

Seminar

Tuesday 1 February 2011

11.00 am - Room 531

David Garrett

Final PhD Presentation

Development of novel nanostructured electrodes for biological applications

Novel surfaces with the ability to electronically interface with living systems are highly sought after in many research fields. New electrode designs have the potential to increase the capture rate of electrons generated by microbial respiration thus improving the power output of microbial fuel cells and increasing the sensitivity of microbial sensors. Beyond microbiology, novel electrodes have the potential to record electronic events or induce responses in mammalian cells and are therefore sought after in drug discovery, neuroscience and medical bionics. In this talk several fabrication strategies designed to produce amperometric sensor electrodes for detecting the respiration current of bacteria will be discussed. The electrodes were modified with carbon nanotubes to act as needle like nanowires, accessing and interrupting electron transport in the bacterial cytoskeleton. To enhance the rate of electron capture, mediator molecules were covalently coupled to the electrodes. Early results from two of the electrode designs and one of the mediation strategies show measurement of respiration current from the common Gram positive bacteria *Bacillus subtilis* and allow changes in the metabolic rate of the bacteria to be tracked in real time.