

Expression of Interest



Contact Person/Scientist in Charge

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Universitat Jaume I de Castellón (UJI)

Department / Institute / Centre

- **Name:** Institute of New Imaging Technologies / Universitat Jaume I de Castellón (UJI)
- **Address:** Av. de Vicent Sos Baynat, s/n 12006
- **Province:** Castellón

Research Area

- Chemistry (CHE)
- Physics (PHY)

Brief description of the institution:

Universitat Jaume I de Castellón (UJI), is the public university in the north of the Valencian Community, created on 1991. It has obtained the 500+ Golden Seal of European Excellence by the Excellence in Management Club.

The UJI offers 31 undergraduate degrees, 19 postgraduate studies, 43 official postgraduate master's degrees, 15 UJI-specific master's degrees and has 14,000 students. It counts on about 1000 researchers distributed in 27 university departments and 12 research institutes.

The UJI is the third University and fifth entity of the Valencian Community, including companies and other research institutes, which have obtained more money from the European Research and Innovation Framework Programmes. Currently it is involved in 26 ongoing European research actions, including several European programmes (such as H2020, FP7, Interreg, SUDOE, LIFE, etc.).

The UJI offers modern research facilities among which stand out the different scientific structures that support research, such as the Central Scientific Instrumentation Service, the Animal Experimentation Service (SEA) or its prestigious Library.

A specific program for newcomers helps researchers with the administrative procedures in order to become familiar with the facilities and standard practices, as well as an accurate integration. Moreover researchers can access additional services such as Sports Service, The University Residence, the Language Learning Centre (CAL) that offers an annual program of languages for foreigner researchers and the health centre available to the University community.

Brief description of the Centre/Research Group (including URL if applicable):

The photonics research group of Universitat Jaume I “Grup d’Investigació d’Òptica de Castelló”, (GROC·UJI), is part of the Institute of New Imaging Technologies (INIT) of UJI. The INIT was created under multidisciplinary vocation in order to cover to a greater or lesser extend every field related to research and development on imaging technologies. (<http://www.init.uji.es/>)

The GROC•UJI (<http://bit.ly/GROCUJI>) is engaged in basic research to deliver on the promise of photonics breakthroughs under the leadership of Dr. Jesús Lancis. The leverage of photonics and light-based technologies on solving key societal challenges has seen substantial growth in several areas such as energy generation, energy efficiency, healthy ageing of the population, climate change, and security. The increasing demand on performance for photonics-based devices has generated a scientific and technological activity aimed to widen even more its range of applications. Smart control over light propagation is one “elephant in room” question that needs to be addressed to push the current boundaries of photonic technologies. The group develops a new family of photonic devices that work by simultaneously designing both the optical system and the image-processing algorithms, thus enabling digital light control through programmable megapixel spatial light modulators. Together, the optics and the algorithms we can achieve things that neither could do alone: single-pixel cameras, photofabrication of nanofluids, images of an object inside a scattering media, widefield microscopy, etc.

Project description:

"Advanced nanomaterials synthesized by pulsed laser ablation in liquids"

In 1993 the nanoparticle fabrication by pulsed laser ablation in liquid (PLAL) was discovered. In PLAL, the interaction of the laser radiation with a target immersed in a liquid promotes the extraction of material from the surface of the target in the form of an ablation plume, which contains atoms, ions and clusters. Nanoparticles are formed from the ejected material and they are collected in the liquid as colloids. This alternative synthesis route has a growing interest in the scientific society due to the unique properties of the nanoparticles: high-pure and ligand -free nanoparticles can be synthesized from any base material. Also, as scientists we have a social responsibility concerning the development of clean and sustainable green

processes for the production of nanomaterials in order to avoid environmental deleterious effects. In this direction, PLAL that is an easy top-down technique that fulfils the twelve principles of green chemistry.

Thanks to the interdisciplinary workforce the new discoveries in nanoscience can be applied in other areas of science, engineering, industry and medicine. In this project will provide new photonic devices to improve the scalability of PLAL, where diffractive and computational optics will allow gaining control over the laser ablation mechanism at the nanoscale and, as a result, over the size, concentration and distribution of the colloidal nanoparticles. We target the fabrication of nanofluids that can be used as volumetric radiation absorbers and as heat transfer media in solar energy applications. We also envisage the fabrication of high-quality gold nanoparticles for labeling and sensing divers parameters of interest in biomedicine.

Applications

Interested postdocs candidates must send:

- CV
- A letter of motivation, which includes the name and contact details of two referees willing to provide letters of recommendation.

Data limit: 30/06/2016