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## **Nanostructured semi-conductive interfaces for real time analytical solutions**

Electrochemistry is the study of electrically stimulated semi-conductive interfaces to interrogate redox reactions, typically in solutions. In principle any compound that can be oxidised or reduced can therefore be analysed. Electrochemistry is a green technology that is fully portable and offers real time analytical data. In our research we focus strongly on the design and synthesis of novel semi-conductive nanomaterials and their application as sensor systems. Using a combined electro-analytical approach we develop the next generation of technological solutions to address analytical challenges in environmental impact assessment, developing diagnostic tools for point of care solutions, as well as energy generation and storage.

We have employed a variety of synthesis approaches to generate novel nanomaterials such as chemical cross linking to produce hydrogels, Schiff base synthesis to generate extended actuator polymer and inorganic enzymes mimics, metal nanoparticles and high surface area conventional polymer nanomaterials. These materials were applied in the development of analytical solutions for antibiotics in environmental systems, water quality monitoring, early disease signalling and health status evaluation.

In this presentation, highlights from the past almost 15 years of electrochemistry in South Africa, will provide a colourful road map to recent advances in the teaching, practice and application of nanostructured semi-conductive interfaces for real time analytical solutions, highlighting recent publications, aspects of research development, growth and the impact of electrochemistry in South Africa and globally.