Materials that lack inversion symmetry (noncentrosymmetric) host a diversity of desirable optical and electronic properties such as chiral emission/absorbance, spin selection, second harmonic generation, and piezo-, pyro-, and ferroelectricity. Unfortunately, reliably accessing noncentrosymmetric packing motifs is a challenge because closest packing of molecules is often achieved through inversion, leading to the relatively low occurrence of noncentrosymmetry in organic crystals. In this presentation, two strategies towards the synthesis of noncentrosymmetric organic electronics will be discussed as well as the unique applications for which these materials are designed. One approach is the formation of solid solutions with structural phases known to lack inversion symmetry, which will be discussed in the context of charge-transfer ferroelectrics. A second approach is the use of enantiopure chiral compounds such as π-conjugated helical molecules (helicenes). Previous discussions of helicenes have been almost exclusively focused on materials produced from racemic mixtures due to difficulties associated with controlling racemization and/or failure of enantiopure helicenes to crystallize; however, an asymmetrical helicene will be discussed that is found to produce enantiopure crystals. These strategies demonstrate the potential for organic materials to lead in areas of materials chemistry that rely on noncentrosymmetric crystal packing.
**Abstract:**

There remains a need for methodologies that can rapidly assemble complex glycan structures in a convergent, user-friendly manner while being amenable to automation and solid-supported approaches. Towards this goal, we have developed a novel strategy that couples readily available and bench stable glycosyl fluorides and silyl ether protected glycosyl acceptors utilizing catalytic amounts of $\text{B(C}_6\text{F}_5)_3$. This method has a broad substrate scope, and proceeds under mild conditions without rigorous exclusion of air and moisture. An advantage of our method is the ability to do sequential glycosylations, where the reactivity of the masked alcohols is controlled by the size of the substituents on the silicon protecting group and the reactivity of the glycosyl fluorides is controlled by the order of addition. This tunable and programmable reactivity allowed us to rapidly assemble a complex hexasacharide in a highly convergent manner.