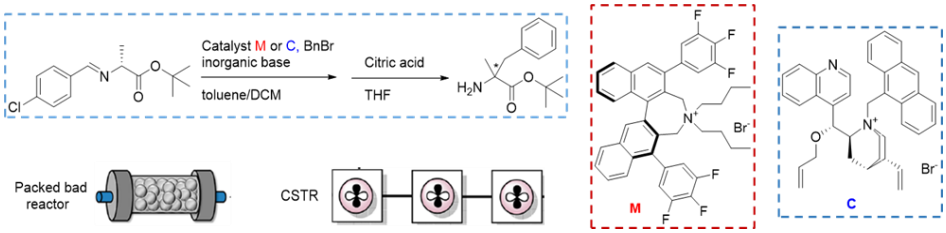
Abstract

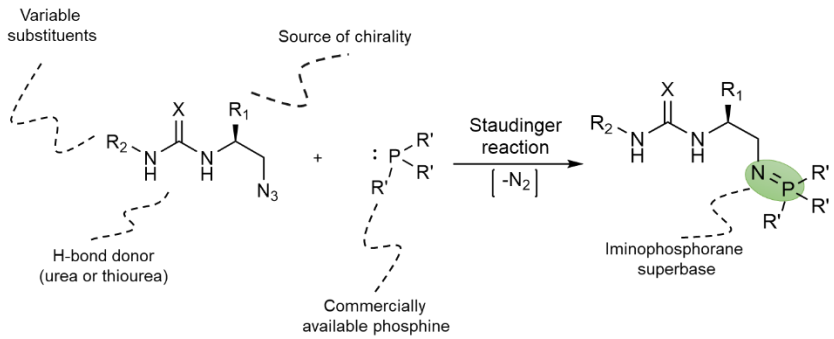
The main goal of this thesis is related to the development of general, reproducible and stereoselective, catalytic methods applicable for industrial production of enantiomerically pure, functionalized amino derivatives featuring a ***quaternary stereocenters***, since they are very interesting and valuable building blocks for the synthesis of novel active molecules. Target molecules are active pharmaceutical ingredients or immediate precursors and nonproteinogenic amino acids.

Accordingly, this PhD thesis covers the following topics that allowed us to achieve the scope of the project:

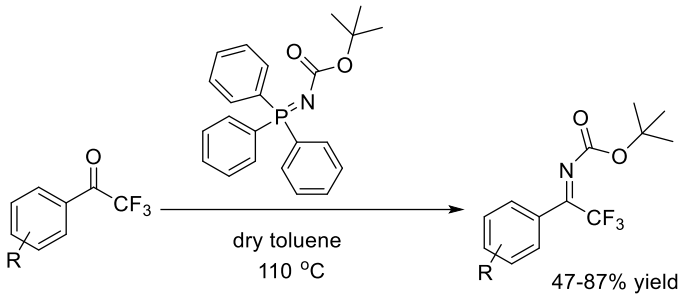
1) Development of an asymmetric phase transfer benzylation in **continuous flow** for the synthesis of **quaternary amino acids**:



2) Synthesis of **novel thiourea / urea based organocatalysts** (***B**ifunctional **IM**ino**P**hosphorane superbases* - ***BIMP***) for the enantioselective organocatalytic addition of nucleophiles to differently functionalized ketimines:



3) Synthesis of **different -CF_3 ketimines** (most of them are **new**) as a valuable precursor for the synthesis of quaternary amino derivatives:



4) Enantioselective synthesis of a **new quaternary amino derivatives** applying different synthetic transformations, such as Aza-Henry or Mannich reaction of malononitrile to various -CF_3 ketimines, promoted by **new iminophosphorane organocatalysts**: