



Scientists build first reprogrammable nanoprocessor

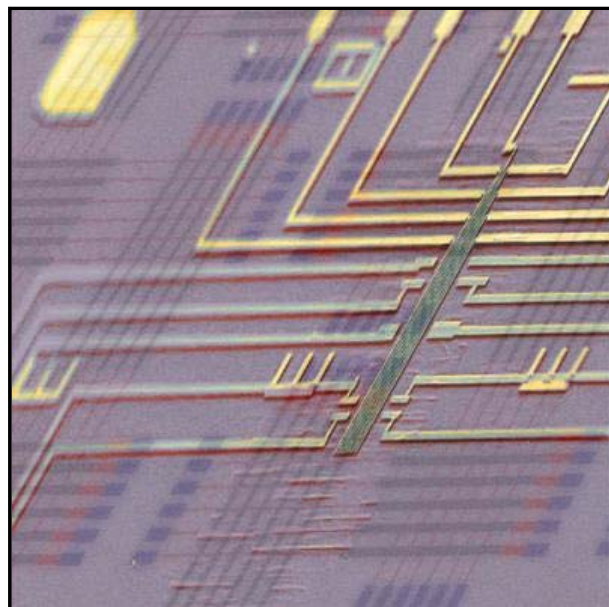
By Boonsri Dickinson | Feb 9, 2011 | 0 Comments

Five decades ago, physicist Richard Feynman thought of building tiny computers from atoms and molecules. In theory, the smaller we could make electronic components, the more memory the computer chip would have.

Researchers at Harvard University might have brought us that much closer to controlling matter on the atomic level. Harvard scientists announced the world's first prototype of a reprogrammable circuit made with nanowire transistors.

Technically, the nano-circuit could shrink the design of modern electronics and bring on a whole new class of small sensors and consumer gadgets. It would change how electronics are produced. But here, the scientists proved that it is feasible to make nanoprocessors with a bottoms-up approach, a way of building electronics by starting at the molecular level.

The idea is to get the nanowires to self-assemble from atoms to make a microchip. The atoms and molecules re-organize



themselves into more complex structures, the same way life assembles.

In this case, the Harvard researchers got the reprogrammable nanoprocessor to perform basic arithmetic and logical functions. It's an energy saver too. Once the chip is programmed, it doesn't require any extra electrical power to store memory.

Charles Lieber, a Harvard professor, said in a statement:

This work represents a quantum jump forward in the complexity and function of circuits built from the bottom up, and thus demonstrates that this bottom-up paradigm, which is distinct from the way commercial circuits are built today, can yield nanoprocessors and other integrated systems of the future.

The researchers published their results in the journal *Nature*.

The applications of microprocessors are endless: high-performance materials, sustainable chemistry, energy production and storage, information processing, miniaturized engineering, healthcare and the environment. Circuits built at the atomic level might soon be used to build a new generation of smaller, faster electronics.

It seems inevitable. The computer chips keep getting smaller and smaller.

"A decade ago, the transistors that make up integrated circuits were being built at a scale of 500 nanometers; today, the latest PCs contain Intel chips with transistors only tens of nanometers across. IBM is already planning to print circuitry on the 30-nanometer scale using new ultra lithography," according to a report put out by The Institute of Physics.

A scientist at MITRE, who worked with the Harvard folks, said:

Because of their very small size and very low power requirements, these new nanoprocessor circuits are building blocks that can control and enable an entirely new class of much smaller, lighter weight electronic sensors and consumer electronics.

If you're still curious about how the nanoprocessor was made, you can check out the details in *Nature*. The Harvard nanoprocessor is exciting news, as it shows that it is possible to build computer parts from nano tools and showed that it can be programmed to do math. Building the computer components this way is very different than the way your laptop and smart phone are made. In this system, the nanowires were stitched together to make a programmable microchip.

However, the scientists would have to make the nanoprocessor on a large scale, for it to infiltrate the electronics space. Hopefully, we won't have to wait another 50 years, before the famed physicist's dream of building nanocomputers is achieved. We're getting there... slowly. On the upside, the researchers do claim the process is scalable.

Photo: Charles M. Lieber, Harvard University

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