**Photo-dynamics in Triplet Organic Donor-Acceptors Dyads**

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**1. Introduction**

The efficiency of light-induced triplet energy transfer (TEnT) in organic chromophores are often dictated by the extent of overlap of the interacting chromophores’ orbitals (or wavefunctions). With this in mind, it has been established that molecular interaction(s) in triplet donor/acceptor dyads systems could dictate the resulting efficiency or performance of organic photo-materials and devices that are constructed from these molecular systems. Hence, in order to maximize light-harvesting and triplet energy flow dynamics and/or kinetic within these photo-materials/devices, it’s essential to engineer donor-acceptor chromophoric systems that exhibit compatible/complementary structural features and/or optoelectronic bandgap. Recently, it has also been proposed that designing structurally compatible donor and acceptor molecular systems or tethering the interacting chromophores would be conducive to achieving faster donor→acceptor triplet energy flow. Capitalizing on this approach, chemists have been able to synthesize many triplet bichromophoric systems which were tailored for applications such as triplet-triplet annihilation based photon upconversion, photocatalysis, bioimaging, and photodynamic therapy.

**2. Results**

The Ayitou lab at UIC had synthesized various dyads from purely organic triplet energy donor and acceptor chromophores, which are structurally similar and energetically compatible. The photophysical characterization of these dyads indicated that while the through-bond molecular interaction would essentially create Charge-Transfer species, the through-space energy transfer can lead to various dynamics depending on the distance between the donor and acceptor moieties.

My presentation will highlight the synthesis and photophysical characterization of various dyads molecules. Also, using various spectroscopy tools *viz.* steady-state UV-vis absorption & emission spectroscopy as well as time-resolved pump-probe spectroscopy, I will describe the photo-behavior of the excited dyads systems.