

Herty Medal Undergraduate Research Symposium 2018



ACS Local Section
Georgia

Friday, September 21, 2018

Herty Medal Undergraduate Research Symposium

Location:

LVIS, Building E
Georgia Gwinnett College
1000 University Center Ln
Lawrenceville, GA 30043

Directions: [Click Here](#)

Parking Map: [Click Here](#)

1:00 PM

Registration & Poster Set-Up

1:30 PM

Welcome/Introduction

1:40 PM

Presentations:

Professor Sandra J. Rosenthal,
Vanderbilt University, 2018 Herty
Medalist

3:00 PM

Undergraduate Student Poster Session /
Reception

4:50 PM

Award ceremony for best posters /
Prizes to be announced.

**RSVP & abstract submission
deadline**

**5:00 pm, Friday, September 14, 2018
at**

<https://goo.gl/n2vu7K>

**NOTE: There is no cost to register for the
symposium.**



**Dr. Sandra J. Rosenthal,
2018 Herty Medalist**

***The Study and Utility of
Single Quantum Dots There
and Back Again; Structure-
Photophysics Correlation to
Single Protein Tracking***



ABSTRACT:

In our research we study quantum dots, one dot at a time. We have learned how to study the photophysics of an individual nanocrystal, and then determine the atomic structure of the exact same nanocrystal with high resolution electron microscopy through a correlation technique developed in our lab. In this way we learn how the structure of the nanocrystal dictates its optical properties. In a second type of single nanocrystal spectroscopy we have developed ligand conjugated nanocrystals to target neurotransmitter transporter proteins which regulate neurotransmitters that are out of balance in mental illness. Through single quantum dot tracking we can make movies of the dynamics of these proteins, probe how mobility is related to regulation (or misregulation) and investigate the dynamics of proteins that have genetic variations associated with disease. We come full circle by illustrating how the photophysics: atomic structure correlation experiment can inform improved probe design for the single quantum dot tracking studies.

BIOGRAPHY:

Sandra J. Rosenthal was born in Urbana, Illinois in 1966 and raised in Arlington Hts., Illinois. She earned her Bachelor of Science from Valparaiso University in 1987, graduating with Honors in Chemistry. While at Valpo Rosenthal played Division 1 basketball, starting her junior and senior seasons at point guard. She received her Ph. D. from the University of Chicago with

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Graham Fleming in 1993. Her thesis work focused on ultrafast solvent dynamics revealed by femtosecond fluorescence upconversion spectroscopy. Following an NSF Postdoctoral Fellowship at UC Berkeley and Lawrence Berkeley National Laboratory with Chuck Shank and Paul Alivisatos she joined the chemistry department at Vanderbilt University in 1996 as an Assistant Professor.

Rosenthal is currently the Jack and Pamela Egan Professor of Chemistry, Professor of Physics, Pharmacology, and Chemical and Biomolecular Engineering at Vanderbilt University. She is also the Director of the Vanderbilt Institute for Nanoscale Science and Engineering (VINSE), a trans-institutional Institute to foster discovery in nanoscience comprised of 55 faculty members from the College of Arts and Sciences, the School of Engineering, and the Vanderbilt University Medical Center. Rosenthal has published more than 165 publications and edited two volumes on NanoBiotechnology. She is the recipient of a National Science Foundation Career Award, a Distinguished Faculty Award, the Popular Mechanics Breakthrough Award, and the Madison Sarratt Prize and Jeffery Nordhaus Award for excellence in undergraduate teaching. In 2011 she was elected a Fellow of the American Association for the Advancement of Science. In 2014 she received the SEC Faculty Achievement Award that recognizes the most outstanding teacher-researcher at Vanderbilt University, and in 2015 she received the Distinguished Alumni Award from the Valparaiso University Alumni Association. This award honors alumni who have enhanced the prestige of Valparaiso University by virtue of their character, integrity, and nationally recognized personal accomplishments.

Rosenthal's research interests include the synthesis, characterization, and application of semiconductor nanostructures in neuroscience and solid-state lighting. She is an inventor on seven issued patents, including patents for ultrasmall (less than 2.0 nanometers in diameter) CdSe nanocrystals that emit light covering the visible spectrum. This was the first demonstration that a single material could emit broad-spectrum white light and has implications for energy efficient solid-state lighting. In another first Rosenthal and collaborator Randy Blakely demonstrated that highly fluorescent, highly photostable core/shell nanocrystals could be utilized to track neurotransmitter transporter proteins. These proteins regulate the neurotransmitters serotonin and dopamine which are out of balance in mental illness. These experiments aim to elucidate molecular mechanisms of these devastating diseases.

Sandra Rosenthal, husband Adam List (VU 1986), and daughter Jaimie live in Nashville, TN.



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