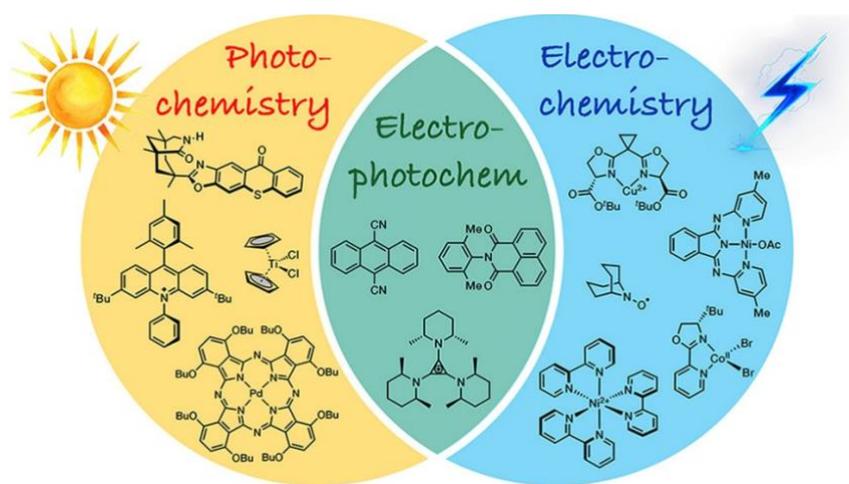


## PROPOSTA DI TESI MAGISTRALE

# ELECTRO/PHOTO CATALYSIS

The use of renewable energy sources is fundamental in all technology fields. In the discipline of synthetic chemistry, *light* (photocatalysis) and *electrons* (electrocatalysis) are often used as *renewable and abundant sources* of energy to drive chemical reactions.



The aim of this thesis work is to design a catalytic process where *one photon* (via light irradiation) and *one electron* (via electrochemical current) are injected together in the same catalytic cycle. Such photo/electrochemical catalytic systems enable *unprecedented high energy levels* to drive challenging chemical reactions.

This proposed work takes inspiration from Nature. In fact, every day in common plants not *one* but *two* visible-light photons are injected into one chlorophyll molecule to drive demanding reactions between  $\text{H}_2\text{O}$  and  $\text{CO}_2$ . As chemists, however, it is very challenging to design such *two-photon* reactions. So, the proposed thesis work involves the combination of *one photon* and *one electron* instead of two photons.

The student will acquire skills in catalyst development, photochemistry, electrochemistry, organic synthesis, and characterization techniques (NMR, chromatography, spectroscopy).

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