

**CAMaR/MatChar Workshop**  
**Advanced Materials Synthesis and Characterization**  
 Taking advantage of our shared facilities...

**March 10, 2020**  
**STEM 364**

Time		
9:00 – 9:10	Opening Remarks	Tito Scaiano
9:10 – 9:50	Versatility in Imaging: From TIRF to Super Res all on one platform	Wesley Lewis, Nikon Canada
9:50 – 10:10	Real-time Fluorescence Imaging of Heterogeneously Catalyzed Suzuki-Miyaura Reaction	Paolo Costa
10:10 – 10:40	Coffee break	Sponsored by Nikon
10:40 – 11:20	Advanced magnetic characterization methods: MCD a piece of a puzzle	D. Diogo Alves Galico & Muralee Murugesu
11:20 – 12:20	CAMaR Report	Tito Scaiano
12:20 – 13:30	Lunch break	Sponsored by CAMaR
13:30 – 14:10	Laser processing of materials with ultrafast lasers	Ravi Bhardwaj
14:10 – 15:00	<ul style="list-style-type: none"> <li>• Infrared Microscopy and Imaging</li> <li>• High-Purity Diamond - Growth and Characterization</li> </ul>	Serge Degreniers
15:00 – 15:30	Peptide-based materials: From electron transfer to regenerative medicine (Notice that we are considering peptide synthesis as a possible CAMaR service)	Emilio Alarcon

**Wesley Lewis, Nikon Canada**

**Versatility in Imaging: From TIRF to Super Res all on one platform**

This talk will be focused on utilizing Nikon's flexible Ti2 inverted microscope and Elements software platforms to expand imaging capabilities. Imaging modalities ranging from TIRF to confocal to Super Res all on one microscope, driven through one software platform, create an environment centered on ease of use and repeatability. With this platform, users can image a variety of samples in Photochemistry, Materials research and Cell Biology research.

**Paolo Costa**

**Real-time Fluorescence Imaging of Heterogeneously Catalyzed Suzuki-Miyaura Reaction**

Among C-C cross-couplings the Suzuki-Miyaura palladium-catalyzed reaction is one of the most important ones. For the first time, single-molecule fluorescence spectroscopy has been applied for monitoring with high spatial and temporal resolution the Suzuki-Miyaura reaction involving nanometric catalyst (Pd/TiO<sub>2</sub>). We showed that the catalyst species (atoms or small Pd clusters) have significant mobility indicating that a dissolution/redeposition mechanism is occurring during the reaction.

## **D. Diogo Alves Galico**

### **Advanced magnetic characterization methods: MCD a piece of a puzzle**

In recent years, molecular magnetic materials have sparked much interest due to their potential application in molecular electronics. More specifically, Single-Molecule Magnets (SMMs) and Single-Chain Magnets (SCMs) exhibit slow relaxation of the magnetization, thus behave as magnets below their blocking temperature. To characterize such intricate magnetic behavior, in-depth low-temperature magnetic measurements are required. Magneto-chiral dichroism (MCD) technique complements other magnetic measurement techniques such as SQUID magnetometry by providing a clear picture of the magnetic-optical activity of the system at low temperatures. Through MCD studies, the Stark sublevels of the molecular magnets, as well as magneto-optical hysteresis, can be elucidated. These studies open a new avenue for exploring intricate correlation between magnetism and optical properties of a molecular system.

## **Ravi Bhardwaj**

### **Laser processing of materials with ultrafast lasers**

In this presentation, I will give an overview of the laser machining platform and the advantages of using ultrafast laser to alter material properties on a micron scale. Selected examples will be presented to illustrate the unique capabilities of ultrafast lasers.

## **Serge Degreniers**

### **Infrared Microscopy and Imaging**

Fourier transform infrared spectroscopy is widely used for materials characterization. New microsampling techniques allow for surface analysis, chemical mapping, and point spectroscopy for which the highest detection sensitivity is required. Experimental capabilities and results of recent research projects will be presented.

### **High-Purity Diamond - Growth and Characterization**

For its extreme and remarkable physical properties, diamond is being considered as a material with a vast potential. Although natural sources of diamonds have been exploited for a long time, the synthesis of defect-free and high-purity diamond presents many challenges. A review of synthesis techniques will be presented along with recent results of crystal growths and applications.

## **Emilio Alarcon**

### **Peptide-based materials: From electron transfer to regenerative medicine**

In this presentation, we will briefly discuss the flexibility and advantages of using peptide-based structures in the contemporary research ecosystem. With some selected examples, we will illustrate the gamma of peptides structures we are currently using and working on.