



Institut de Materials Avançats & Green Investigation and Development Group

Universitat Jaume I

Castelló

[www.inam.uji.es](http://www.inam.uji.es)

[PhD POSITION ON LCA](#)

[at UJI funded by Q-Solutions Prometeo Grant](#)

## **Job Description**

**Universitat Jaume I, Institut de Materials Avançats (INAM), GID Group**

**Location: Castelló, Spain**

**Duration: up to 3 years (Renewable, subject to funding availability)**

**Working hours: 37,5**

**Expected starting date: Immediately**

**Hours of work: Full time position**

**Interview: Date to be confirmed**

**Information enquiries to: Rosario Vidal ([vidal@uji.es](mailto:vidal@uji.es)) including as a subject of your E-mail “Predoctoral LCA Q-SOLUTIONS job offer”**

# THE POST

## The Project

The post is available as part of the project **Low Dimensional Quantum Materials for Advanced Solutions in Optoelectronics (Q-Solutions)**.

**Q-Solutions** proposes a multidisciplinary and multilevel study of low dimensional quantum materials from their fundamental properties, to the final optoelectronic device optimization, considering also the synthesis, the surface functionalization, the systematic characterization, the synergies with other materials, the development of industrial friendly deposition techniques and the life cycle sustainability assessment of the different devices, including cost, social and environmental impact and recyclability facing to the sustainability of the final device and system. The project is focused mostly in halide perovskite nanocrystals due to the relatively easy synthesis, the versatility of this family of materials, making it possible to tune the band gap in near IR, visible and UV, and their very high PLQY. However, other families of quantum dots (QDs) as chalcogenides or IV-VI semiconductor will be also investigated looking for synergies in combination with halide perovskites,

**Q-Solutions** is applied to the fabrication of solar cells (e.g. agrivoltaics), LEDs and photocatalytic systems (e.g. decontamination and solar fuel production.). Final devices and application will be analyzed by life cycle sustainability assessment (LCSA) looking for reducing environmental impacts and production cost.

The PhD student will develop analysis work on life cycle sustainability assessment of the new materials and process developed in Q-Solutions. This work will allow the PhD student to defend a Doctoral Thesis at the end of her/his contract. Experience with life cycle assessment (LCA) or other environmental assessment methodologies applied to materials and industrial processes will be important.

This research aims to review and update the toxicity characterization factors for the metals used in the absorber layer of perovskites to be included in the LCA. Furthermore, the toxicity of perovskite degradation products, which can appear in the case of leachate in the use phase or disposal at end-of-life, will be evaluated.

Another important point is the appropriate supply of the raw materials for PSCs, in this case with focus on the metals of the PSC's absorber layer. With this in mind, this research will cover the supply risk, abiotic depletion, and circularity, focusing on the recycled content of the analysed metals.

The successful completion of the project should lead to the defense of a highly interdisciplinary PhD Thesis under the direct supervision of Prof. Rosario Vidal (Green Investigation and Development group, GID) and Prof. Iván Mora Seró (Advanced Semiconductors Group).

### **Eligibility criteria**

This is a Position for a Master on Engineering, Chemistry, or similar, interested on research of LCSA of quantum materials.

General skills requested are:

- Strongly motivated to develop a scientific research career.
- Excellent results obtained during the studies graduated.
- Excellent interpersonal and communication skills.
- Fluent in English.

### **Benefits**

The candidate shall be appointed with a full-time (37.5 hours/week) employment contract for periods of one year, renewable for a total of up to three years, according to the Spanish legislation and covered under the Spanish social security scheme. The is immediately, but depending of the selection process or visa process.

Gross salary will be approximately €1450.

The candidate will course PhD studies in the Technology and Materials Program of the University Jaume I.

### **Selection process**

Candidates should send the following documents to [vidal@uji.es](mailto:vidal@uji.es), as soon as possible.

- Motivation letter.
- Brief CV (including academic record summary)
- Name and email of one/two references.

Applications will be evaluated for technical and eligibility requirements. The best applications overcoming those requirements will be shortlisted, and asked for further information, as well as for an interview. The interview will be handled face to face or by teleconference (Meet or similar) and will be arranged at convenience of both parts.



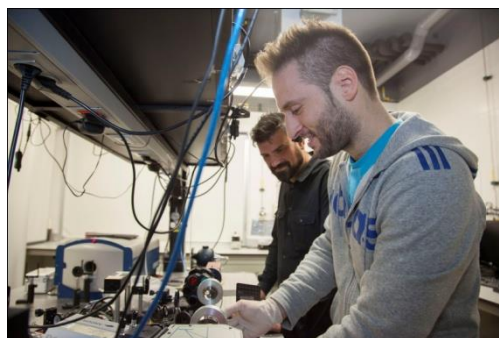
## HOSTING ARRANGEMENTS

Training and career development at **Institute of Advanced Materials (INAM)** as part of the University Jaume I (Castellón, Spain) is central to its culture of encouraging both learning and knowledge transfer to its user communities. Over the last 5 years (2015) **INAM** there has trained over *48 people* including *9 PhD* and *31 Post Docs*. For its part, Rosario Vidal, responsible of **Green Investigation and Development Group (GID)** has trained 16 doctors.

## FACILITIES

INAM main equipment comprises the required facilities for the fabrication and characterization of the novel materials and devices, including a Kelvin Probe, six potentiostats with impedance analyzers, two solar simulators, a climatic chamber, two UV/VIS spectrometers, two fluorimeters and two IPCE systems. Moreover, two gas chromatographs, one of them fitted with a mass spectrometer to carry out the analysis of products of catalytic reactions. The UJI central research services also provides of further equipment to analyze the structure of the materials: a BET porosimeter, two scanning electron microscopes (SEM) and a transmission electron microscope (TEM), all of them fitted with Energy Dispersive Spectrometers (EDS) for chemical analysis, an atomic force microscope (AFM), an optical microscope (OM), X-Ray diffractometers for polycrystalline and monocrystalline samples (XRD), mechanical and optical profilometers, temperature controlled impedance spectroscopy analyzer, two nuclear magnetic resonance devices (300 and 500 MHz), Raman and infrared spectrometers, an ICP-MS equipment for elemental and isotopic analysis, and a nanosecond laser for transient spectroscopy. All the equipment above described is used by the experienced researcher on his own, with help from his supervisor or by technicians in charge. It stands out, the experienced researcher is familiar with the vast majority of the equipment.

The UJI also counts on transversal infrastructures such as UJI prestigious library, which manages specialized library collections and it makes great emphasis of the use of "**open access**". The host institution aims to give an unbeatable deal to the researcher, therefore the UJI supports the general principles specified in both the European Charter for Researchers and the Code of Conduct for the Recruitment of Researcher. The Human Resources Service helps to the researcher to settle into their new host country by providing advice on issues such as salaries and taxation, social security, work permits and health care.



## CITY OF CASTELLÓN

In Castellón, everything is nearby. In our city, the smell of oranges still surrounds the city streets and the orchards are still present in the settlement. Castellón is the capital city of la Plana Alta and stills preserves the quiet and friendly character of working environments. The urban has around 180.000 inhabitants and it is possible to distinguish between the historic centre, the new neighborhoods, and the maritime district known as el Grao or the port.

The climate is generally excellent that is always an advantage. In the city centre the cultural and commercial life – completely Mediterranean – allows seeing a joyful and lively city. The historic centre which still conserves the shape of a Roman camp houses the city's emblematic monuments. This primitive core rose from the ancient Arab farms after the Town Charter provided by Jaume I in the XIII century. On the city's outskirts, cultural and sports facilities have been developed. Between the primitive core and the sea stands the maritime district, El Grao where all the nautical activities take place.

The urban ensemble from Castellón is only understood considering the modern mentality and international outlook of its inhabitants. There is, and there has always been a continue desire of being updated and open to visitors. And that is what is offered along with other variety of attractions such as the sea, orchards, monuments, culture, nature, festivals, and so on.

We suggest you to [check the comparison cost of living](#) in Castellón from other places. From [here](#) you can rent an apartment or room.

