



# PHYSICAL SEMINAR

MONDAY,  
NOVEMBER 16<sup>TH</sup>, 2015, 4 PM  
HUTCHISON HALL 473  
DEPARTMENT OF CHEMISTRY  
UNIVERSITY OF ROCHESTER

GUEST SPEAKER:

**PROFESSOR ANDREW GREYTAK**

**University of South Carolina, Department of Chemistry and  
Biochemistry**

## **QUANTUM DOT PURIFICATION AND METRICS FOR RATIONAL CONTROL OF SHELL GROWTH, LIGAND EXCHANGE, AND QUANTUM YIELD**

Metrics such as absorption spectroscopy and transmission electron microscopy are suitable to characterize the size distribution, crystal structure and hence the band-edge electronic states of colloidal nanocrystal quantum dots. However, many applications of QDs depend sensitively on chemical reactivity or surface-mediated non-radiative decay rates, which depend strongly on interfacial structure. The achievement of suitable metrics to permit precise descriptions of QD samples is complicated by the fact that the surfaces of colloidal nanocrystals are subject to dynamic exchange with solution-phase species.

We have prepared highly purified nanocrystal QDs using gel permeation chromatography, and we are using these QDs to study the effect of ligand association on quantum yield, quantitative measurements of ligand exchange and shell growth, and preparative use in the development of robust, biocompatible QD fluorophores. By correlating these outcomes with analytical measurements of purified NCs, we hope to arrive at a set of metrics for colloidal QDs that allows their chemical and physical behavior to be abstracted from the details of earlier synthetic steps.

**HOST: PROFESSOR TODD KRAUSS, EMAIL: [krauss@chem.rochester.edu](mailto:krauss@chem.rochester.edu)**