Electrochemical imaging methods have thrived and expanded over the past two decades as a consequence of continued developments in instrumentation, theory and a diversity of applications. These developments have taken electrochemical imaging methods beyond the field of electrochemistry into chemistry in general and its borders with materials science, engineering and the life sciences. With a diversity of applications come opportunities to greatly enhance the capability of such methods, particularly with regard to multifunctional imaging and pushing these methods to the nanoscale. This contribution will provide an overview of work from Warwick in this area and highlight some recent and ongoing developments that are seeking to develop multifunctional electrochemical imaging through:

(i) the use of new types of probes, particularly new variants of the scanning micropipette contact method (SMCM) to allow high resolution investigations of electrode and mineral surfaces, resolving surface topography and activity unambiguously;

(ii) the development of completely new imaging modes, specifically intermittent contact- scanning electrochemical microscopy (IC-SECM) and scanning electrochemical cell microscopy (SECCM) that allow the activity, topography and properties of surfaces and interfaces to be resolved simply and effectively. These developments build on our earlier pioneering work with combined scanning electrochemical microscopy-atomic force microscopy (SECM-AFM);

(iii) combinations of SECM with spectroscopic techniques, such as fluorescence confocal laser scanning microscopy (CLSM) to allow rapid (millisecond) visualization of diffusion and heterogeneous reactions, including the tracking of membrane transport.

These various methods will be illustrated with applications including: the elucidation of complex electrode activity, including novel carbon electrodes (nanotubes and conducting diamond) and alloys; probing the behavior of biomaterials; and mapping the properties of biomimetic systems and, ultimately, living cells.

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**CBC SEMINAR ANNOUNCEMENT**

**Professor Patrick Unwin**  
University of Warwick

**New Directions in Electrochemical Imaging: Probes, Modes and Combinations**

**Date:** 6th December 2010 (Monday)  
**Time:** 2pm – 3.30pm  
**Venue:** NTU SPMS CBC Building Level 2, Conference Room  
**Host:** Nanyang Asst. Prof. Martin Pumera