



**Wolfson Department of Chemical Engineering Seminar**

**Monday, August 7<sup>th</sup>, 2023 at 13:30**

**Room 4**

**Autonomous Sensing Platform for Controlled Release of  
Chemotherapeutic Drugs**

**Vivian Darsa Maidantchik**

**Mid-PhD Seminar**

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In recent years, Chemosensitivity and Resistance Assays (CSRAs) such as MTT and ChemoFx assays have been used to gain insight into a patient's cancer. This technology allows clinicians to assess the likelihood of the cancer responding to specific treatments, as well as to guide treatment decisions. Disadvantages of *in vitro* methods are the long wait time for results, the requirement for a substantial amount of tissue, and the growth rate of tumor cells which differs from *in vivo*. Thus, more reliable data may be attained via detection and monitoring of cancer-related Volatile Organic Compounds (VOCs) *in vivo*, alongside biocompatible sensing technology.

A volatolomic analysis of human healthy and cancerous tissues was conducted utilizing Gas Chromatography-Mass Spectrometry (GC-MS), followed by the analysis through a novel hierarchical stacked geometrical configuration (HSGC) device, composed by functionalized graphene oxide-based sensors printed on free-standing cellulose films to swiftly acquire real-time spectrograms of VOCs.

The GC-MS analysis demonstrated that alkanes, carboxylic acids, and phenols are the most effective substances that the sensor array can detect. HSGC device created chromatograms of VOC spectra in healthy and cancerous tissues in only 1-2 minutes, enabling it to serve as an alternative to cryo-section analysis (45-60 minutes), or a wearable spectrometer. Further research is focused on applying bioresorbable wearable sensor arrays to measure the effects of chemotherapeutic drugs on tissues in real-time.

By offering real-time data in the midst of cytotoxic treatment, we could drastically improve the lives of cancer patients by providing faster and more accurate results in comparison to biopsies without additional effort.

**Refreshments will be served at 13:15**