What New Device Will Replace the Transistor?

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Abstract
The transistor is the great success story of 20th century technology. Nonetheless, the device is 65 years old, and it cannot be expected to continue to serve the needs of civilization forever. The transistor is a relatively insensitive switch, demanding an operating voltage close to 1 Volt for On/Off switching.

In principle, a more sensitive switch could be powered by a few milliVolts, leading to a power saving of voltage squared. This could reduce power consumption by five orders of magnitude, or more. This is likely to be translated into a corresponding improvement in IT functionality for both the infrastructure core, as well as for wireless systems. Yablonovitch will review the world-wide efforts to replace the transistor with a more sensitive switch.

Biography
Eli Yablonovitch is the Director of the NSF Center for Energy Efficient Electronics Science (E3S), a multi-University Center based at Berkeley. He received his Ph.d. degree in Applied Physics from Harvard University in 1972. He worked for two years at Bell Telephone Laboratories, and then became a professor of Applied Physics at Harvard. In 1979 he joined Exxon to do research on photovoltaic solar energy. Then in 1984, he joined Bell Communications Research, where he was a Distinguished Member of Staff, and also Director of Solid-State Physics Research. In 1992 he joined the University of California, Los Angeles, where he was the Northrop-Grumman Chair Professor of Electrical Engineering. Then in 2007 he became Professor of Electrical Engineering and Computer Sciences at UC Berkeley, where he holds the James & Katherine Lau Chair in Engineering.

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