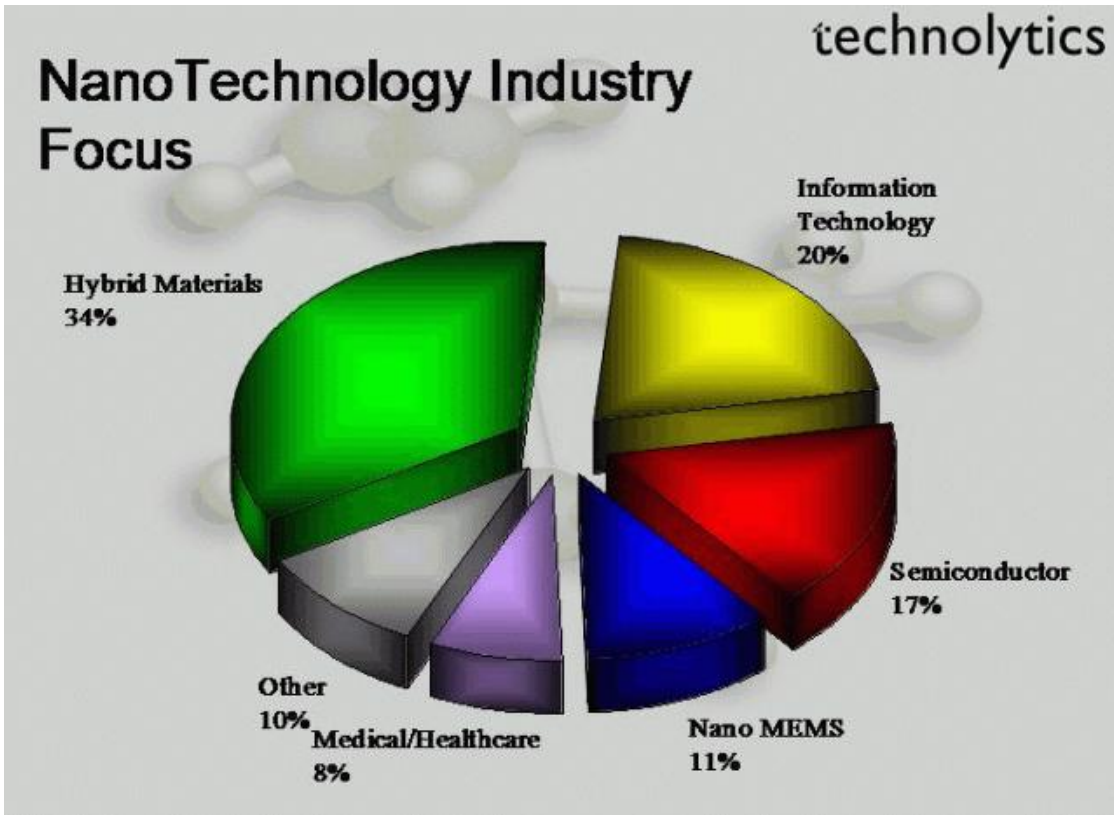


# Nanotechnology within IT and Automotive



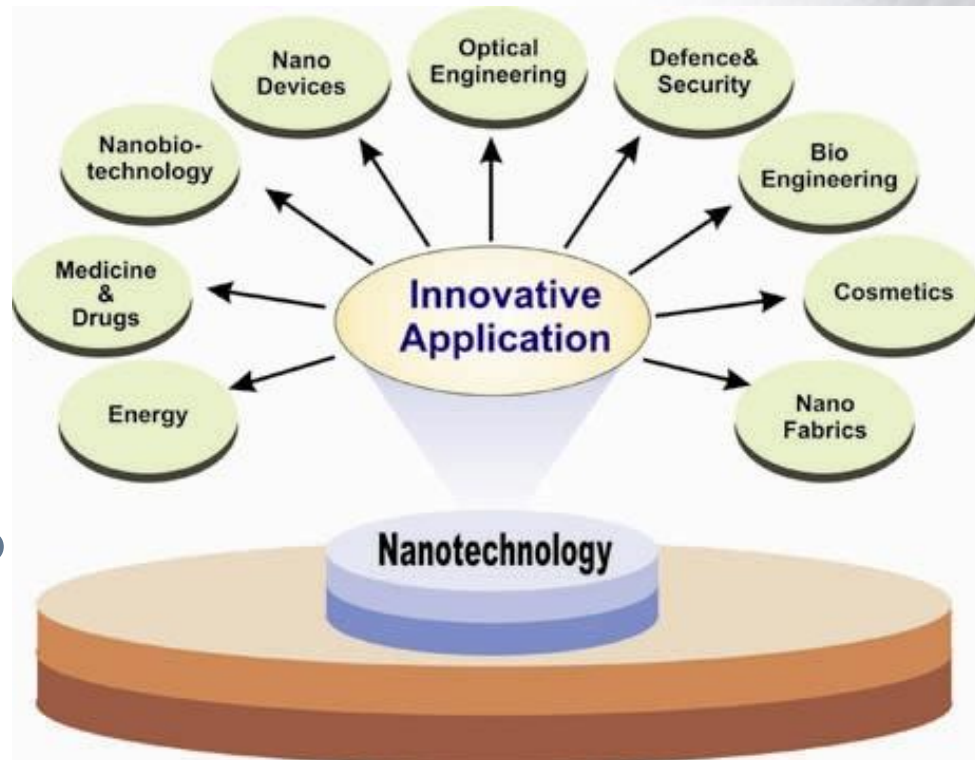
# Nanotechnology

## What is it?

Nanotechnology works with substances **within the scale of about 10-100 nanometers.**

The diameter of a hair is about 3000 nanometers.

The ability to manipulate substances in these small scales opens up possibilities to create **new features in material that we never seen before.**



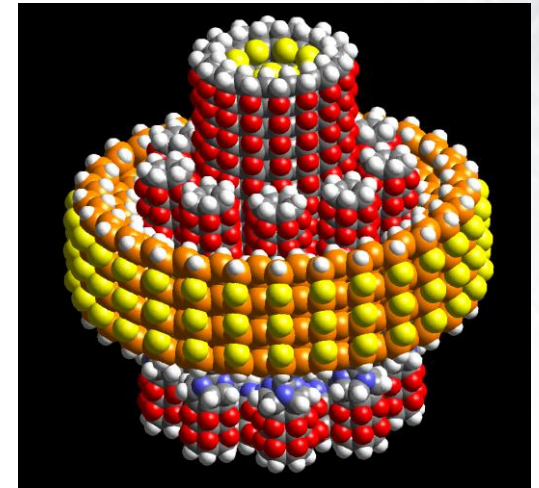
The possible areas are numerous

# Nanotechnology

## What is it?

The **computer chip industry** started it all!

**NanoMaterials** and process is ranging over areas such as coatings, industrial powders, chemicals, and carbon nanotubes and high temperature protective materials for spacecraft.



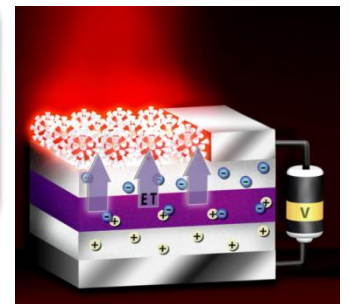
# Nanotechnology

## Some examples

**Material:** Superthin, superflexible, superhard etc.  
 "Intelligent" material that can change behaviour due to external conditions. E.g. temperature, moisture etc.

**Medicine:** Goal seeking drugs, finding the right spot and make repairing job. Inplants fully accepted by the body. Tools with completely new featur.

**Energy:** New ways of capturing solar energy.  
 More efficient than todays technology.



And more and more...

# Nanotechnology

## The IT area

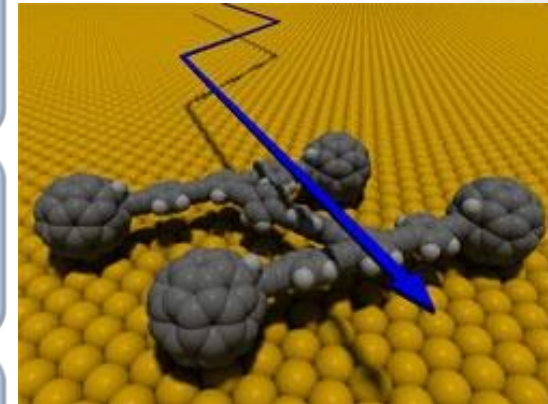
Keeping up with **Moore's law** has been a goal during >30 years.  
Now the **computer chip technology** have reached 30-40 nanometers.  
(Moore's Law: Computer chip capacity is doubled about every 2<sup>nd</sup> year.)

Here are some examples from the lab's today:

**Flexible hardware** such as screens, keyboards and other components. Thinner screens with low energy consumption.

New **battery technology** will produce long life batteries with short charging times, smaller size and with lower weights.

Disks with the size of a current DVD disk with a **storage capacity** of >100000 times more.



# Nanotechnology

## Automotive

Some projects currently within Volvo (e.g. VTEC):

- **New catalysts** technology
- **Cylinder liners** with extremely low friction
- **Hydrogen fuel cell** with better performance

Some possibilities for the future:

- **Paints** with new features
- **Windows** changing to sunglasses due to how much light is coming in
- **New material solutions** for literally all parts and functions in the vehicle

How will **the IT applications** look like and what kind of skill is needed to keep track of these new structures in our products?

# Nanotechnology

## Obstacles and risks

### Nano garbage and security issues

We are dealing with **substances with new features** never seen before. For instance "Intelligent" particles in drugs that can do very specific tasks to human cells by accident or by intention.

How will high volumes of "**nano garbage**" affect our environment and our bodies? Can they interact and create new features that we didn't foresee?

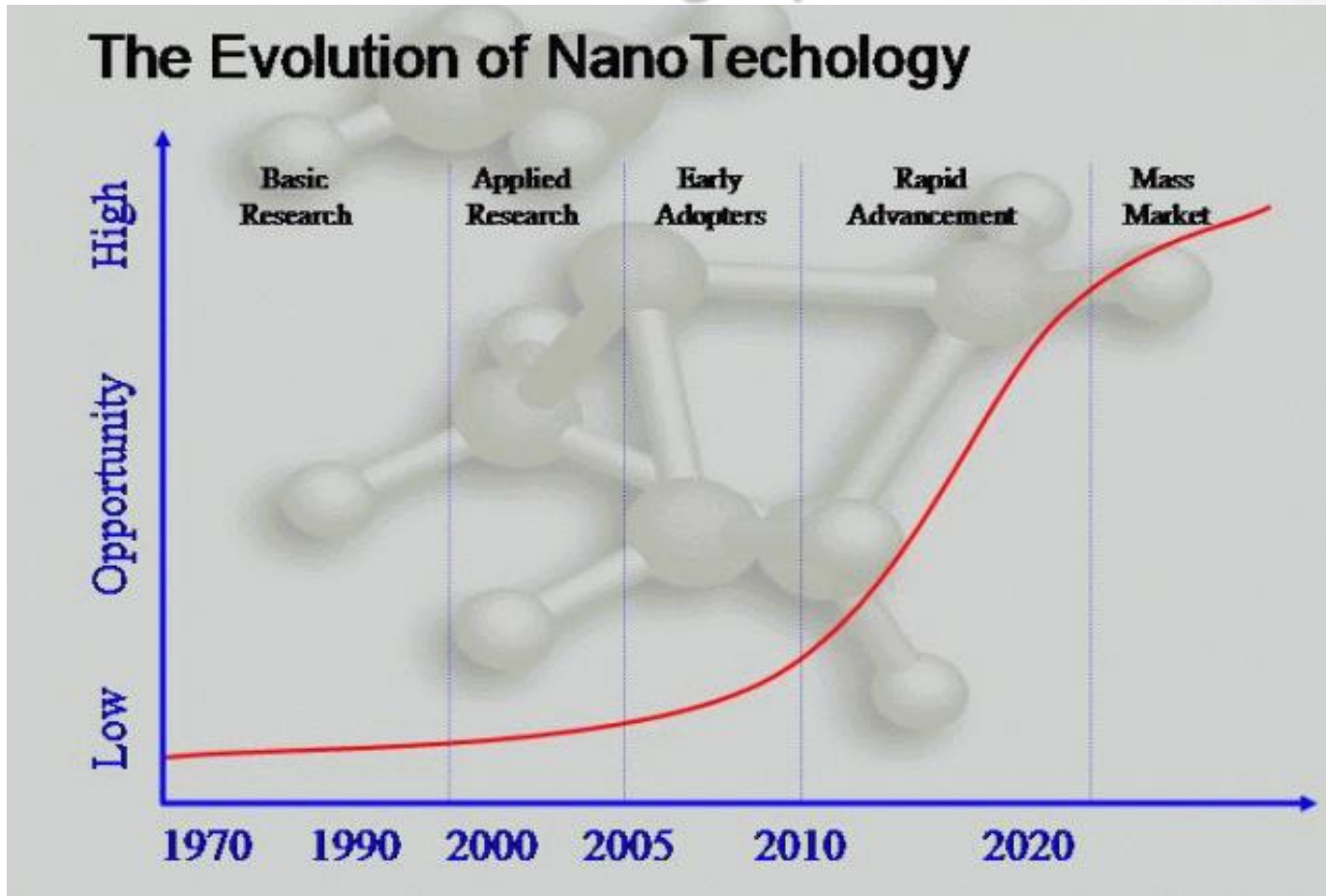
There is a debate today and many countries have already **strategies and rules** for this research area.

There are still many political, ethical and other kind of questions to investigate.



# Nanotechnology

## Summing up



# Nanotechnology

## Summing up

We are still **in the beginning** (except for silicon)

We can see **huge possibilities** for Volvo, transformation of energy and new material forms are first in line

... but there are also **risks** and important questions to deal with

