Joint Analytical & ChemBio Seminar

Prof. Stuart Lindsay

Arizona State University

Recognition Tunneling: A New Tool for Single-molecule Chemical Analysis

Thursday, April 28, 2016

12:15 pm

Room 1315 Chemistry

Electron tunneling though a molecule is, in principle, sensitive to the electronic states of the molecule, and therefore potentially useful in identifying single molecules. However, the electronic conductance of a real junction is usually dominated by (poor) contacts to the molecule. We have developed recognition tunneling (RT) to overcome this limitation. In RT, electrodes are functionalized with molecules that are strongly bonded to electrodes, displacing contamination and extending the tunneling range. The recognition molecules are designed to form non-covalent bonds with target anaylte molecules, capturing them from solution. The electronic signals are complicated, reflecting thermal fluctuations in these capture bonds, but can be analyzed using machine-learning. Applications being developed include single molecule DNA and protein sequencing, and analysis of glycans. Specific capture of single proteins may also be possible.