

Respect for Quantity

Inaugurele rede

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Prof. dr. Lis K. Nanver

1. Introduction

Let me start by making a comment about the title of my talk: Respect for Quantity. When I received the pre-print of the invitations I was horrified: they had turned it into "Respect for Quality". Now I have always been one to strive for quality, I have great respect for quality, who doesn't? But if I were to give a talk about quality, I would first have to define it. I'm not going to do that, because quality is subject to individuality. I am sure every one of you makes that definition every day, by the choices you are making when you buy clothes, drink wine or do research.

Now defining quantity is much more straightforward: my dictionary, for example, defines quantity as a considerable amount. In my field of work, Silicon Integration Technology, this is something we can relate to. We run into very considerable amounts all the time and more often than not do we find ourselves entangled in a web of activities all designed to tame this excess of quantity. This all reflects the fact that Silicon Technology is the first practical technology that manipulates and controls quantity all the way down to the atomic level and right up to the macroscopic scale where we lead our daily lives. Therefore, in my line of work: by tackling quantity we achieve quality!

2. Silicon Technology: the fragile link

Today everybody has some picture of what a chip is. In modern society chips are omnipresent and they have a profound and pervasive impact on every level of our daily lives - ranging for instance from small tagging chips, to personal computers, to communication satellites and even the whole organization of the national water supply. Modern warfare unfortunately also springs to mind. What we have been seeing in Iraq lately looks more like a highly complicated video game than old-fashioned combat.

And, of course, there is the ever-present Internet, yet another offspring of Silicon Technology. For example, to write this inaugural speech, I did not have to make one single trip to the library. In between preparing dinner, helping with homework and all the other important daily tasks that occupy your typical female professor, I could make detours to my computer and feed it with the appropriate search-words. Then I injected some key words into my semi-

intelligent text-processor and there you are - this speech practically wrote itself! Well, not quite, silicon chips cannot as yet replace the human thinking machine, but to put it unambiguously: microelectronics is the principal driver of the modern Information Revolution and will surely continue to be so for quite some time.

Let's first put Silicon Technology into perspective. Technically speaking: Silicon Technology is an enabling technology, in which we build the integrated circuits or microchips that are so popularly just called "chips". Let me sketch a diagram that illustrates more clearly where Silicon Technology belongs in the order of things (Figure 1). To do this I will attach some key numbers and quantities to the different elements in the diagram:

gigahertz speeds X-ray data stored in hosp

nanotechnology, nano-electronics,
quantum devices

data produced worldwide/year
total # transistors shipped/year

data in all US academic libraries

data in a short story

0.00000001

Silicon Integration Technology

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