

The incredible shrinking transistor just got smaller

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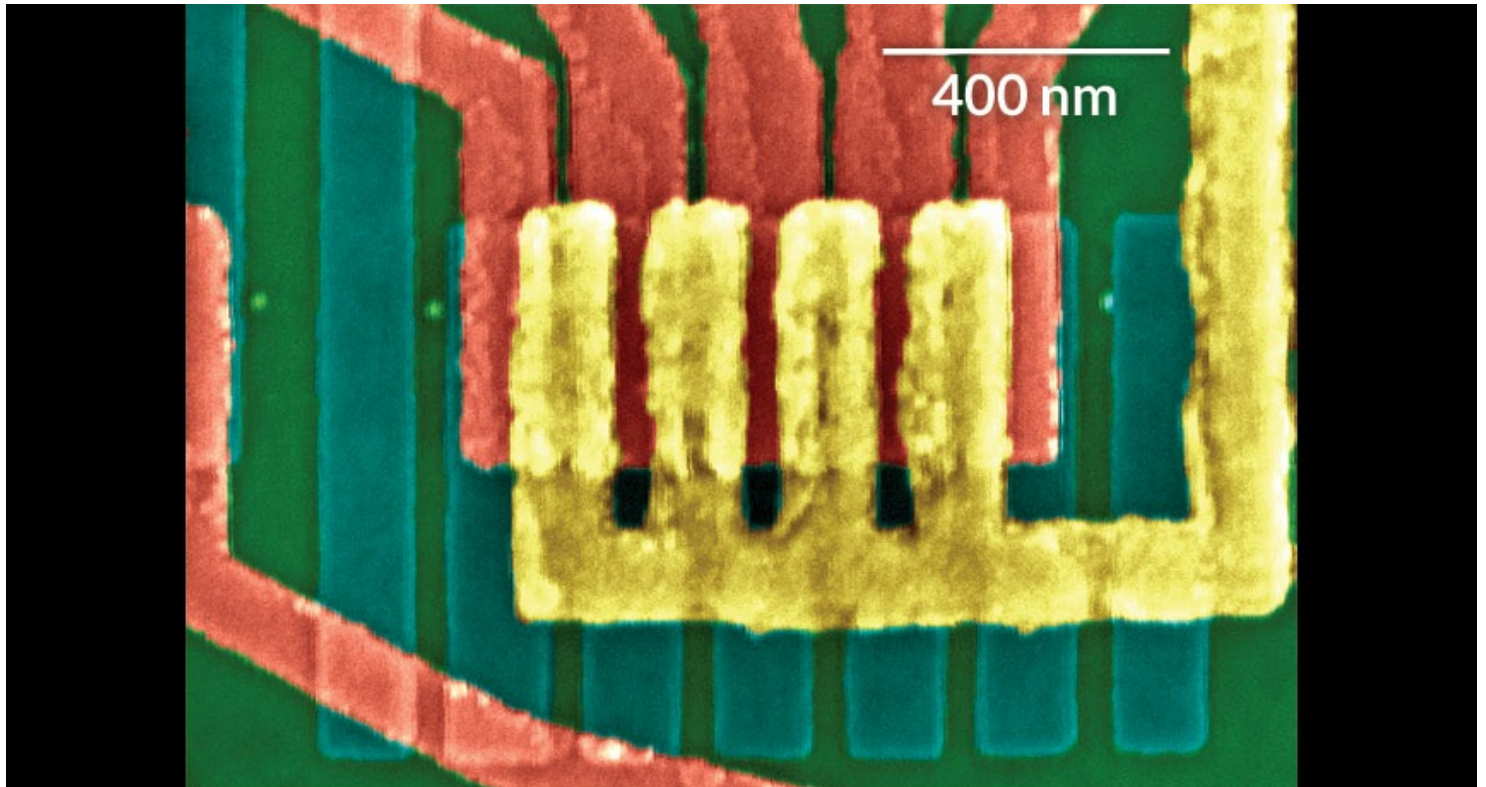
Emily Conover

Carbon nanotubes enable miniature components for computer chips

By

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SMALL WONDER A new transistor, made with carbon nanotubes, is tinier than standard silicon versions. Four itty-bitty transistors sit between barriers (blue). Current flows through electrodes (red). Gates (yellow) turn current on and off

IBM

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Carbon nanotubes may be the key to shrinking down transistors and squeezing more computer power into less space.

Historically, the number of transistors that can be crammed onto a computer chip has doubled every two years or so, a trend known as Moore's law. But that rule seems to be nearing its limit: Today's silicon transistors can't get much smaller than they already are.

Carbon nanotubes may offer a sizable solution. In the June 30 *Science*, IBM researchers [report a carbon-nanotube transistor](#) with an overall width of 40 nanometers — the smallest ever. It's about half the size of typical silicon transistors.

Researchers have created carbon-nanotube transistors with certain supersmall components before, but the whole package was still bulky, says study coauthor Qing Cao of IBM's Thomas J. Watson Research Center in Yorktown Heights, N.Y. The new study confirms that, in terms of size, carbon-nanotube transistors can beat out silicon — and that's no small feat.

Citations

Q. Cao et al. [Carbon nanotube transistors scaled to a 40-nanometer footprint](#). *Science*. Vol. 356, June 30, 2017, p. 1369. doi: 10.1126/science.aan2476.

