**Department of Chemistry**
**The University of Western Ontario**

# PAUL de MAYO AWARD LECTURE

## Dr. Gregory Wallace

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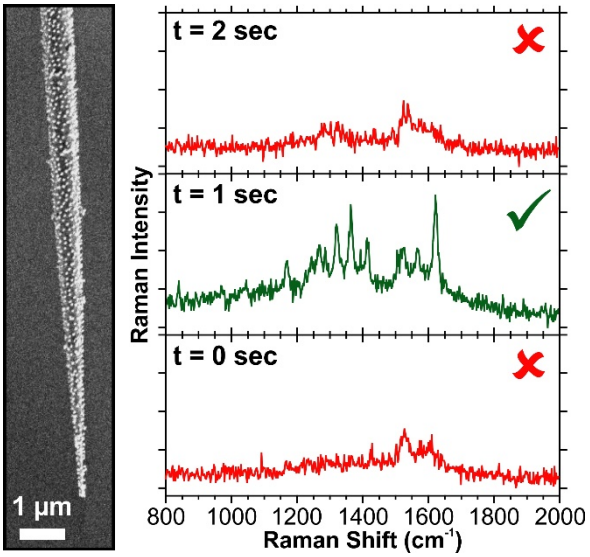
## Surface-Enhanced Raman Scattering Nanosensors for Optophysiology: Exploring Neurochemistry in Near-Real-Time

### Thursday, June 13th, 2019 at 1:30 pm
### Room 9, Chemistry Building




Over the past decade, the interest of surface-enhanced Raman scattering (SERS) as an analytical technique for both qualitative and quantitative detection of analytes, especially in complex chemical environments, has grown significantly. Exploring biological processes, such as neurotransmitter secretion, are of interest for SERS-based detection, as conventional techniques often suffer from poor temporal resolution or a lack of multiplexing capability. By using dynamic acquisition (less than 100 milliseconds per spectrum) and exploiting the unique vibrational fingerprints of the biomolecules of interest, it is possible to probe these processes in near-real-time. This talk will cover the recent advancements made in the Masson group in the field of SERS-based optophysiology for neurochemistry.

The first part of the talk will cover the preparation of the nanosensors by nanotemplating using a block-copolymer brush film. By varying the structural characteristics of the nanoparticles used during the fabrication, it is possible to impart unique opto-geometric properties. The SERS sensing performance of these nanosensors for a variety of analytes, including neurotransmitters, will then be shown. Machine learning is subsequently employed to evaluate detection of the neurotransmitters in mixed solutions. The last portion of the talk will show how the combination of the SERS-based detection coupled with machine learning can be applied to neurotransmitter secretion in biological samples, with the final goal of performing in-situ measurements within slices of brain tissue.

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