

Interview with Alumnus David Cheriton



Photo: Martin Dee

Dr. David Cheriton is a Professor of Computer Science at Stanford University and one of the 800 richest men in the world. Dr. Cheriton came to UBC in 1971 as a transfer student from the University of Alberta, and completed an undergraduate degree in Honours Mathematics in 1973. He finished both his Masters (1974) and PhD (1978) in Computer Science at the University of Waterloo. He returned to UBC as an Assistant Professor for three years, and then moved to Stanford in 1982.*

In 1996 Dr. Cheriton and Andy Bechtolsheim founded Granite Systems which was sold to Cisco Systems in the following year for over \$200 million. In 1998, Dr. Cheriton was approached by Larry Page and Sergey Brin, two Computer Science graduate students at Stanford University, who sought his assistance for their newly developed search engine. Google Inc. was then formed, and Dr. Cheriton's initial investment of \$200 thousand is now worth over \$1.1 billion.

Not only has Dr. Cheriton seen tremendous financial success, he has also made significant contributions in his research, and in 2003 was awarded the SIGCOMM Lifetime Achievement Award by the ACM. This award was initiated in 1989 as "a means of honouring computer communication professionals for outstanding lifetime technical achievement in the fields of data and computer communications."

Dr. David Cheriton was interviewed by telephone on Friday January 15th 2010 by Eric Naslund, one of our outstanding 2nd year Mathematics undergraduate students.

**Forbes 2009 List*

Eric: How did you first come to UBC?

David Cheriton: Well, I first came to UBC as an undergraduate in 1971. I was a transfer student from the University of Alberta as my parents were living in Edmonton.

Eric: How did you become interested in Mathematics?

David Cheriton: I think I have always enjoyed Mathematics. In public school, I found it amazing how things worked and fit together, and I always found the problems interesting. I didn't like to memorize a lot of random things like they end up doing in other fields, and in Mathematics if you were smart enough you could just rediscover what the rules were or how to solve some problem rather than having to remember it.

Eric: What memories do you have of UBC, good or bad?

David Cheriton: Well, let's see. I have good memories of riding out to UBC on my bicycle from my aunt and uncle's place in West Point Grey. The ride up the hill from where they were located was always a good piece of exercise in the morning. I would often ride back on Marine Drive, right along the ocean.

I have fond memories of being in classes in the Math building. It's still the same old Math building as I saw when I was there recently. The high ceiling, old fashioned wood trim and so on. I really enjoy those types of buildings.

I was involved in Theatre when I was at UBC, and I have great memories of being involved in a Freddy Wood production. I met a very attractive young lady who was my girlfriend for the time I was at UBC. She was also in Theatre.

Of course there were the cinnamon buns in the Old Auditorium. I always went there in the morning for hot cinnamon buns. It's great to see that place renovated, but I am not sure where you would get cinnamon buns from now, if any place.

Eric: I heard that you originally wanted to go into Music?

David Cheriton: I have always had this great interest in Music. At the University of Alberta I applied for Music as well as Mathematics, and they rejected me in Music and accepted me in Mathematics. That was sort of the end of my aspirations to get a university education in Music. Although I took more Music lessons, vocal lessons from Donald Brown, who was a Music instructor at UBC, I ended up doing it as a hobby.

Eric: How would things have been different if you had gone into Music instead?

David Cheriton: I doubt that I would be in the same financial situation. But money has never been the top priority for me. I think I would have been less happy because one of the things I discovered as a student was the unfortunate experience to run into people in Music who were better than me without trying. I met very, very talented people and came to the realization that no matter how hard I tried I would not have been in the same league as they were. That's why I think I wouldn't have been as happy there in the long term. Also, in Theatre I encountered people at UBC that really lived and breathed Theatre in a way that I didn't, and I realized that I didn't quite have the involvement or the commitment needed to continue on in that. So I think it turned out for the best.

Eric: Did you have a favourite course or topic in Mathematics?

David Cheriton: Yes well, let's see. I really enjoyed Topology (currently offered as Math 426/427), and I liked Measure Theory (Math 421). The other elements I discovered somewhat later on in my career at UBC. I think the last courses I was taking, were on proof theory, mathematical logic and the theory of computation, which I found fascinating.

Eric: What influenced your decision to go into Computer Science?

David Cheriton: There was actually a very significant event at UBC. I was taking three courses in my fourth year. One was about the Theory of Computation, another was on Mathematical Logic (currently the seldom offered Math 415), and the third one was on Set Theory (the old Math 414). All three courses came at undecidability and the theory of computation from three different angles at the same time. There was Gödel's incompleteness proof, the halting problem, and Post-systems, and I recognized that these were all the same thing. To me it was such a dazzling idea of undecidability that permeated these formal systems that I felt I needed to study this further. That made me very enthused about getting the computational context which seemed like an exciting one. Being able to know there was something computers simply could not do, I'd call it mind-boggling or mind-blowing, and it was really that experience that made me go into Computer Science.

Eric: How did you first get into the entrepreneurial aspect of Computer Science?

David Cheriton: When I came to Stanford there were a number of people involved in outside consulting activities, and a few that were looking at starting companies. One was Jim Clark, a pretty well known internet entrepreneur, the man behind Netscape, and a colleague of mine at Stanford. He was starting his first company called Silicon Graphics. There was also Andy Becholsteim who was at Stanford at the time and was founding Sun Microsystems. I saw other people doing this which gave me connections in the area, and acted as a role model to follow as well. That got me interested, and then over the years I was involved in a number of these companies. I tried to start a company myself which was at first unsuccessful. I got involved by knowing the people and knowing how to do this, by seeing the obvious rewards, and by seeing the technology out there.

Eric: Can you tell us about founding Granite Systems?

David Cheriton: Granite Systems made gigabit ethernet switches. This was one of these unexpected events. I

had known Andy Becholsteim when he founded Sun in the early 80s and in 1994 I was taking a sabbatical from Stanford and had it all planned out. Then Andy showed up. He displayed great frustration with networking technology known as ATM, with which I actually had similar frustrations. We started talking and we both decided it was an opportunity to start a networking company. Ethernet was taking over the world and it was an opportunity to go faster than the standard 100 megabits. But it was also an opportunity to build a much more integrated switch chip. Andy knew a lot about hardware. I don't know that I can claim I knew a lot about networking but I certainly knew

more about networking than he did at the time, and so we decided to join forces and start the company.

Eric: What made you invest in Google?

David Cheriton: I originally knew Larry (Page) and Sergey (Brin) as PhD students at Stanford. They didn't work with me directly, but they came to me on a few occasions for some business advice. The first time they were looking for some advice about how to license

their technology to other companies. I suggested some people that could help. But I also mentioned that there were not many people I was aware of that ever managed to be successful by passing their technology off to someone else. They came back after a year of trying to license their technology to different companies, including Yahoo and other search engine companies at the time. This was in 1998, and they came and said they wanted to form their own company as they hadn't been successful with the licensing. They were concerned about raising the money. But I told them that raising the money wasn't a problem. I was willing to put in money and I knew many other people that were too.

Eric: What was it about their technology that convinced you to invest with them?

David Cheriton: Even the Stanford prototype of Google was dramatically better than the other search engines at the time. I'd be crazy to cite this, but here is the truth: the first time, I typed in "Canadian Exchange Rate" and found this site that was run by the Bank of Canada that provided a great set of information. I was literally surprised by this being the result. In 1998, many people don't remember, a number of companies started as search engine companies like Yahoo and Excite and others had been compromised into being iterated in circles so the search was terrible. They were more or less online magazines and newspapers that were not really good for searches. The Web had been growing enormously and I personally was having great problems trying to find things and I knew other people were too. So when I saw how good Google



David Cheriton

Photo: Martin Dee

was on every search that I typed in, I knew there had to be value there. But what I didn't realize was two things; how much value there turned out to be and also I didn't really appreciate how hard it would be to take it further.

Eric: Could you elaborate on that?

David Cheriton: It takes a lot of computer cycles, and a lot of networking analysts and a lot of computer resources to do a high quality search. The demo I saw had a small number of users using it. To make it viable you had to have tens of millions of users, so you really have to do a very good job of figuring how to stay alive at that level. A silly analogy is to imagine someone provides you with a really nice cup of lemonade, and you want to turn this into an enterprise. The problem is that the mechanism used to make the lemonade has to scale up cost effectively from hundreds to millions. Many people don't appreciate that Google is a technical marvel behind the scenes. To service a search is very simple, and the core algorithm, the page rank algorithm, is barely understandable. But the amount of careful engineering behind the scenes to actually deliver the result cost effectively is dazzling.

Eric: What do you feel is your greatest accomplishment?

David Cheriton: Well I don't know that I can identify a greatest accomplishment. Let me tell you a few things I feel proud of. I do feel like I gave Larry and Sergey some useful help and guidance in the early days. I don't deserve a lot of credit for Google overall. I am happy I had some small part, as some people have written, "It's hard now to imagine a world without Google." I certainly graduated a number of students who have gone on to have a useful impact on the world and I think that's another accomplishment. I will list a third area, that there's an amazing number of things that I have almost done wrong but didn't. I could probably come up with a long list of them, but I think I am convinced that one of the keys to success is just avoid doing really dumb things.

Eric: What is one of the most important things you have learned throughout your career and from your work?

David Cheriton: One of them is that there is a very useful perspective, the engineering perspective, on problem solving in life in general, which is all about trade-offs. You encounter choices and make trade-offs between the different options, and that type of trade-off thinking is certainly a big thing I have learned. Some people are after the perfect solution and sometimes there isn't one. Other people don't explore all the possibilities before they make a decision or choose a solution, which goes away once you think everything is all about trade-offs. What are the options and what are the trade-offs?

Eric: What can you tell us about your research and the Distributed Systems Group at Stanford?

David Cheriton: The Distributed Systems Group has migrated its interest over the years depending on my interest and the students' interests. It used to be more towards a broad system, application-independent view of how you build distributive systems. Then I spent several years looking at the internet as a distributive system and

trying to identify some of the issues there. More recently, I have become interested in the question of how to build distributive applications. I think there's an opportunity to build very complex applications that are automating even more complicated systems. Air traffic control is one of my favourite examples to point at where it ends up being distributed for performance and because the problem is geographical. So that's the primary area of focus these days, distributive applications.

Eric: What did it mean for you to achieve the SIGCOMM lifetime achievement award from the ACM.

David Cheriton: I was very honoured by that. It's always really exciting to be recognized by your peers in the field. When other people in the field who are very knowledgeable about what you're doing and knowledgeable about the field think that you've made significant contributions, it's really exciting.

Eric: There is a quote of yours I liked, "These people who build houses with 13 bathrooms, there's something wrong with them." Could you elaborate on this?

David Cheriton: Well I think that there is a certain type of craziness, people have a latent stupidity and that latent stupidity is held in effect by lack of money. Suddenly someone is given a lot of money, by an investment or some good fortune, and there is a danger they unleash this latent stupidity. I don't think building the largest possible house is anything other than craziness. It seems more like monument building. I think it is unfortunate when you have people with extra money doing things that seem just beyond what's real. Having the biggest house in the whole city seems to prove a point that doesn't need to be proved. I like the view that when somebody is fortunate and acquires a lot of money they can live a little bit better as a result. I think that's fine. But I think they should also try and retain the view that they are part of a society and the society is part of what enabled them to attain that wealth. There are more productive uses of it than 13 bathrooms.

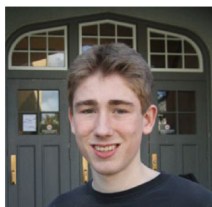
Eric: If you could give an undergraduate student one piece of advice what would it be?

David Cheriton: Try to take advantage of unexpected new opportunities and try to prepare yourself for unexpected opportunities that come along. That's pretty general, but to me it is a key element. I am also a big fan of Mathematics, and I'd advise people to take a small number of core Math courses as an undergraduate. You can take anything else you want, but just take a small number of core Math courses all the way through to the third or fourth year and that will set you up with the right disciplined thinking to do almost anything.

Eric: What does Mathematics mean in your life today?

David Cheriton: I regard Math as the basis for how I reason about things. While I don't think that I use terribly sophisticated Mathematics, many times just arithmetic, I think that the instinct I gained from being a Math student is invaluable. When somebody says something I immediately think, "Is that provably true or provably false?" and if not, perhaps is it just an opinion. The same is true when

something comes out of my mouth: I tend to ask, is this a theorem or is this a conjecture? I believe that style of thinking, part of using carefully made definitions, really distinguishes people who do that from the vast majority of the human race. ■



Eric Naslund



Photo: Robert Kinzmann

The Mathematics Annex building on a beautiful summer day.