

**CORE-CM SEMINAR**  
**Michigan State University**

**Chemical Engineering and Materials Science**

February 9<sup>th</sup>, 2017

**12:00 p.m.**

**1400 Biomedical & Physical Sciences**

**Host: Richard Lunt**

*Excitons, Charge-Transfer states, Charge-Separated states, the path to free carriers and the importance of charge delocalization*

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**Abstract:**

Although OPV devices have increased in solar harvesting efficiency, there remains much debate surrounding the mechanism by which the active medium absorbs solar radiation and creates high yields of free, mobile carriers that do not immediately recombine. The uncertainty arises from the low dielectric constant of the active material, normally a conjugated polymer and a fullerene, which lack the ability to screen the coulombic interaction between charges.

This presentation will discuss the role of charge delocalization on producing a charge-separated state, where the electron and hole are created at a larger distance than that found in a charge-transfer state. It will examine the important role of the solid-state microstructure of the polymer and its impact on delocalizing the hole, and also on the aggregation properties of the electron acceptor and its role on delocalizing the electrons. In addition, the role that time-resolved microwave conductivity (fp-TRMC) plays in helping to unravel this story will be explained.