



**Wolfson Department of Chemical Engineering Special Seminar
Lecture Hall 6, Wolfson Department of Chemical Engineering,
Monday, November 25th 2019 at 11:00am**

Wearable Chemical Sensors for Monitoring of Infectious Diseases

Mr. Rami Busool

Advisor Prof. Hossam Haick

About 23% of the global population is estimated to be contaminated with Mycobacterium tuberculosis and among poor / low-income nations, tuberculosis (TB) accounts for 1.4 million deaths per year and one-fifth of adult deaths. When left untreated, each patient with active pulmonary TB is expected to infect 10–15 other people per year. Interrupting the transmission of disease is therefore of great importance and requires early detection in conjunction with appropriate therapy.

Through my study, I introduced and developed a wearable diagnostic device that could connect a variety of sensors, i.e. chips with 8 heterogeneous sensors, with different Monolayer-Capped Nanoparticles (MCNPs) and form an electronic acquisition network that acquires measured sensor responses and transmits them to computer labs or even cloud processing. The wearable device developed, i.e. the patch, was first validated in the laboratory before we used it in a prospective clinical study in Latvia. In total, we examined 51 subjects (21 TB patients, 30 healthy) in two different body areas; chest and arm. The data we received from the patch was analysed in different PCA methods and I obtained the best result from the implementation of Linear Discriminate Analysis (LDA) with 82.76% sensitivity, 100% specificity, 85.76% accuracy, respectively, and 0.93 receiver operating characteristic

Refreshments will be served at 10:45