

XUNTA DE GALICIA Rede CIGUS

**University of Murcia** 



Illuminating Earth-abundant Metals: New Opportunities in Organic Synthesis

Fondos Europeos

CIOUS

March 19, 2025 CiQUS Seminar Room | 12:15 PM

## Dr. Francisco Juliá Hernández

Centro de Investigación Multidisciplinar · Universidad de Murcia

www.fjhresearch.com @franciscojh84 @FJHGroup

## Abstract

Visible-light photoredox catalysis has driven the evolution towards more efficient and sustainable syntheses to build up molecular complexity via single-electron transfer (SET) events. State-of-the-art photocatalysts, commonly made by precious metals or organic compounds, promote this key SET via an outer-sphere mechanism, in which a match between the redox potentials of both photocatalyst and substrate is required. Although outstanding advances have been accomplished in this area, this redox limitation has hampered the expansion of the scope of these transformations. In my talk, I will summarize my group's efforts to overcome these challenges with the design of Earth-abundant metal photocatalysts, made of inexpensive and readily available base-metals, which operate via a complementary inner-sphere mode of action, outperforming the reactivity of canonical photoredox catalysts. We have utilized this innovative reactivity platform to uncover new decarboxylative functionalization reactions of aliphatic carboxylic acids, including fluorinated carboxylates. This approach has enabled us to streamline the synthesis of pharmaceuticals and agrochemicals, including malaria vector control insecticides and antiviral compounds.

## Biosketch

Francisco studied Chemistry at the University of Murcia where he obtained his PhD degree in 2012 working on the synthesis of high-valent organometallic palladium(IV) complexes. After this, he moved to the UK to join the group of Prof Igor Larrosa at Queen Mary University of London as a postdoctoral research assistant, where he worked in the development of catalytic C–H arylation methodologies using Ru and Pd catalysts. In 2014, he was awarded a COFUND postdoctoral fellowship and joined the group of Prof. Ruben Martin at ICIQ to design catalytic carboxylation



Rede CIGUS Centros de investiga

:





strategies with carbon dioxide using Ni catalysts. In late 2018, he started his independent career as an Assistant Professor in Synthetic Organic Chemistry at Stockholm University (Sweden). In 2020, Francisco received a "Ramon y Cajal" fellowship and moved back to the University of Murcia where he currently leads his independent research group on the development of synthetic methodologies using Earth-abundant metal catalysts powered by visible light.