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## NANOIMPRINT gets second chance to make a good IMPRESSION

Researchers at Hewlett-Packard developed a 64-bit laboratory prototype memory (shown) in which molecules are used as the primary switching function. A startup has licensed HP's nanoimprint technology and is working to commercialize it—perhaps signaling a new era for the nanoimprint lithography market after years of hype and false starts.

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EE Times:

## Nanolithosolution works to take HP tech to market

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The bulk of nanoimprint lithography tools sold by such companies as EV Group, Molecular Imprints Inc., Nanonex, Obducat AB and Suss AG have gone to R&D applications. Now research labs and universities are getting another potential source for their nanoimprint requirements.

Hewlett-Packard Co. has licensed its nanoimprint lithography technology to Nanolithosolution Inc. (Carlsbad, Calif.) and has taken an undisclosed equity stake in the startup. Nanolithosolution will sell an inexpensive nanoimprint module based on HP's technology, which remains available to other potential partners through HP's intellectual-property-licensing organization.

HP began researching nanoimprint technology in 1997 for in-house development of next-generation devices. "We built our own [nanoimprint] system, not because we wanted to, but because we had to," said Stan Williams, senior fellow at HP Labs and director of the company's quantum science research group.

To date, HP has developed four generations of nanoimprint modules and has used the technology to achieve several announced breakthroughs, including a [64-bit memory](#) that uses molecules for the primary switching function.

In another example, HP recently claimed a breakthrough that could lead to the creation of a form of fieldprogrammable gate array that would be up to eight times denser than today's FPGAs. The technology, which HP calls a field-programmable nanowire interconnect, layers a 15-nanometer-wide nanoscale crossbar switching structure on top of a 45-nm half-pitch CMOS process HP now is working on a nano-alignment technology that it promises will improve the overlay for nanoimprint lithography.

HP continues to explore the development of devices using nanoimprint processing, but the [computer](#) giant has no intention of entering the equipment market, Williams said. Instead, it will leave that work to licensees like Nanolithosolution, whose AR-NIM-100 module is said to process 4-inch wafers at sub-10-nm feature sizes. The module fits into a traditional contact aligner and sells for less than \$100,000 in a standard configuration. The technology targets the research community, said Bo Pi, co-founder and chief executive of the startup. The other co-founder of the company is Yong Chen, a UCLA professor and former member of HP Labs. Nanolithosolution also claims to have found a way to rein in the rising costs for nanoimprint templates: mold sharing. Under the program, separate research efforts would share templates to minimize R&D expenses, according to Pi.

For now, Pi believes, nanoimprint can have its biggest impact on R&D rather than volume production. "Given the status of nanoimprint, it has a long way to go before it will reach the fab." "In the meantime, there are thousands of researchers [whose nanoimprint requirements] need to be addressed," Pi said.

-- Mark LaPedus

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