

My first computer (1979)



- 64 KiloByte RAM
- 1 MHz clock rate

... my smart-phone (2009)

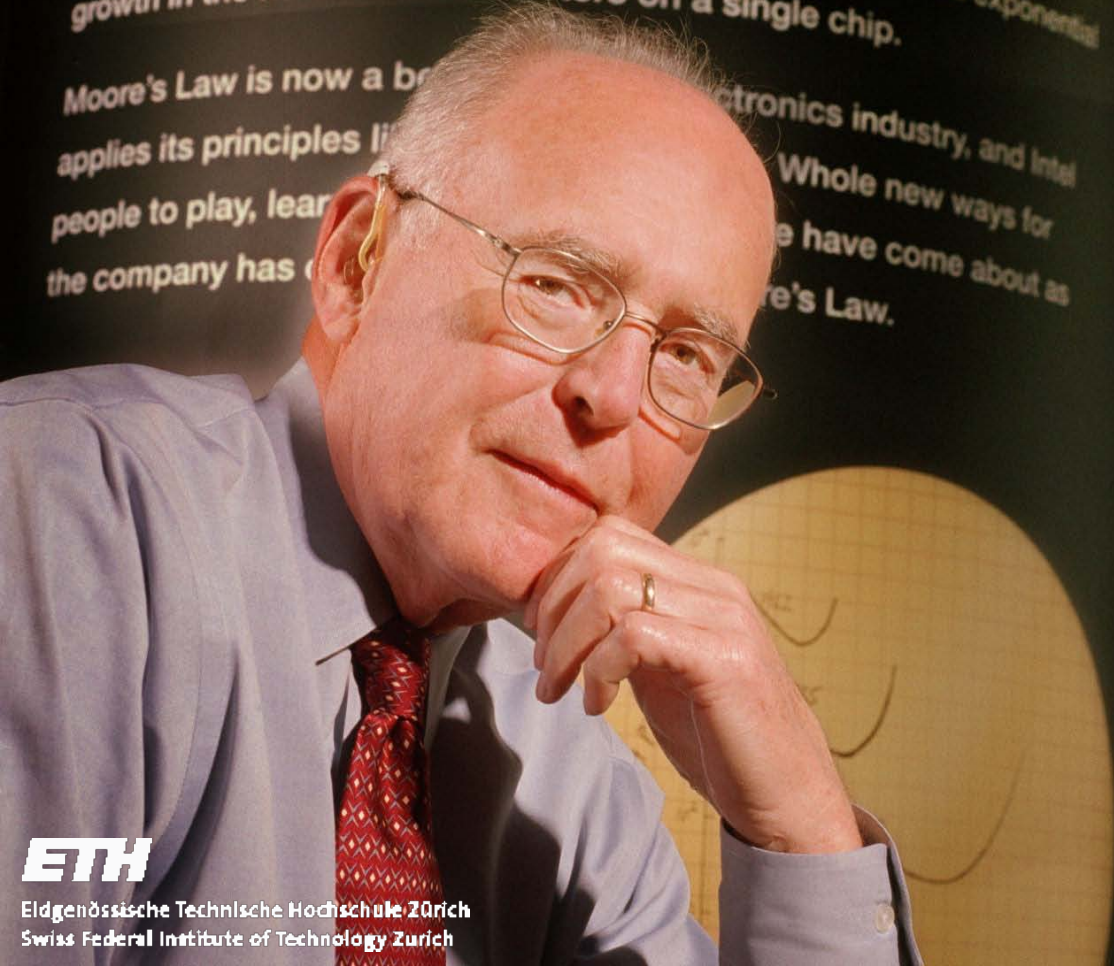
- 256 MegaByte RAM
- 1 GHz clock rate



Moore's Law

In 1965, Intel co-founder Gordon Moore predicted that the number of transistors on a piece of silicon would double every couple of years—an insight later dubbed “Moore's Law.” His prediction has held true, as ever-shrinking transistor sizes have allowed exponential growth in the number of transistors on a single chip.

Moore's Law is now a benchmark for the electronics industry, and Intel applies its principles to help people to play, learn and work. Whole new ways for the company has come about as Moore's Law.



The Development

“The number of transistors on a piece of silicon will double every couple of years.”

Gordon E. Moore, 1965
Mitbegründer von Intel

Is valid since more than
40 years!

1 cm



The first transistor

developed at Bell Labs 1947 by John Bardeen, Walter Brattain and William Shockley.

Nobel prize in physics, 1956

material:

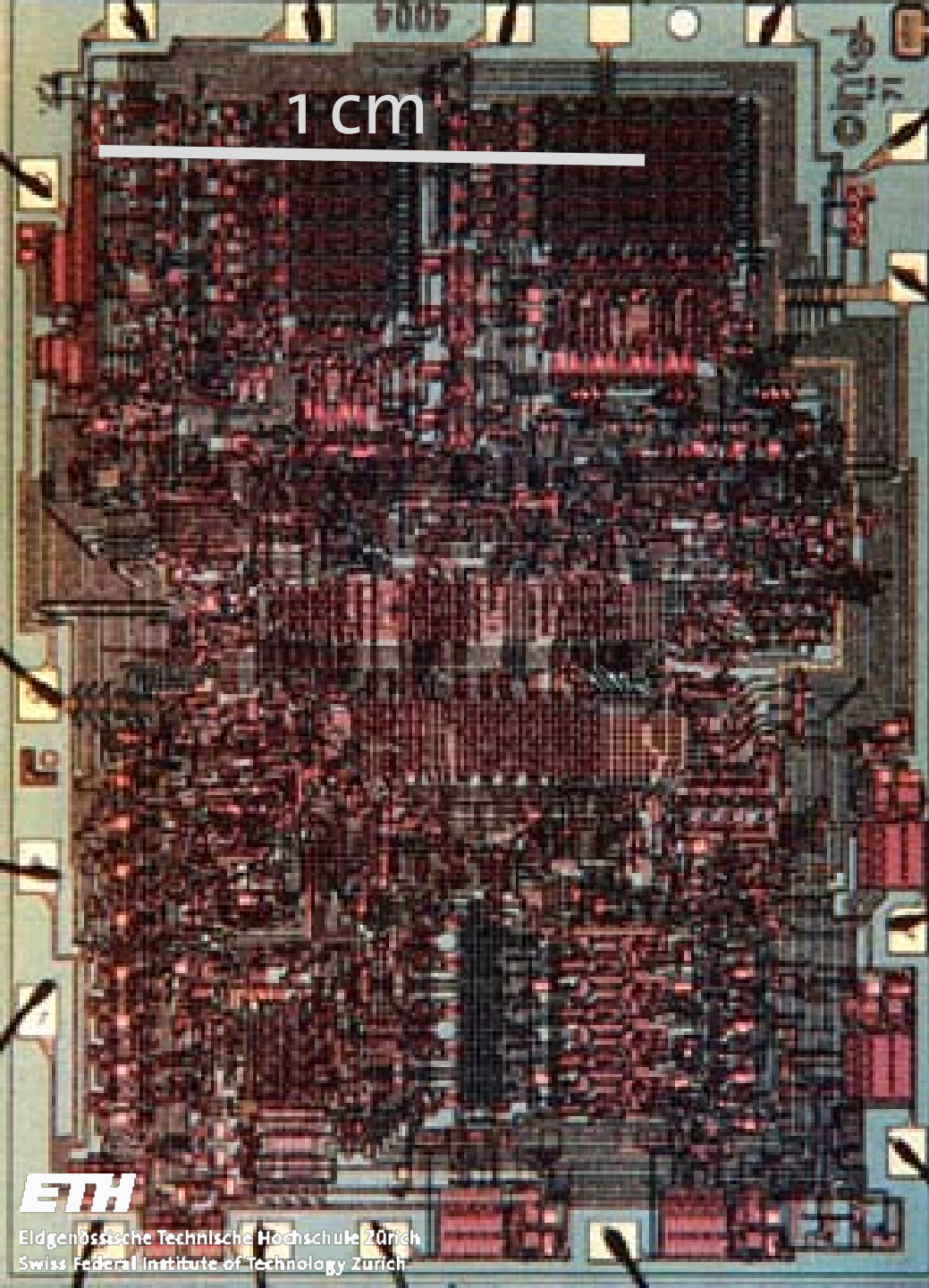
- semiconductor

clock rate:

- 1 Hz

dimensions:

- 1 cm



First Intel Processor

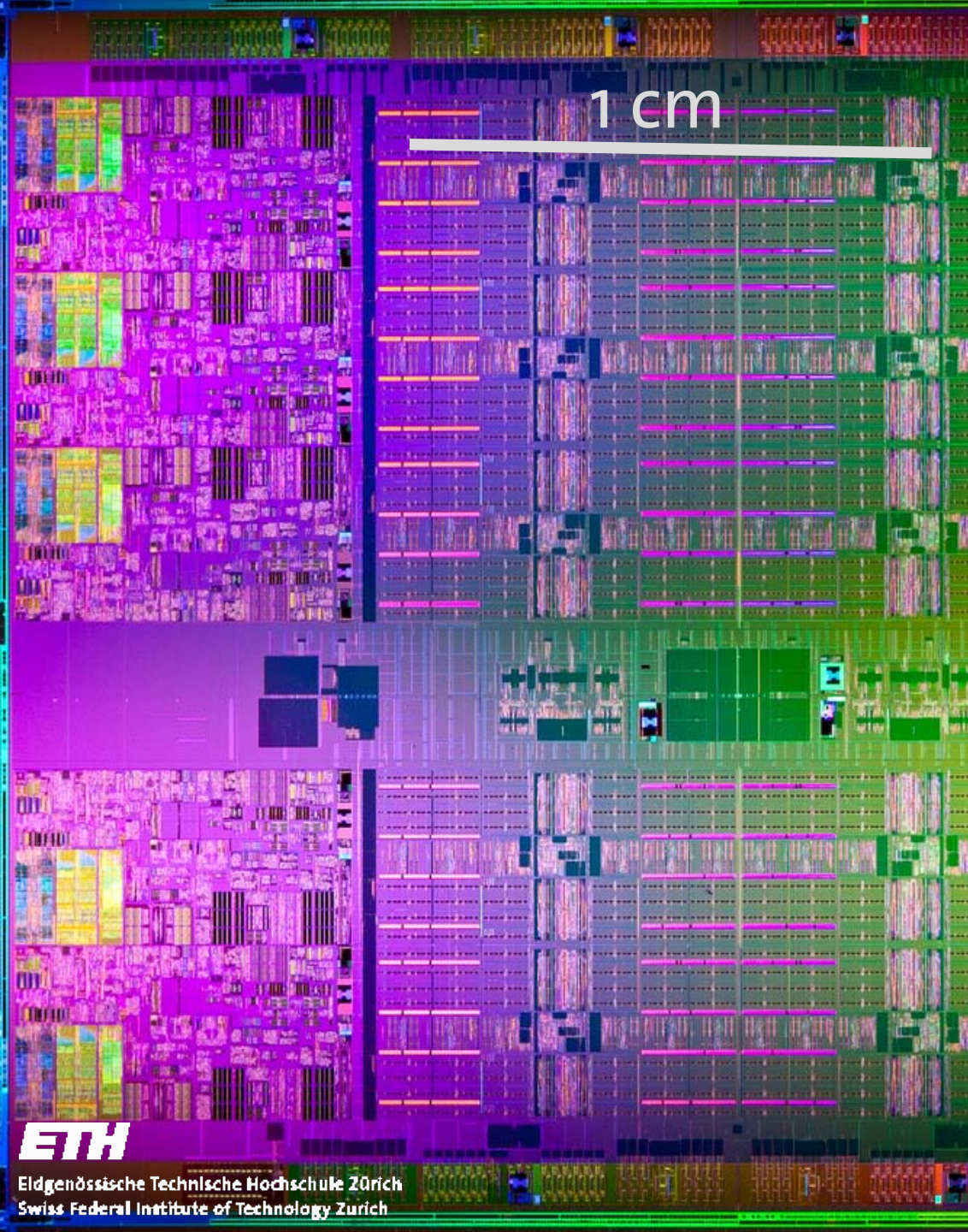
Intel 4004, 1971

- 2000 transistors
- 60 kHz
- 10.000 nm = 0,001 cm

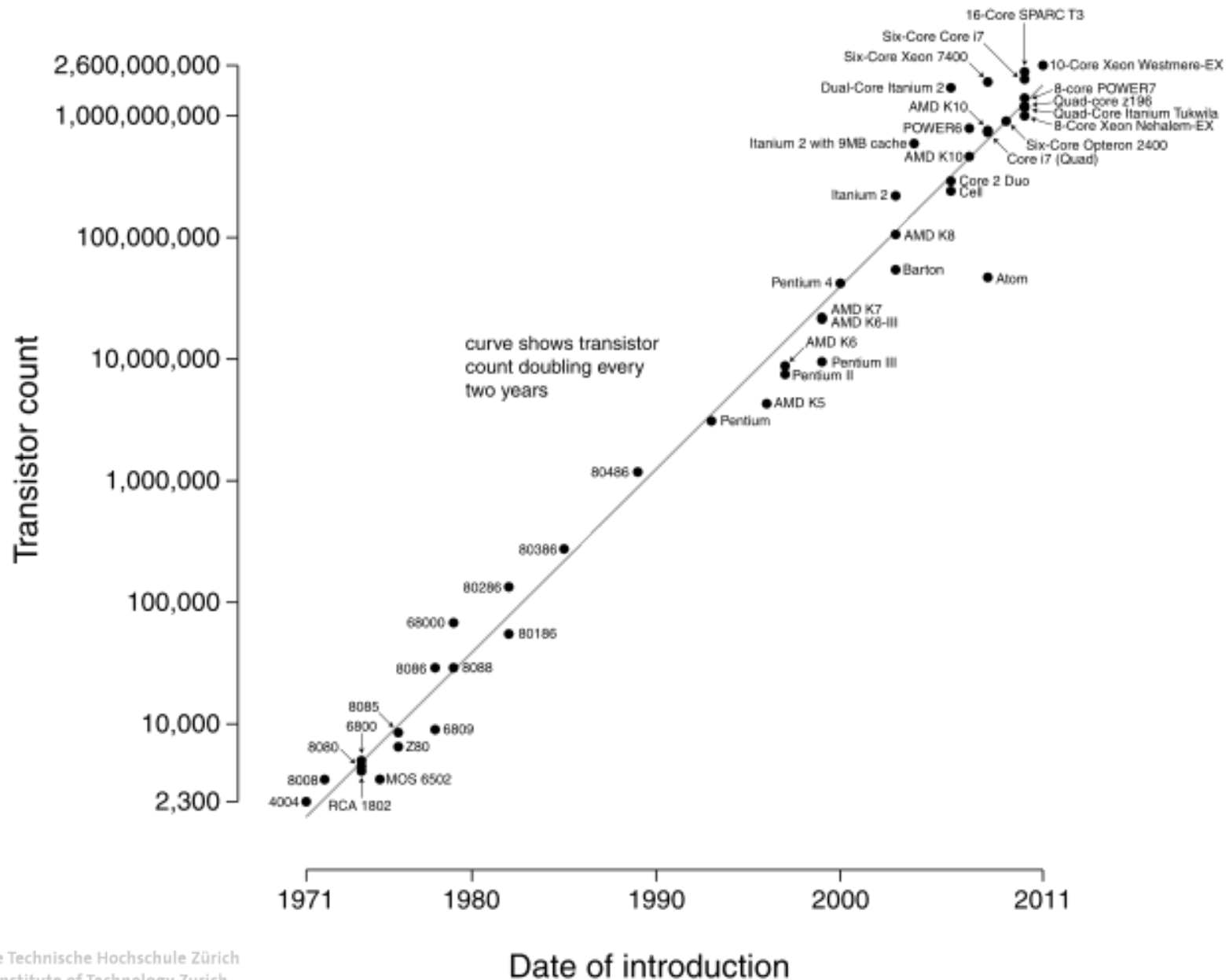
Today's processors

Intel Xeon, 2011

- 3 Billion Transistors
- 3 GHz
- 32 nm = 0.0000032 cm



Microprocessor Transistor Counts 1971-2011 & Moore's Law



Will information technology develop in the same way in the next 40 years?

Are there limits to the current technology?

Can we overcome these limitations?

What will future computing technology look like?

How small can electronics be?

1 nm



Electronic circuits may reach the size of atoms!

Will conventional transistors still work?

Is quantum physics a nuisance or can it be used?