

Call for expressions of interest for the submission of Marie Skłodowska-Curie projects in  
BIOMOLECULAR FUEL CELLS FOR IN-VIVO GENERATION OF ENERGY

ORGANISATION UNIVERSITAT ROVIRA I VIRGILI

RESEARCH FIELD: .CATALYSIS AND ENERGY

RESEARCHER PROFILE: Established Researcher (R3)/ Recognised Researcher (R2)

LOCATION : Spain › Tarragona

TYPE OF CONTRACT: Temporary

JOB STATUS: Full-time

HOURS PER WEEK: 37.5

EU RESEARCH FRAMEWORK PROGRAMME: H2020 / Marie Skłodowska-Curie  
Actions

Professor Montserrat Diéguez, established at the Universitat Rovira i Virgili (Tarragona, Spain), is interested in receiving Expressions of Interest of potential candidates for the Marie Skłodowska – Curie Individual Fellowship (MSCA – IF) 2019 call.

*Lithium batteries in biomedical implants and biosensors need to be recharged or replaced surgically. To avoid those hassles, research efforts are directed towards the in-vivo generation of energy using renewable substrates found in the body. A biomolecular fuel cell requires the coupling of two half reactions: (i) the oxidation of the biomolecular fuel at the anode and (ii) the oxygen reduction at the cathode. The oxidation of the biomolecular fuel is a bottleneck for the generalized use of biomolecular fuel cells. The biocatalysts (enzymes) that have been proposed for this reaction still have a low efficiency. This projects aims to improve efficiency by coupling enzymes and organometallic catalysts to obtain artificial metalloenzymes (ArtMets). ArtMets, combined with multi-walled carbon nanotubes as electron transfer mediators, will work as biohybrid anodes to oxidize water and/or NADH. As both compounds are present in the hosts body fluid such anodes could be integrated into micro- and nano-fuel cells able to generate power from substrates found in the body. The project will be developed in five stages: (1) preparation of ArtMets by combinatorial techniques (2) testing of ArtMets using electrochemical analysis in solutions that mimic the human serum or blood, (3) chemometric data analysis and optimization of the ArtMets, (4) construction of water and/or NADH oxidation ArtMet anodes and (5) evaluation of the anodes by electrochemical analysis and characterization techniques (XRAS, XRD, and electron microscopy). This project will contribute to the scientific progress towards the next generation of anodes for biomolecular fuel cells. The combination of molecular catalysts and enzymes may open up a novel research subfield in catalysis and, this particular*

*application, at the frontiers between catalysis and biomolecular cell fuel technology. The results of this project are aligned with the Horizon 2020 strategies in health, demographic change and wellbeing.*

We are looking for talented and innovative young scientists, strongly committed to high quality frontier research and able to add new insights to the existing URV core expertise. Only candidates with an outstanding record of research achievements and publications in top-quality journals will be considered

URV as Hosting Institution located at Scientific Campus of Universitat Rovira i Virgili (Tarragona, Spain), has use of all the technical and scientific facilities for carry out this project.

**Eligibility criteria**

At the deadline for the submission of the proposals (11/09/2019), researchers:

Shall be in possession of a doctoral degree or 4 years of full-time equivalent experience;

Must not have resided or carried out their main activities in Spain for more than 12 months in the 3 years immediately prior to the above mentioned deadline.

**Selection process**

Researchers willing to apply should check that they fulfil the eligibility criteria and then send an expression of interest, consisting of:

A Curriculum Vitae (cv europass);

A summary presentation of their research proposal (max. 5 pages long);

A motivation letter (1 page);

The contact information of two referees.

Expressions of interest must be submitted to [uspir@urv.cat](mailto:uspir@urv.cat) (Title of the e-mail " URV-MSCA - Prof. Montserrat Diéguez ).

Proposals will be pre-selected on the basis of internal evaluation. Candidates will be informed of the results of the pre-selection a week after the deadline.