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Tiny Computers, Genomes Top 2001 Science List

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By Maggie Fox, Health and Science Correspondent

WASHINGTON (Reuters) - Breakthroughs in making tiny computers, progress on decoding the human genome and work on unraveling some of the Sun's mysteries topped the list of notable scientific achievements for 2001, the journal *Science* said on Thursday.

New drugs to treat cancer, a decision that people are indeed responsible for global warming and research on ``cold'' superatoms also made the annual top 10 list put out by *Science*, published by the American Association for the Advancement of Science ([news](#) - [web sites](#)).

But the work on the little computers, called nanocomputers, really stood out, said Phil Szuromi, a supervisory senior editor at the magazine who helped make the selections.

Although true computers the size of a few molecules are years from becoming reality, their potential was easy to visualize, Szuromi said.

``You can imagine something like powering a sensor that would be inside your body monitoring the level of a drug or monitoring the level of insulin. Or a little embedded pack to deliver drugs," he said in a telephone interview.

More mundane uses might be ``smart" lights that could automatically sense and adjust the lighting level, he added.

James Ellenbogen at the MITRE Corporation in McLean, Virginia, said 2001 brought a breathtaking rush of advances in the small but promising field.

``It's building up a momentum ... in a way that is going to have this transformative effect almost before people realize it," said Ellenbogen, whose not-for-profit company advises the U.S. government on technology issues.

In January, Yu Huang and colleagues at Harvard University in Cambridge, Massachusetts, reported they had made tiny wires, 1,000 times thinner than circuits, that can be scratched onto a silicon chip using today's technology.

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Jan Hendrik Schon and colleagues at Bell Laboratories, now owned by Lucent Technologies in Murray Hill, New Jersey, created diodes and transistors on the same tiny scale.

Groups at the University of Delft in the Netherlands, Pennsylvania State University, IBM and elsewhere reported making the equivalents of switches, wires and transistors on a molecular level this year.

``The industry is really intrigued," Szuromi said. ``There are reasons why places like Hewlett-Packard and IBM and Lucent take these things seriously."

The other advances identified by the association:

-The publication of detailed sequences of the human genome, the collection of all the genes, in February.

-The development of targeted drugs that can find and correct the defects in cells that cause cancer. One, Gleevec, is being marketed by Novartis to treat a form of leukemia.

-Work on super-cold ``superatoms" called Bose-Einstein condensate. Eric Cornell and Carl Wieman won the 2001 Nobel Prize in Physics for their work in the field, and other teams reported on continued advances.

-The declaration by the International Panel on Climate Change that human beings are, for sure, one main cause of global warming, the deterioration of the atmosphere caused by greenhouse gases such as carbon dioxide.

-In a related area, the discovery that the United States has a huge ``carbon sink" -- a mass of territory covered with plants that soak up extra carbon dioxide from the atmosphere, perhaps mitigating the effects of climate-changing global warming.

-Work in understanding the role of RNA in the cell. RNA was once seen as the working arm of DNA, which carries the genetic code, but studies show it can ``silence" genes and even help cut them up.

-A discovery that neutrinos, virtually massless particles, convert into other forms known as muon and tau before they leave the Sun -- solving a 40-year-old mystery.

-Work on new superconductors -- materials that can transmit electricity with very little resistance, thus preserving the amount used.

-Advances in understanding how brain cells called neurons signal to one another.

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