Model for the assembly of advanced, single-molecule-based electronic components developed at Pitt

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Researchers based at the University of Pittsburgh have created the best method so far of assembling wire-like structures only a single molecule wide, a significant step in science's increasing attempts to reduce the circuitry size of electronic devices to the single molecule scale and provide smaller, faster, and more energy efficient electronics. The findings were published online today in the *Journal of the American Chemical Society*.

Led by Hrvoje Petek, a professor of physics and chemistry in Pitt's School of Arts and Sciences, the project presents a template for assembling molecules over troughs that are only as wide as a single atom of copper, but can be made to several times that length, matching wires currently used in computers and other devices. These ultra-thin wires are one-dimensional, which may enable them to conduct electricity with minimal loss and thus improve the performance of an electronic device.

The published research pertains to organic--or carbon-based--soccer ball--shaped carbon molecules known as fullerenes, but the method can serve as a template for creating the very tiny wires from a broad range of organic molecules, Petek said.

The merits of these wire-like structures can only be fully realized with organic molecules. Materials used in contemporary electronics--such as silicon--are inorganic and cannot be miniaturized to be truly one-dimensional, Petek said.

Source: University of Pittsburgh