

### ***Electro-organocatalysis - new opportunities for asymmetric synthesis***

Identification of new, catalytic methods for the formation of carbon-carbon bonds is one of the most important tasks of modern organic chemistry. Methodologies using chiral organic catalysts with a strictly defined spatial architecture are of particular significance and are gaining increasing attention of the scientific community. In this type of reactions, the catalyst serves a dual function. Firstly, it activates the substrates, allowing for the reaction to proceed under mild conditions. Secondly, it provides a chiral reaction environment enabling it to be carried out in a stereocontrolled manner.

Electrochemistry is an interdisciplinary science that is applicable in various fields of physics, chemistry and biology. It is a tool that has been successfully applied in organic synthesis for the efficient functionalization of organic molecules. Organic electrochemistry is a technique that allows for heterogeneous redox reactions, avoiding both the use of stoichiometric amounts of redox reagents and the resulting formation of stoichiometric by-products. In fact, the redox reagent in these reactions is an electron which is naturally environmentally friendly and produces no by-products. So it is obvious that electrochemistry can be classified as one of the techniques that meets the requirements of "green chemistry".

The aim of this project is to push the boundaries of organocatalysis by the implementation of electrochemical tools into this field of research. It is anticipated that following such an approach access to important chiral building blocks and molecules of chemical or biological relevance should be possible. Therefore, the synthetic methodologies devised within the project take advantage from the potential of two rapidly developing fields of research: electrochemistry and organocatalysis opening access to compounds that are not accessible by classical means. They can be considered as environmentally benign as they are expected to proceed under mild reaction conditions and with great atom economy, thus meeting the requirements of sustainable development. Furthermore, they should be beneficial to the society in terms of economical and the environmental impact (energy savings, less waste generation, efficiency of the processes).