Charge Mediated Nonvolatile Spintronic Logic
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In this presentation a spin logic device called MESO is introduced which uses magneto-electric switching in combination with an efficient spin to charge transduction mechanism. The new family of spin logic devices is based on magneto-electric and spin-orbit effects, is energy efficient and addresses a prior shortcoming of all prior spintronic devices – the slow switching and interconnect speed, while it is also dimensionally scalable. The innovative impact of MESO logic is its realization of charge mediated interconnect at its output, and a voltage signal to the capacitive input of following gate. The proposed MESO devices scale favorably with critical dimensions of the device, showing a cubic scaling of energy/switching ($E_{MESO} \propto 1/W^3$) and square law scaling of energy with voltage ($E_{MESO} \propto V^2$). The proposed logic technology is superior in energy-delay product to the leading beyond CMOS options while allowing scalable nanoscale interconnects, and non-volatility.

BIO: Ian Young is a Senior Fellow and director of Exploratory Integrated Circuits with the Technology and Manufacturing Group of Intel Corporation, Hillsboro, Oregon. He leads a research group exploring the future options for the integrated circuit in the beyond CMOS era.

He received the B.E.E and the M. Eng. Science, from the University of Melbourne, Australia. He received the Ph.D. in Electrical Engineering from the University of California, Berkeley