

# OPEN CALL for 10 PhD positions, H2020-MSCA-ITN PARACAT-813209

H2020 / Marie Skłodowska-Curie Action / European Innovative Training Network / European Joint Doctorate entitled "*Paramagnetic Species in Catalysis Research. A Unified Approach Towards Heterogeneous, Homogeneous and Enzyme Catalysis*" (PARACAT), Grant number 813209.

**Are you keen to conduct fundamental research in catalysis at the interface between chemistry, biology and physics?**

The PARACAT project aims to educate and train a group of young researchers on implementing advanced spectroscopic methods (Electron Paramagnetic Resonance) for cutting edge research in the field of catalysis. For the first time, this project will comprehensively explore the role of open-shell species in catalysis and at the interface between chemistry, physics and biology. The programme places strong emphasis on ethical considerations and social reflections to research by combining the scientific expertise of (bio)chemists, (bio)physicists and industrial partners with the input of an ethicist, to support a new generation of scientists capable of tackling the many societal responsibilities as experts in their field. PARACAT is composed of a consortium of 5 academic beneficiaries complimented by 1 research institute, 3 industrial organizations and 2 academic institutions as partners, collaborating in the research and training activities to offer 10 Early-Stage-Researchers (ESR; 36 month PhD positions) the possibility of **being awarded with double doctoral degrees from two separate Universities in two different European countries.**

The overall PARACAT programme will focus on the role of open-shell species in catalysis, commencing with a knowledge-based bottom-up approach that integrates homogeneous, heterogeneous and bio-catalysis. The primary goals of the project include; 1) designing new catalysts based on earth abundant and sustainable elements; 2) taking a bioinspired approach to discovering new and more sustainable reaction pathways for the activation of small molecules and selective oxidations; 3) enabling new routes for polymerization and de-polymerization reactions. The training programme will overcome barriers between traditional disciplines by providing comprehensive tuition on topics ranging from advanced spectroscopic methods, synthesis and property characterization, to quantum chemical modelling, whilst also including a full set of complementary skills. The objectives are therefore to build a chain of knowledge whereby fundamental scientific understanding is translated into practical applications by the synergistic interactions between academic and industrial partners, within an ethical and social context.

A summary of the available positions include:

- **ESR 1:** *Applications of Earth Abundant Metals (EAMs) for small molecule activation and C-C cross coupling* (Prof. D. Murphy, Cardiff University, UK and Profs. S. Van Doorslaer, B. Maes, University of Antwerp, Belgium);
- **ESR 2:** *Activation of small molecules by cupric ions in MOFs and zeolites* (Prof. A. Pöpl, University of Leipzig, Germany and Profs. M. Chiesa, B. Civalieri, University of Turin, Italy);
- **ESR 3:** *Mechanistic insight in peroxidase activity towards industrial applications.* (Prof. S. Van Doorslaer, University of Antwerp, Belgium and Prof. I. García-Rubio, University of Zaragoza, Spain);

- **ESR 4:** *Paramagnetic active sites in Ziegler Natta Catalysts.* (Prof. M. Chiesa, *University of Turin, Italy* and Prof. S. Van Doorslaer, *University of Antwerp, Belgium*);
- **ESR 5:** *The role of Cr paramagnetic states in olefin polymerization over Phillips catalysts.* (Prof. M. Chiesa, Prof. E. Groppo *University of Turin, Italy* and Prof. A. Pöpl, *University of Leipzig, Germany*);
- **ESR 6:** *Elucidation of the role of paramagnetic valence states of chromium, vanadium, and iron in bimetallic MIL-100 and MIL-101 MOF catalysts* (Prof. A. Pöpl, *University of Leipzig, Germany* and Prof. D. Murphy, *Cardiff University, UK*);
- **ESR 7:** *Towards tuning P450 reactivity: Study of the oxidation cycle of CYP116B5 using H<sub>2</sub>O<sub>2</sub>* (Prof. I. García-Rubio, *University of Zaragoza, Spain* and Profs. M Chiesa, G. Gilardi, *University of Turin, Italy*);
- **ESR 8:** *Studying the role of proximal heme ligation in the reactivity of compound I by hyperfine spectroscopy.* (Prof. S. Van Doorslaer, *University of Antwerp, Belgium* and Prof. I. García-Rubio, *University of Zaragoza, Spain*);
- **ESR 9:** *An EPR investigation of cobalt & manganese catalysts for oxidative transformations.* (Prof. D. Murphy *Cardiff, University, UK* and Prof. M. Chiesa, *University of Turin, Italy*);
- **ESR 10:** *Combined EPR - DFT methodology to gain mechanistic insights in transition-metal catalysed oxidation reactions of organic molecules.* (Profs. S. Van Doorslaer, B. Maes, *University of Antwerp, Belgium* and Prof. D. Murphy, *Cardiff University, UK*).

**The successful PhD candidates will participate in the network's advanced training activities and work placements in the laboratories of the PARACAT academic and industrial partners.** Regular meetings and workshops within the EU-funded PARACAT Innovative Training Network will supplement the training and support provided at the host organizations. Practical scientific training will also be complemented by a coordinated programme of industry-relevant transferable skills that will prepare the ESRs for their future careers in the catalysis sector.

Fulltime employments as PhD students are offered for 36 months. **The starting date of the contract would ideally be 1<sup>st</sup> March 2019.**

### **Benefits**

The Early Stage Researcher (ESR) will receive a Monthly Living Allowance plus a Mobility Allowance consistent with the applicable EC Marie Skłodowska-Curie Actions-ITN general conditions. The ESR salary is subject to local tax, social benefit and other deductions following national regulations. The PhD students will be employed with full social security coverage and all benefits in accordance with the Marie Skłodowska-Curie ITN fellowship regulations of the European Union.

### **Eligibility criteria**

To meet the requirements of the Marie Skłodowska-Curie Innovative Training Network, and to be eligible to submit an application you must satisfy the following criteria:

- be an early stage researcher within the first four years of your research career;
- have not yet been awarded a doctoral degree (PhD);
- have not lived or carried out your main activity (work/study) in your host country for more than 12 months during the past three years.

The ideal candidate should have a Diploma and/or a Master Degree in any of the disciplines Chemistry, Biochemistry or Physics. Previous knowledge or experience in catalysis and/or magnetic resonance spectroscopy is desirable, but not essential.

### **Selection process**

Candidates should submit:

- 1) A fully completed application form (Annex A);
- 2) A copy of your Passport or other identity document;
- 3) A full CV;
- 4) A cover letter clearly stating why you wish to undertake in this research programme;
- 5) The names and contact details of at least 2 referees;
- 6) An official document indicating your ranking (degree classification) and marks within your last year at the Master Degree.

Only documents in English will be accepted.

Applicants should submit the above documentation (in a single zipped file attachment), exclusively to the following e-mail address: [paracat@unito.it](mailto:paracat@unito.it). Applications will only be accepted via this method.

The deadline for application is **30/01/2019** at 1800 hrs (GMT).

Applications failing to include the requested documentation or submitted after the dead line WILL NOT be considered in the selection process.

PARACAT is committed to a well-balanced gender ratio. Therefore, this job advertisement addresses qualified male and female persons equally.

### **Selection process**

Candidates will be evaluated against the following criteria:

- Educational track record;
- Scientific quality of the applicant's CV;
- Expected individual impact and benefit to the researcher and to the project.
- Previous experience in the subject areas relevant to the PARACAT research programme.

Shortlisted candidates, selected on the basis of the above-mentioned criteria, will be invited for a web (skype) interview and positions will be offered to candidates following approval by the PARACAT selection committee.

# ANNEX A

## APPLICATION FORM

SURNAME .....

FAMILY NAME .....

PLACE AND DATE OF BIRTH.....

NATIONALITY.....

IDENTITY DOCUMENT NUMBER (SPECIFY THE TYPE OF DOCUMENT)

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E-MAIL ADDRESS

.....

PHONE NUMBER

.....

SKYPE ADDRESS

.....

APPLICATION(S) OF INTEREST (MULTIPLE CHOICE IS ALLOWED, maximum 2)

ESR1  ESR2  ESR3  ESR4  ESR5

ESR6  ESR7  ESR8  ESR9  ESR10

Date Signature