2015 NJ SYMPOSIUM ON BIOMATERIALS SCIENCE
"THE PROMISE AND CHALLENGE OF BIOACTIVE MATERIALS"

Featured Speaker Series

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Marcus Cicerone, PhD,
National Institute of Standards and Tecnhnology

Exploring Biology and Materials with Coherent Raman Methods

Over the past ten years, Dr. Marcus Cicerone and his team at the National Institute of Standards and Technology (NIST) have developed a spectroscopic coherent Raman imaging (CRI) method that allows us to rapidly obtain broadband Raman spectra from specimens such as biological systems or engineering materials.

By attending the ***NJ Symposium on Biomaterials Science*** on **November 9, 2015**, you will have the opportunity to learn about the latest developments in Coherent Raman Imaging (CRI) methods, and the key technical features of the imaging system that Cicerone's team has developed. He will also provide examples of applications in materials science and biology and describe their approach in the context of the broader CRI field.

Raman spectra can provide rich functional information pertaining to complex biological systems, but it is rarely used due to the inefficiency of spontaneous Raman scattering. Coherent Raman methods have previously been unable to acquire high quality fingerprint spectra.

Dr. Cicerone and his team have overcome this limitation by developing a highly efficient signal excitation paradigm and appropriately harnessing the nonresistant background (NRB) signal that accompanies the resonant signal of interest. They have developed a CRI approach based on broadband coherent anti-Stokes Raman scattering (BCARS) that provides an unprecedented combination of speed, sensitivity, and chemical selectivity.

Dr. Cicerone is currently a project leader in the Biomaterials Group of the National Institute of Standards and Technology. His research has two broad focus areas. One is nonlinear spectroscopic imaging. In 2004, he and his research team introduced BCARS microscopy. Subsequent advances by his group have led to BCARS being the fastest method of acquiring Raman spectra from delicate biological samples. Biophotonics Magazine recognized this achievement among the top 10 advances of 2014.

Dr. Cicerone's other research area is dynamics of amorphous and glassy systems. This area includes work in biopreservation - stabilizing proteins in dry state for therapeutic and diagnostic use. He and his colleagues were the first to show that dynamics on the ps to ns timescale ultimately control protein

degradation rates in sugar-based glasses, a discovery that has lead to increased efficiency in formulating freeze-dried protein drugs. This work was recognized by a 2014 Innovations in Biotechnology award from the American Association of Pharmaceutical Scientists.

Marcus Cicerone received his Ph.D. in Physical Chemistry at the University of Wisconson-Madison in 1995. After graduation he worked at Johnson & Johnson Clinical Diagnostics for three years and then as a visiting assistant professor at Brigham Young University for two years before taking a position at NIST.

By attending the ***NJ Symposium on Biomaterials Science*** on **November 9, 2015**, you will learn how Dr. Cicerone, an expert in the field of coherent Raman imaging, has developed an innovative imaging system with the potential for examining cells and tissue non-invasively. These advanced imaging techniques will lead to optimized methods to characterize cell differentiation and disease state.

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Do you wonder if patents are still worth the effort?
The symposium will feature an ***Interactive Panel Discussion*** covering several controversial topics related to patents.

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