

# One- and Two- Dimensional Carbon Nanostructures for Applications in Microelectronic Devices and Electrochemical Sensors

G. Keeley<sup>1</sup>, T. Lutz<sup>1</sup>, N. McEvoy<sup>1</sup>, S. Kumar<sup>1</sup>, M. Schreiber<sup>1</sup>, N. Whiteside<sup>2</sup>, and **G. Duesberg<sup>1</sup>**

<sup>1</sup>Trinity College, Dublin  
School of Chemistry / CRANN  
College Green, Dublin, 02  
Ireland

<sup>2</sup>University of Wollongong  
Wollongong NSW 2522 Australia

We investigate one- and two-dimensional carbon nanostructures such as carbon nanotubes and ultrathin carbon films for the improvement of electronic circuits and electrochemical sensors. Besides the synthesis of homogeneous nano-materials with reproducible properties, the manufacture of suitable contacts to these components remains a major challenge. We employ CVD and pyrolysis of gaseous and liquid precursors to fabricate carbon contacts, resulting in all-carbon devices and electrochemical electrodes. Examples of the fabrication of all-carbon electrodes and nano-devices will be shown. Particular attention will be given to the question of *why* nano-carbons function as electro-catalysts, since various explanations for their impressive performance have been proposed in the literature. For this purpose we have designed and constructed a novel electrode system, which permits the facile insertion and contact of as-grown nano-carbons as substrates for electrochemical studies.