"Stretchable Silicon" exhibit hits the road...

Hands-on mock-up of a stretchable silicon transistor--part of the Nano-CEMMS traveling exhibit

Just imagine. Surgeons will have sensors in their latex gloves, giving them real-time feedback during an operation. Electronic wallpaper will display moving images or change colors at the flip of a switch. Electronic books and newspapers will allow you to turn the pages like conventional books. Computer will fold up inside a pen that you can put in your pocket. And all of this is just a few years away thanks to the wonders of nanotechnology.

“Stretchable Silicon, the Next Wave in Electronics,” a new traveling exhibition from the Center for Nanoscale Chemical-Mechanical-Manufacturing Systems (Nano-CEMMS) at the University of Illinois, made its debut on Saturday, September 29, at the Tech Museum of Innovation in San José, California. The display, which was unveiled at the U of I Foundation meeting earlier this month, examines the mechanics of stretchable silicon computer chips that can bend and stretch, eliminating all the limitations of the rigid silicon wafers that form the basis of today’s electronics and opening the possibilities for exciting new products. Stretchable silicon has already been named one of the top 10 emerging technologies in the *MIT Technology Review.*

Nano-CEMMS educators developed the display in collaboration with John Rogers, a professor of materials science and engineering at Illinois who has led the team to develop stretchable silicon.

"Stretchable silicon offers different capabilities than can be achieved with standard silicon chips," Rogers said. "Functional, stretchable and bendable electronics could be used in applications such as sensors and drive electronics for integration into artificial muscles or biological tissues, structural monitors wrapped around aircraft wings, and conformable skins for integrated robotic sensors. Some of the research by Rogers and his fellow researchers--Dahl-Young Khang, a postdoctoral research associate in materials science and engineering; Hanqing Jiang, a research scientist in the Depatment of Mechanical Science and Engineering, and

Display allows visitors to view silicon circuit details under a microscope.

Yonggang Y. Huang, a professor of mechanical science and engineering--was done with the support of Department of Energy through the Frederick Seitz Materials Resarch Laboratory and the Center for Microscale Analysis of Materials at Illinois.

The museum display has several components, including a hands-on mockup model of the stretchable silicon that museum visitors can bend and stretch; an actual silicon circuit under a microscope with buttons that allow visitors to stretch and relax the circuit; a monitor that shows the wave amplitude changing depending on stretch of the sample; a repeating video that introduces the practical uses of stretchable silicon; wooden concept manipulatives that demonstrate rigidity and flexibility; and a facilitator guide and operating manual.

Funded by the National Science Foundation, Nano-CEMMS' research addresses a central problem in the development of nanotechnology: how to assemble structures at sizes smaller than can be seen (or transduced) and manipulated (or transcribed).

"Making three- dimensional, nanoscale devices and systems from millions to trillions of different types of molecules is incredibly difficult," explained Nano-CEMMS Director Placid Ferreira. "The center's goal is to develop a reliable, robust and cost-effective nanomanufacturing system to make nanostructures from multiple materials. This technology will allow advancements and discoveries in nanoscience to move from the laboratory to production.

"Within ten years, nanotechnology will be a trillion dollar economy, and products made with stretchable silicon will be part of vast product changes," Ferreira added. "This display allows the general population to visualize the technological changes and economic opportunities about to occur."

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