1 cm

The first transistor

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

Nobel prize in physics, 1956

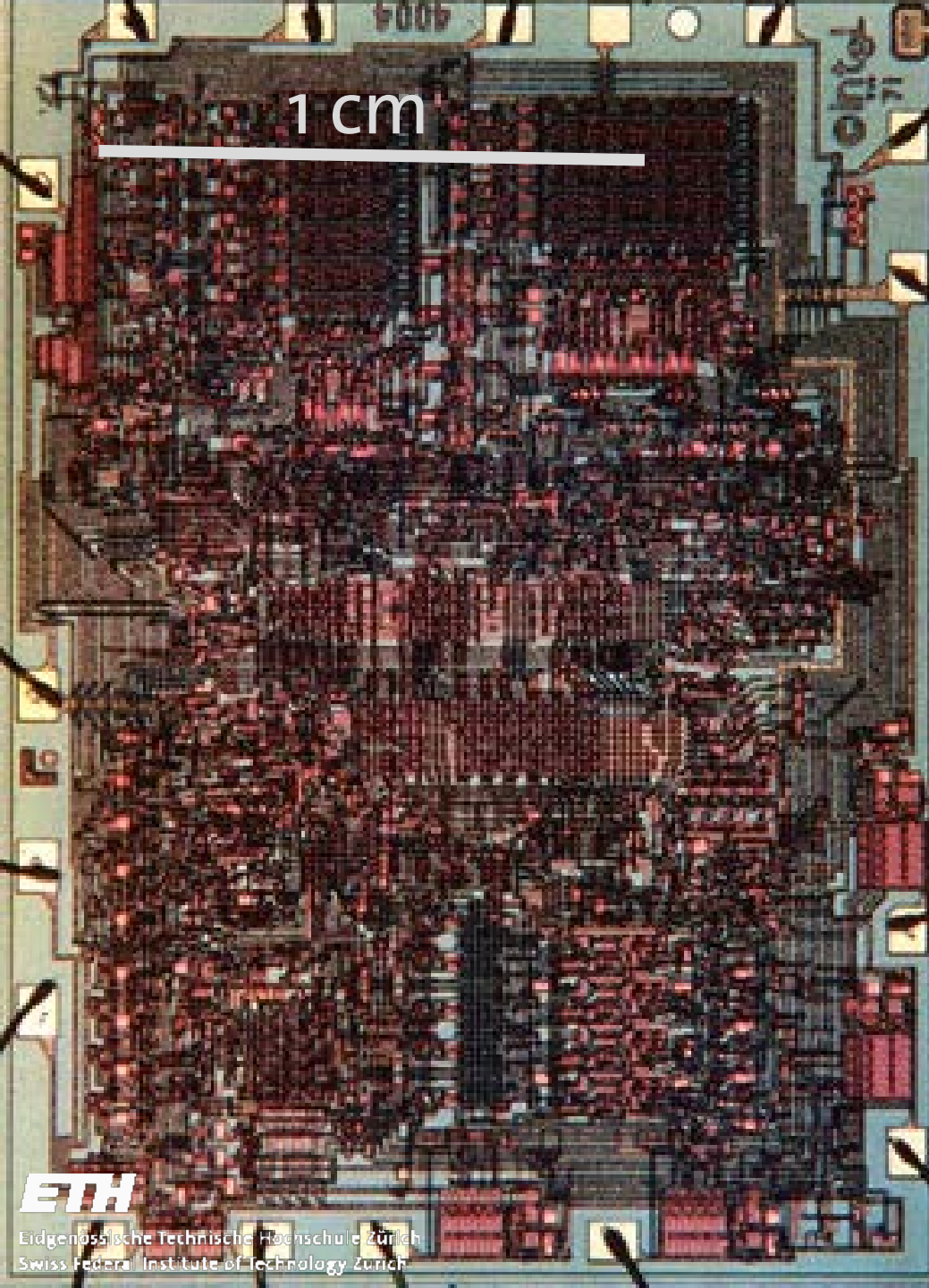material:
- semiconductor

clock rate:
- 1 Hz

dimensions:
- 1 cm

ETH
Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich
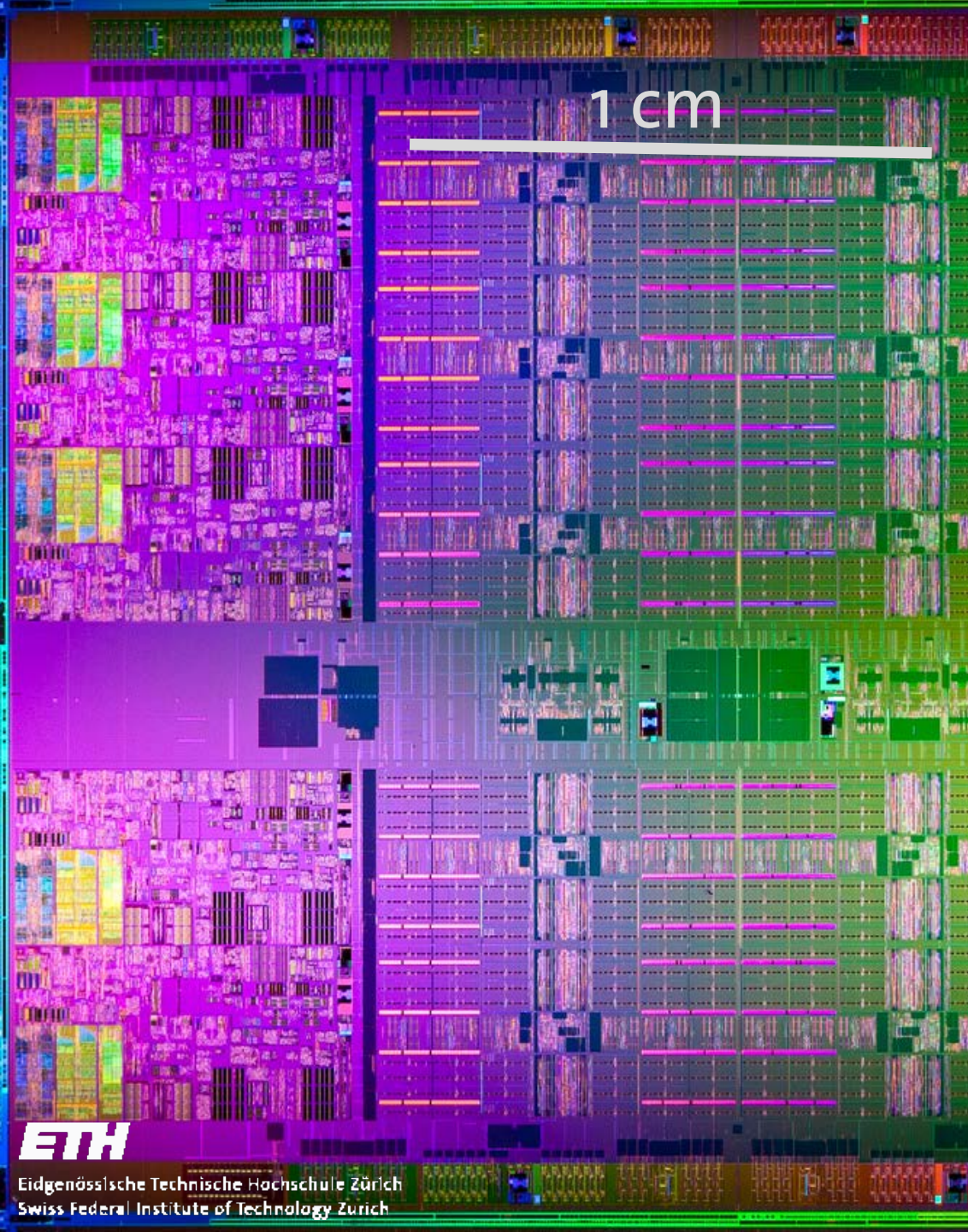
1 cm

First Intel Processor

Intel 4004, 1971

- 2000 transistors

- 60 kHz

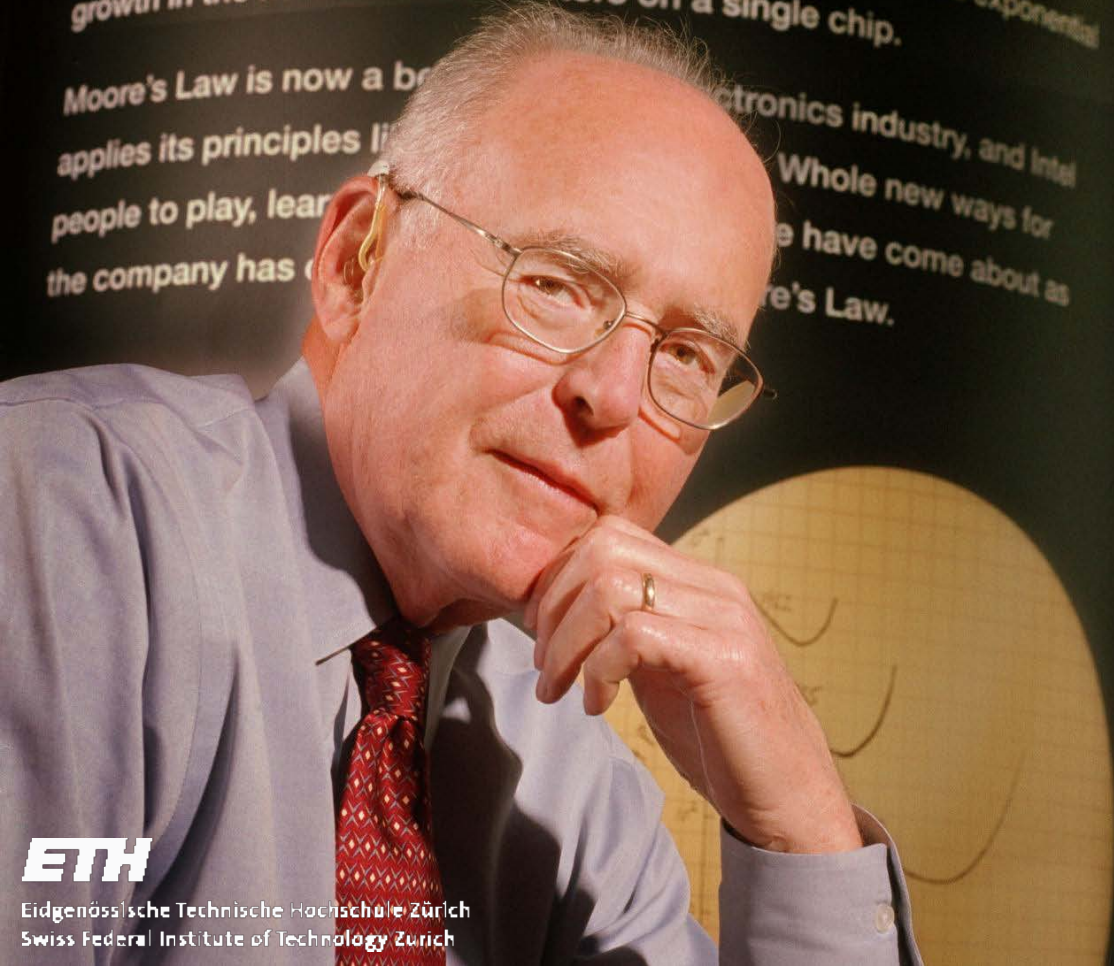- 10.000 nm = 0,001 cm

1 cm

Todays processors

Intel Xeon, 2011

- 3 Billion Transistors

- 3 GHz

- 32 nm = 0.0000032 cm

ETH
Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

The Development

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

Gordon E. Moore, 1965
Co-founder of Intel

Is valid since more than 40 years!

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 my reach the size of atoms!

Will conventional transistors still work?

Is quantum physics a nuisance or can it be used?

ETH
Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich