



UNIVERSITÀ  
DEGLI STUDI  
DI PADOVA

## **PhotoFix-Bio - Photocatalyzed CO<sub>2</sub> Fixation into Biorelevant compounds: access to unnatural aminoacids and carbohydrates**

Climate change calls for immediate actions to support our future. Basic research has a fundamental role in providing our society new technologies to guarantee an environmentally sustainable development in all sectors. In this regard, innovative sustainable synthetic routes are highly sought after in medicinal chemistry to prepare biorelevant chemical compounds, which are essential to understand, prevent and treat diseases. The PhotoFix-Bio project will support progress in this field. Specifically, the project aims at exploiting the synthetic potential of organic photoredox catalysis, a modern activation strategy in organic synthesis, to fix CO<sub>2</sub> within organic molecules. This will provide unprecedented routes to prepare previously inaccessible unnatural amino acids and carbohydrate mimics. This ambitious research program will target three major objectives: 1) The rational design of bimodal organic photoredox catalysts to be used in CO<sub>2</sub> fixation reactions. 2) The development of carboxylation reactions for the fixation of CO<sub>2</sub> to access unnatural aminoacids. 3) The fixation of CO<sub>2</sub> to prepare carboxylated carbohydrate mimics with potential use as anti-diabetes drugs. The objectives of this project will help increase European competitiveness, while promoting the ecological transition, thus being in line with the goals targeted within Horizon Europe and the Piano Nazionale di Ripresa e Resilienza (PNRR). The multidisciplinary nature of the project transfers knowledge of CO<sub>2</sub> fixation and photoredox catalyst design to the candidate and reinforces the expertise of the host institution in the synthesis of biomolecule mimics. The fellowship offers an invaluable opportunity for the candidate to strengthen his skills and reach scientific and professional maturity. The candidate will be offered with an Assistant professorship position, that will place him in an excellent position for his next career move and for the preparation of a successful ERC Starting grant proposal.