

Catalysis constitutes one of the most fundamental techniques allowing for the initiation and kinetic as well as stereochemical control of chemical reactions. The main benefits of catalysis are associated with the high efficiency and atom-economy of catalytic processes, since catalysts are used in sub-stoichiometric amounts. Furthermore, catalytic technologies save energy and reduce the waste generation, time and costs required to access desired products. In recent years, an increasing demand for enantiopure compounds from the pharmaceutical, fragrance and flavor industries has led to a tremendous development in the field of asymmetric catalysis. As a consequence, the development of methods for the preparation of pure stereoisomers has received increasing attention. In particular, enantioselective reactions where prochiral substrates are converted into enantiomerically enriched products in the presence of chiral catalysts has become increasingly more important in recent few years.

The asymmetric transformations of aromatic compounds have attracted much attention owing to their high availability and wide distribution of this structural motif in natural and various synthetic products. This project aims to develop new activation modes and innovative asymmetric reactions of aromatic carbonyl derivatives using the principle of dearomatization. It is anticipated that through the *in situ* generation of the highly challenging catalyst-tethered-dearomatizative intermediates or activated aromatic systems (especially with chiral aminocatalysts) a platform for the development of new reaction profiles should be accessible. Notably, the introduction of innovative catalytic and stereoselective solutions for efficient promotion of organic reactions offering access to novel reaction pathways fulfills the requirements of “green chemistry”. Through the collaboration of researchers from China and Poland, we can establish an array of facile and effective asymmetric transformation protocols for aromatic carbonyl compounds under mild organocatalytic conditions, thereby enriching our knowledge on reactivity of aromatic compounds.