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Abstract: "Driving Moore's Law into the future through Nano-electronics"

In 1965, one of Intel Corporation's co-founders, Gordon E. Moore, made a prediction that the number of transistors on an integrated circuit chip would double about every two years. Now known as Moore's Law, this prediction became reality and has become the heartbeat of the semiconductor industry for the last four decades. Intel Ireland Ltd is a testament to Moore's Law. From 1993 to the present day, four world class semiconductor fabrication facilities have enabled the production of state-of-the-art integrated circuit products, with minimum feature sizes as small as 35nm. As the semiconductor industry continues to reduce dimensions, many of the existing materials used in manufacturing will limit future improvements in density and will need to be replaced with new materials with unique properties and nanometer control. To identify such materials, research is needed to understand synthetic processes that can control material structure and composition at the nanometer scale and how this structure controls the properties of the materials. Critical nano-materials for the ICT and semiconductor industry include, nanometer size lithography templates, nanostructured device materials (such as carbon nanotubes and magnetic materials for spintronic applications), low resistance nanometer scale electrical interconnects, ultra-low capacitance dielectrics to separate metal interconnects, ultrahigh capacitance materials for fast delivery of power, and nano-material composite polymer materials to enable low stress packaging of silicon. This talk will provide some insight in to Intel's innovative 65nm and 45nm technology, and also show how Intel Ireland is working to meet the above research challenges, partnering with Academia to maintain the heartbeat that is Moore's Law beyond the 22nm technology node.

Bernie received a Masters Degree in Engineering (MEng) from Newcastle Polytechnic and has been working at Intel for the past 12 years holding various Engineering and Management roles across all four wafer fabrication facilities. Bernie is currently responsible for all silicon nanotechnology EU projects involving Intel Ireland. Bernie's semiconductor career spans 22 years, with other Process and Equipment Engineering positions held at Telefunken GmbH, Nortel/Bell Northern Research, Applied Materials and Newport Wafer Fab.

