

**MSCA IF FELLOWSHIPS 2018: “EXPRESSION OF INTEREST” FOR HOSTING MARIE S. CURIE FELLOWS IN IMDEA NANOCIENCIA (CALL MSCA IF 2018)**

**1. Scientist in Charge**

a. Name and Surname:	Dooshaye Moonshiram
b. E-mail:	dooshaye.moonshiram@imdea.org

**2. Institution**

c. Name of the institution	Fundación IMDEA Nanociencia
d. Province	Madrid
e. Address	c/ Faraday, 9 Ciudad Universitaria de Cantoblanco 28049 Madrid

**3. Brief description of the Research Group**

Our research group is focused on the development and application of advanced spectroscopic tools for the design of active catalysts for water oxidation, proton reduction, and methane to methanol production processes. Currently the development of artificial photosynthetic assemblies and biomimetic mimics of naturally methane oxidizing enzymes is of great interest, and has drawn significant attention by exploring molecular catalysts based on 3d transition metal complexes. However in spite of emerging design principles, there remains a lack of general understanding about the structure-activity/stability relationship.

In this regard, we are interested in the development of static and time-resolved X-ray based spectroscopic approaches, including X-ray absorption and X-ray emission spectroscopy, to elucidate critical catalytic intermediates in solution phase and upon immobilization on electrode surfaces at synchrotrons. Combined analysis of experimental data on structures, electronic configurations and spin states provide valuable information to understand the operation mechanism. Further selectivity is achieved through resonant XES or resonant inelastic X-ray scattering spectroscopy.

Synchrotron-based techniques employed in our group are complemented with laboratory-based spectroscopic methods such as Raman, Electron Paramagnetic Resonance and Atomic Force microscopy and involve the interplay of several disciplines including synthetic inorganic chemistry, electrochemistry, kinetics, and spectroscopy.

#### 4. Project description

The project will consist in studying artificial analogues of biological enzymes for dioxygen activation reactions through time-resolved X-ray absorption, emission and laboratory-based techniques with fs-ps temporal resolution. The main objectives of the project will be to explore the light-induced intramolecular electron transfer dynamics and kinetics to generate the active species responsible for the insertion of oxygen atom transfer in organic substrates.

The focus of the project will be based on synchrotron-based X-ray absorption and emission spectroscopy including valence-to-core XES, resonant XES, pump X-ray/probe laser spectroscopy and optical transient absorption spectroscopy. These studies will in the long term be complemented with studies at the X-ray free electron lasers and table top high harmonic sources.

The recruited postdoctoral fellow will assist in defining the study, writing the beamtime proposals, and carrying out the synchrotron and laboratory-based experiments, data analysis and interpretation.

Required Qualifications:

1. **Ph.D in chemistry, Physics or Biological Science**
2. **Experience in synthesis of photo-catalytic complexes**
3. **Some experience in X-ray spectroscopy is favored**
4. **Strong analytical skills, written and verbal communication skills**

#### 5. Research Area

<input checked="" type="checkbox"/> Chemistry (CHE) <input type="checkbox"/> Social Sciences and Humanities (SOC) <input type="checkbox"/> Economic Sciences (ECO) <input type="checkbox"/> Information Science and Engineering (ENG)	<input type="checkbox"/> Environmental Sciences and Geology (ENV) <input checked="" type="checkbox"/> Life Sciences (LIF) <input type="checkbox"/> Mathematics (MAT) <input checked="" type="checkbox"/> Physics (PHY)
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#### 6. Applications (documents to be submitted and deadline)

Candidates are required to submit a complete an updated CV with a brief description of the previous research and a motivation letter. Applications should be sent to the email [dooshaye.moonshiram@imdea.org](mailto:dooshaye.moonshiram@imdea.org) with subject MSCA-IF 2018 before **August 20<sup>th</sup>**.