Craig Barrett (BS 1961, MS 1963, PhD 1965, MSE)

As Chairman and former CEO of Intel, Craig Barrett (BS 1961, MS 1963, PhD 1965, MSE) is one of the best known names in the technology business.

Back in 1974 as a young associate professor of materials science and engineering, Barrett decided to leave academia to join Intel as a technology development manager. Over the years as he rose to run the company, he never forgot his connection to Stanford or his commitment to education at all levels.

Barrett granted this interview as part of a larger set of stories on the four decades of partnership between Stanford Engineering and Intel (soe.stanford.edu/companies/profiles/intel.html).

In what ways has Stanford’s School of Engineering been important to Intel over the years?

It has been important in a variety of ways:

• We obviously hire a large number of Stanford graduates
• We interact with Stanford professors and support research programs at Stanford
• We have joined with other companies in creating research consortia at Stanford
• Intel’s participation in Semiconductor Research Corp. and Focused Centers Research Program activities have included many research programs at Stanford
• the ideas generated by Stanford faculty and students during their research have helped shape the future of the semiconductor industry

How have the interactions between Intel and Stanford affected the development of semiconductor and computing technology?

Across the board from computer architecture, to semiconductor device modeling, to new packaging technologies, to new computer programming algorithms, the work at Stanford has helped move the industry forward. Industry does a good job at the D part of R&D – but we rely on the tier 1 research universities like Stanford on the R side – the basic research done at Stanford is typically pre-competitive research that impacts all companies in our sector – not in specific product development but in the ideas to solve the next generation problems – the issues that our industry faces 5, 10 or 15 years out. A good example is the semiconductor technology roadmap that drives our industry to follow Moore’s Law. The basic material, architecture, modeling issues described in the roadmap are the basics of the research carried out at universities like Stanford. The fact that our industry has been able to follow Moore’s Law for nearly 50 years with another 10-15 years in sight is an indication of how impactful the basic research done at Stanford has aided our overall development.

How do academic-industrial partnerships like that between Stanford Engineering and Intel contribute to economic growth?

Economic growth or economic competitiveness comes from three things: first and most important is quality education of the work force; second is the generation of new ideas that create the next generation products, services, companies, etc; and, lastly, creating the right environment to bring smart people together with smart ideas to do wonderful things. Stanford plays a critical role
in the first two issues – education and R&D – Stanford is ranked at or near the top in the quality of the Engineering School in education (especially MS and PhD level) and quality of research. And, Stanford helps to create the right environment for innovation through aggressive transfer of students, knowledge, faculty, etc. to local industry. As such Stanford is much more than an educational institution – it educates students with 21st Century skills, it does great research, and it closely associates with industry to promote innovation. Taken as a whole, Stanford fulfills the role of a center of wealth creation – not just an institution to train the next generation of workers.

When you were a student at Stanford, what interested you the most about your studies?

I was a post-Sputnik graduate when there was a huge emphasis on the role of new and advanced materials in promoting engineering excellence and economic competitiveness. The time I spent at Stanford both as a student and then on the faculty was exciting because of the quality of the faculty and students but also because of the breadth and quality of the basic research activities. It was not ivory tower research. Silicon Valley was just beginning in the early 1970’s and there was close association between the school and local industry. It was a time of rapid advancement in the industry and individuals on both sides (university and industry) could make huge contributions to move the technology forward. My interest in materials science (defects in solids, solid state phase equilibria, diffusion and interface structures, and basic solid state electronic designs) were exactly aligned with what was going on in industry. The ability to create new designs, new structures, and new devices and bring them to market almost immediately was totally different from the classic materials industry (steel, aluminum, etc) where it took years or decades to make a change. It was a terribly exciting time.

It would seem that the jobs of professor and industry executive are very different. How did you make that transition work so well?

I don’t think the worlds are that different. Engineers are trained as problem solvers and that is what business is all about. Engineers define problems to be solved, collect evidence and data, postulate explanations, and then see if the problem is solved. This is what business is all about. The fact that the most common educational background of the Fortune 500 CEOs is engineering is probably evidence of this correlation. One can only wish that perhaps we had a few more engineers involved in the political arena where there is no shortage of complex problems to be solved.

In the various times you’ve come back to campus, what has been your most memorable or favorite experience?

The best part is always interacting with the students – the energy, the enthusiasm, the quality – all these things make it exciting.