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Inspiring Minds

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## Using small molecules to miniaturize computer chips

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## Inspiring Minds

Modern integrated circuits (ICs) for computing chips are built using complex three-dimensional nanostructures of interwoven metal and insulating components. Manufacturing these devices require a lengthy series of repetitive steps of deposition, top-down patterning (via masking and photolithography) and etching. Decades of advancements in nanofabrication techniques have enabled consumer scale production of increasingly smaller integrated circuits, with devices featuring 3-nm components being put into production this year. However, as device features are pushed towards these small length scales, existing fabrication methods and materials are no longer viable. My research focuses on a “bottom-up” method to meet the increasingly stringent industry needs for film uniformity and precision. Using small molecules with extreme selectivity to metals for inhibition of sequential depositions, we’ve been able to demonstrate novel methods for sub-nm resolution of device manufacturing.