

SPIE Student Seminar Series



Alexandra Brumberg

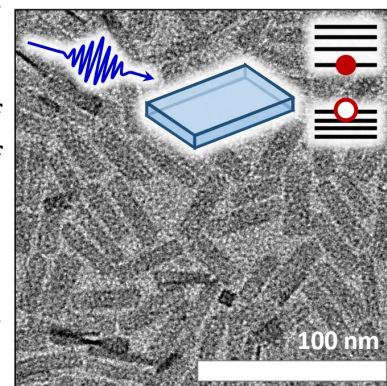
(Northwestern University)

Probing the Photophysical Properties of Semiconductor Nanoplatelets

Abstract: Recent progress in the field of nanomaterials has enabled significant advances in optoelectronic devices, such as solar cells, light-emitting diodes, photocatalysts, and sensors. One of the most effective ways of optimizing the properties of nanomaterials for such applications involves changing the number of quantum confined dimensions in the nanoparticle, as quantum confinement in one, two, or three dimensions results in drastically different optical and electronic properties. However, because the electronic

behavior of one- and two-dimensional nanomaterials is not captured by either that of nanoparticles confined in all three dimensions (i.e. zero-dimensional nanomaterials), nor by that of bulk materials, experimental investigations into their photophysical behaviors are needed to gain fundamental understanding regarding how nanoparticle dimensionality affects optoelectronic behavior.

In this talk, I will present my work investigating the effect of nanoparticle dimensionality on the optoelectronic behavior of semiconductor nanoplatelets (NPLs)—colloidal, two-dimensional nanoparticles that are quantum confined in only one dimension. In each study, I employ time-resolved spectroscopy to characterize the magnetic, optical, and structural properties of CdSe NPLs following photoexcitation, in order to gain insight into the behavior of NPLs in conditions relevant to optoelectronic applications.



Bio: Alexandra Brumberg is an NSF graduate research fellow and 5th year Ph.D. candidate in chemistry at Northwestern University, where she is advised by Prof. Richard Schaller. Her research uses time-resolved spectroscopy to probe the optoelectronic properties of colloidal nanocrystals, with a particular focus on two-dimensional semiconductor nanoplatelets. For her work, she has received a Ryan Fellowship from the International Institute of Nanotechnology and a 3M graduate research fellowship. Alexandra received her B.S. in chemistry and mathematics from Tufts University in 2016.

SPONSORED
BY

**SPIE. STUDENT
CHAPTER**



NORTHWESTERN
UNIVERSITY

UNIVERSITY
OF CHICAGO

PURDUE
UNIVERSITY

WASHINGTON
UNIVERSITY IN
ST. LOUIS

UNIVERSITY
OF WISCONSIN-
MADISON

TEXAS A&M
UNIVERSITY

ASTON
UNIVERSITY