

**DEPARTMENT OF CHEMISTRY AND
ENVIRONMENTAL SCIENCE**

FALL 2016 SEMINAR SERIES

**Sponsored by: Purdue Pharma L.P.
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**Tuesday, October 4, 2016
2:30 PM**

**Faculty Memorial Hall
Room 309**

GUEST SPEAKER

**Dr. Xiaoji Xu
Assistant Professor
Lehigh University
Department of Chemistry
Bethlehem, PA**

TOPIC

**Nanoscale chemical sensitive infrared microscopy, and its applications in characterizations
individual aerosol particles**

ABSTRACT

Infrared microscopy with spatial resolution below the optical diffraction limit enables investigations at the frontier of nanoscience. One of such a super-resolution technique is the scattering-type near-field microscopy that achieves ~10 nm spatial resolution with spectroscopic sensitivity. In the first part of the seminar talk, I will present the latest advance of near-field infrared microscopy techniques developed by my research group on the bound electric field characterization as well as the implementation of scattering-type near-field microscopy of low repetition rate pulses. These techniques enhance the applicability of scattering-type near-field microscopy. In the second part of the seminar talk, I will present our research on the spectroscopic characterization of individual aerosol particles from urban pollutant. A non-near-field based infrared microscopy technique is developed for this project. The joint infrared spectroscopy and mechanical property mapping allow in-situ studies of the intra-particle structures of individual aerosols with diameters ~100nm or less. Further studies will be along the way of deciphering the formation mechanism of aerosol particles from their precursors and aging conditions.

BIOGRAPHY

Dr. Xiaoji Xu grew up in Beijing, China. He received his B.S. degree in chemistry from Peking University in 2004. He studied ultrafast laser spectroscopy with Prof. John Hepburn and obtained his Ph.D. degree in physical chemistry from the University of British Columbia, Vancouver in 2009. His postdoctoral research at the University of Toronto is on near-field infrared microscopy. Since his independent research at Lehigh University in 2014, he has so far published five research articles, applied for two patents, and received the Class 68' research fellowship from Lehigh University.

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