*Abstract of the PhD Thesis in:*

# Asymmetric synthesis of Heterocyclic Compounds through cascade Carbon-Carbon and Carbon-Heteroatom bond forming processes

By

**Lorenzo Serusi**

*Department of Chemistry and Biology "A. Zambelli" University of Salerno, Via Giovanni Paolo II, 132, I-84084 Fisciano, Salerno, Italy*

The aim of my PhD thesis was focused on the asymmetric synthesis of new heterocyclic compounds using cascade and tandem processes involving the formation of new binding Carbon-Carbon and Carbon-Heteroatom.

Heterocyclic structure are meaningful in organic synthesis for the role they hold in many fields such as pharmaceutical chemistry, polymers synthesis and vehicles in synthesis of other heterocyclic compounds.

The project was focused on three mainly classes of heterocyclic compounds structurally related: Isoindolinones, Phtalides and Isoquinolones. These classes of molecules have been found in many naturally and synthetic compounds biologically active. The activity they show is strictly related to stereochemistry of asymmetric centers they host in their structure, about that the need of develop new synthetic routes to reach out them with high level of enantiopurity.

In this project we design new starting materials with group enable to trigger important cascade reaction, under organocatalytic conditions, for easy access to important derivatives in high selectivity.

Herein we reported the main three goals of this thesis:

-Design of N-tosylbenzilidenimine (**3.1**) and α-amidosulphones (**3.2**) , derived by 2-formylbenzoates, for constructing γ-lactam ring of isoindolinone scaffold functionalized with sulphur group and nitromethyl side chain.

-Synthesis of new imines derived by 2-formyl phenylacetate (**3.5**) for construction of 1-substituted isoquinolones through convenient solvent and catalyst free lactamization process.

-Use of 2-cyanobenzaldehyde (**3.4**) and 2-formylbenzonitrile (**3.3**) in cascade reaction to access synthesis of phtalides and isoindolinones anologs of biologically active products bearing tetrasubstituted stereocenters.

Through convenient design of structurally related starting materials, we achieved very satisfying results for synthesis of new class of heterocyclic compounds overcoming the limits of previous synthetic routes and giving new insights for exploring the synthetic power of these new starting materials.