DEVELOPMENT OF REVERSE SATURABLE ABSORBER (RSA) MATERIALS AT THE ARMY RESEARCH LABORATORY

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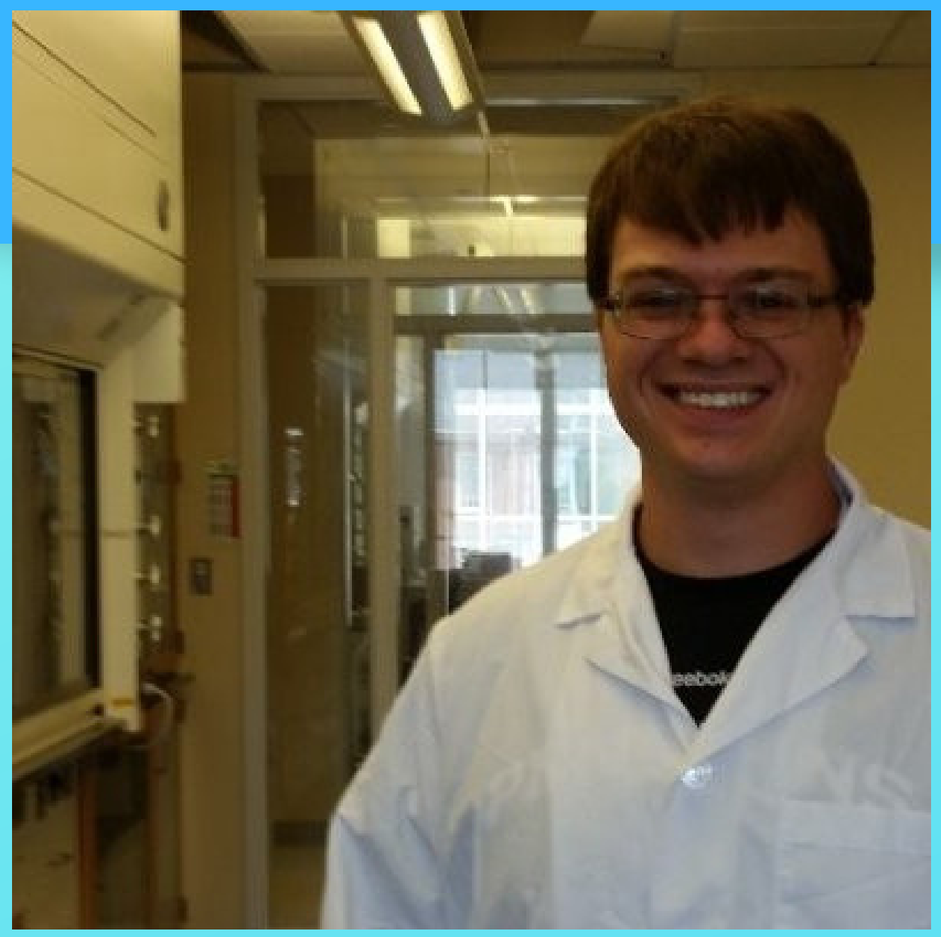
SMLC ROOM 102 - 4 PM

Presented By: Ryan M. O'Donnell
U.S. Army Research Laboratory



Transition metal chromophores (TMCs) have found broad application in photoredox catalysis, photodynamic therapy, biological sensing, organic light-emitting diodes, and non-linear optical (NLO) applications. Second- and third-row d6TMCs, such as RuIIor IrIII, are of particular importance due to their large spin-orbit coupling constants and the prevalence of metal-to-ligand charge transfer (MLCT) excited states. These compounds generally exhibit: large intersystem crossing quantum yields; moderate to high photoluminescence quantum yields; long-lived excited states; and substantial photostability.

Interest in the NLO applications of these materials has increased recently with reports of both two-photon absorption (2PA) and reverse saturable absorption (RSA). Our research team has been developing and photophysically characterizing iridium(III) complexes of the form [IrIII(C^N)2(LL)]where C^N is a cyclometalating ligand such as 2-phenylpyridine and LL is an ancillary ligand such as acetylacetonate. In particular, a new class of nitro-derivatized ligands synthesized via Suzuki coupling reactions are under investigation. The chemical, redox, and photophysical properties of this family of materials will be discussed in detail with particular emphasis on their potential application as RSA materials.