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# Department of Chemistry

## *Seminar*

9:45 a.m. Thursday, May 5, 2016 • 331 Smith Hall



Associate Professor

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Department of Chemistry  
University of Washington

### ***Measuring correlated vibrational and electronic motions in molecules***

Research aims to understand the ultrafast structural dynamics of light-driven chemical and biological processes in solution. We study how transient molecular configurations on relevant electronic surfaces and their interactions with the surrounding solvent dictate the course of chemical reactions. Our goal is to design experiments that are sensitive to the details of the electronic and atomic structural rearrangements as the reaction of interest evolves over decades in time.

Website: <http://depts.washington.edu/chem/people/faculty/mkhalil.html>

#### **Abstract**

Coherent Fourier Transform multidimensional spectroscopies have had a big impact in understanding complex phenomena in condensed phases. In this talk, I will discuss novel third-order vibrational-electronic spectroscopies employing a sequence of femtosecond infrared and optical fields to directly probe vibronic couplings in solution. The selection rules and experimental configurations will be detailed and recent results on the coupling of specific high frequency vibrations to charge transfer transitions in small molecules will be presented. The talk will highlight how the newly developed vibrational-electronic spectroscopies can be used to measure coupled electronic and vibrational motions in complex systems in the condensed phase.

**Host: Professor Aaron Massari**  
**Refreshments will be served prior to the seminar.**