



**Wolfson Department of Chemical Engineering Seminar
Lecture Hall 6, Wolfson Department of Chemical Engineering,
Wednesday April 25 at 1:30pm**

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Beyond Microbial Fuel Cells: ElectroMicrobiology and its applications

Microbial cells, alone and in microstructured biofilms, show an impressive set of interactions with polarized electrodes. In fact, microorganisms can use polarized electrodes to conserve energy, in both anodic and cathodic processes. ElectroMicrobiology has explored the effect of electrical current and potential on the metabolism and activity of a handful of microbial species, in which these interactions were exceptionally strong. In these microbial species (e.g., *Geobacter* sp. and *Shewanella* sp.), often termed strong electricigens, the redox proteins and the other biomolecules involved in extracellular electron transfer (EET) processes have been identified and studied in great details.

Following this initial discovery, ElectroMicrobiology researchers have attempted to develop Microbial Fuel Cells for energy recovery from wastewater. However, this effort has not been successful, because the EET processes in mixed microbial communities are generally weaker than those observed in single species electricigens. In recent years, ElectroMicrobiology has expanded to study weak electricigens, i.e., those microbial species in which electroactivity, albeit small, become relevant under well-defined environmental conditions.

Here, three applications will be discussed: a) Biofilm formation and activity monitoring through low-cost quantitative electrochemical methods; b) the role of weak electricigens in Microbially Influenced Corrosion; c) Bioelectrofermentation and other bioprocesses involving weak electricigens, which could provide new avenues for sustainable production of fine chemicals.

Weak electricigens are likely to play a role also in human gut microbiome, where the presence of trace transition metals and the prevalent anaerobic conditions, could change the microbial ecology and favor the proliferation of pathogens.

Refreshments will be served at 1:15pm