SPRING 2021 CHEMISTRY SEMINAR SERIES

DR. COLLEEN SCOTT

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Mississippi State University
Starkville, MS

HOST: DR. JAEKLE

ALL THOSE INTERESTED ARE WELCOME TO ATTEND

Design Strategy for New Optoelectronic Organic/Polymeric Materials

February 26th, 2021 ~ 11:30AM

Seminar Via Zoom

Abstract: Grand challenges continue for the efficient synthesis of known compounds and the development of new and interesting compounds using C-H functionalization reactions; specifically when the compounds to be synthesized are material focused. However, due to the highly active research in this area, C-H functionalization has been demonstrated to be a very useful technique for the synthesis of materials for organic devices such as Organic Light-Emitting Diodes (OLEDs), Organic Field Effect Transistors (OFETs), and Organic Photovoltaic (OPVs) devices. Still, very few studies have been done to investigate the use of C-H activation reaction to prepare fluorescent dyes. Consequently, our group has been investigating the use of C-H activation reaction to prepare NIR fluorescent dyes for application as biosensors, and deep tissue imaging. In this presentation, we describe our design rationale for a series of new NIR I & II dyes that are readily accessible by the C-H activation reaction. These dyes have absorption and emission wavelengths between 700 nm – 1100 nm.

Conjugated polymers (CPs) play a leading role in the field of organic semiconducting materials. These polymers have great electronic, thermal, and optical properties. Besides, they have better solubility, low temperature processability, and mechanical properties when compared to conventional semiconductors. These characteristics are very attractive for applications such as OFETs, OLEDs, OPVs, power storing devices, and sensors. In this presentation, we will discuss our design strategy, synthesis, and characterization of two kinds of CPs; polyphenoxazine, which is a polyaniline mimic, and a new n-type DPP polymer developed from a new DPP scaffold.

Biography: Dr. Scott was born in Kingston Jamaica where she grew up and attended High School. Following high school, she accepted a track and field scholarship to Auburn University where she graduated with a bachelor's degree in chemistry (*cum laude*). She went on to obtain her Ph.D. in chemistry from the University of Pittsburgh, under the guidance of Dr. Craig Wilcox. Her thesis focused on the development of methods for the synthesis of organic and supramolecular compounds.

Research in the Scott group focuses on the design and synthesis of organic polymeric materials and small molecule emissive dyes. For example, we designed and prepared polyaniline-like conducting polymers, near infrared I & II emissive materials, and diketopyrrolopyrrole (DPP) containing polymers for OFET, OLEDS, or donor-acceptor low band gap materials for photovoltaic applications. Most of our work to date is based on developing xanthene dyes and their silicon analogs as fluorescent dyes for sensing and imaging. We are also investigating silicon-containing conducting polymers as low band gap and ambipolar materials for field effect transistors and photovoltaic cells. Our group has also prepared bio-based thermally stable poly(ether amide)s and poly(ester amide)s.

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