Next Big Future

Breaking news of disruptive technology and science that can majorly impact the future course of civilization. Answers for - What matters ? What is the sequence ?

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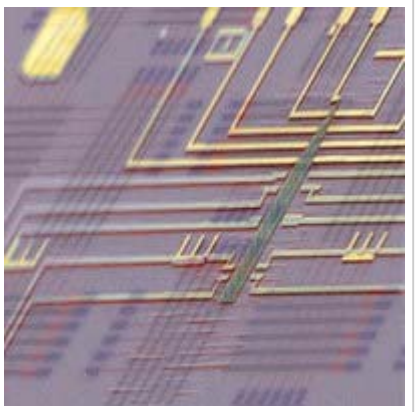
Researchers at Harvard and MITRE produce world's first programmable nanoprocessor with potential for 2 Terahertz switching



False-colour scanning electron microscopy image of a programmable nanowire nanoprocessor superimposed on a schematic nanoprocessor circuit architecture. Photo courtesy of Charles M. Lieber.

Engineers and scientists collaborating at Harvard University and the MITRE Corporation have developed and demonstrated the world's first programmable nanoprocessor. Nanowire tiles can perform arithmetic and logical functions and are fully scalable. In a significant step forward in complexity and capability for bottom-up assembly of nanoelectronic circuits, Yan et al. demonstrate scalable and programmable logic tiles based on semiconductor nanowire transistor arrays. The same logic tile, consisting of 496 configurable transistor nodes in an area of about 960 square micrometres, can be programmed and operated as a full-adder or full-subtractor circuit, and used for various other functions including multiplexers. It should be possible in future to cascade these logic tiles to realize fully integrated nanoprocessors with computing, memory and addressing capabilities.

Journal Nature - Programmable nanowire circuits for nanoprocessors

> *A nanoprocessor constructed from intrinsically nanometre-scale building blocks is an essential component for controlling memory, nanosensors and other functions proposed for nanosystems assembled from the bottom up. Important steps towards this goal over the past fifteen years include the realization of simple logic gates with individually assembled semiconductor nanowires and carbon nanotubes but with only 16 devices or fewer and a single function for each circuit. Recently, logic circuits also have been demonstrated that use two or three elements of a one-dimensional memristor array, although such passive devices without gain are difficult to cascade. These circuits fall short of the requirements for a scalable,*