- you got bored, you, you know, lost the excitement of doing new things. Have you been involved with other technology activities since then in the last 20 years? What's been your work since then and what do you-- what advice would you give to somebody going into the technology business today?

B. Lau: Well, I've been-- since then, I've been doing investing, kind of a venture investing into like new startup and things like that.

Fairbairn: What areas particularly interest you?

B. Lau: Mostly in the high-tech space, and some are in the biotech. And I'm amazed at still a lot of great idea that people can come up with. And I'm into the newcomer. I think that-- I mean, a lot of opportunity is still available. So just start dreaming and like how you can make things better. And I think there's still a lot of opportunities.

Fairbairn: Is there any particular area that you're most excited about in biotech? Is there a particular company that you think is just really outstanding?

B. Lau: Well, there is a company that they're currently under the radar. I'm not authorized to disclose. And they are working on some revolutionary treatments for diabetes. Diabetes. And so I'm quite excited about that, when they announce.

Fairbairn: That's great. Finding meaningful things continuing. Lee, what about you? You've been in the venture capital business. Tell me about your interests and activities since leaving in 2000.

L. Lau: Well, not really much. The thing is, I'm a very lazy person. When I'm not forced to do anything, I tend to not do anything. Today, my focus is my granddaughter, and nothing makes me happy or sad too much. The things that relates to me directly, right? I mean, what would make me really excited or happy would be my son, a big break on whatever-- or my granddaughter or my daughter. Most of my investment are passive. I don't even like investing. But I kind of-- through a friend, I was involved with-- there's a new incubator at the U of T, creative destruction lab. So the founder of that lab, Professor AjayRJx, when he founded that lab, he kind of convinced me to be one of the advisor. And I was the advisor there for about two, three years. And I'm not sure whether people in Silicon Valley know about that or not. It became a really successful program. Nowadays, they have chapters across Canada, and I think they kind of a feeder fund to the YCombinator in Silicon Valley.

Fairbairn: Right, right.

L. Lau: In terms of advice to the young guys, I kind of look back, compare my days to the current situation, where, during my days, when we got started, there's no internet. Information available is far less than what it is available today. And there are all kinds of advisors, right? People advise you on capital structure, setting up fund, advise you about your idea, advise you about this, about that, sales, marketing, whether you're going to win or lose. I think the pendulum swing to the opposite extreme. There's too much advisors. I believe, at some point, the young guys-- okay, I've listened to enough advice, I'm going to jump and don't listen to advice anymore. Because if you listen-- if you analyze, I mean, it's not going to be successful, your venture. If you look at the statistics, it's hopeless. Why would you even start a company? Why would anybody bet on starting a company when their odds of being successful is so low? There's no reason to jump. So my advice is just analyze but don't overanalyze. Don't overanalyze. And just jump. Also, I think the difference between people with experience and no experience is confidence. I truly believe, if you want to be successful, you have to have the confidence. You cannot-- and trying to get advice, whenever you run into problem, you actually reduce your confidence. Because confidence come from making mistakes. And be able to fall down and come back up. So that's my advice to the young guys.

Fairbairn: Well, that's a great perspective. I don't want to leave without acknowledging-- it looks like you've also made some major contributions to-- philanthropic contributions to the University of Toronto, and also to some local hospitals. Looks like you have some-- can you tell us a little bit about that, and your motivations?

L. Lau: Yeah. As I said, I came here with a blank sheet of paper. And even though I'm not even-- I mean, I only see the dust of Bill Gates-- not even see the dust of Bill Gates, I'm pretty happy where I am. I learn everything I know in technology from U of T. So I just want to give back.[1]

Fairbairn: That's great. Well, from either of you, any final words you want to say about yourselves or the company? Or do you believe we've covered it? Benny, any other thoughts?

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[1] [Interviewee's note] Arthur Lai and KY played an important role in the early days of ATI, I think they deserved more mentions:

Arthur had been working for me part time as a programmer with no pay since day one of Comway. He worked for Pratt and Whitney during the day and his 2nd job starts after supper til midnight or later. I was there with him all evenings to provide moral support.

KY besides managing production, subcontractor is also responsible for dealing with banks. Our 1st OEM customer, either Kaypro or Commodore placed a big order and issued a L/C for payment. KY's relationship with Overseas Union Bank, which is later on acquired by Lloyds Bank and finally by HSBC provided cash advance for initial production order of Graphics Solution chips.

B. Lau: No, just it's been a good run for me.

Fairbairn: Yeah. Well, as you say, it's a tremendous success to have built a company, fended off so many competitors, and built an organization that continues to make contributions-- huge contributions to the technology and worldwide industry. So congratulations to both of you. I think you've made a big contribution. And I appreciate your taking the time this afternoon and I hope you found it valuable and learned a few things about each other as well.

END OF THE INTERVIEW