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Gate-all-around carbon nanotube field-effect transistor ZHIHONG CHEN, DAMON FARMER, IBM T.J. Watson Research Center, SHENG XU, ROY GORDON, Department of Chemistry and Chemical Biology, Harvard University, PHAEDON AVOURIS, IBM T.J. Watson Research Center, JOERG APPENZELLER, School of Electrical and Computer Engineering, Purdue University — The ultra-thin body of carbon nanotubes allows for aggressive channel length scaling while maintaining excellent gate control. In general, a gate-all-around (GAA) structure is expected to be the ideal geometry that maximizes electrostatic gate control in FETs. Combining the ultra-thin body of a carbon nanotube with a GAA device geometry is a natural choice for ultimate device design. In this talk, we demonstrate a gate-all-around single wall carbon nanotube field-effect transistor. This is the first successful experimental implementation of an off-chip gate and gate-dielectric assembly with subsequent deposition on a suitable substrate.

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