Postdoctoral Fellowship under the Marie S. Curie Actions Cofund project "Opening Sphere UAB-CEI to Postdoctoral Fellows (P-Sphere)" Gran Agreement 665919.

Department or Institution involved

<u>Microfuel cells made of paper and printed electronics processes</u>

Topic description

The main objective of the research line is the development of self-powered sensing devices. project is focused on the development of single-use biosensors that will use the biological fluid to extract the energy to power themselves. To achieve these goals the project envisages energy generation from blood, urine and sweat and the autonomous detection of different parameters associated to them.

The Fellow will implement his work mainly on the following areas:

- Printed electronic processes and components
- Electrochemical Characterization techniques

Project supervisor & hosting group

Dr. Neus Sabaté will supervise the Fellow. She is ICREA Senior researcher at IMB-CNM-CSIC in Barcelona and the head of microfuel-cells research group. She has been recently granted with an ERC Consolidator Project starting July 1st, 2015. The research will be part of the MicroEnergy Sources and Sensor Integration (MESSI) group, which deals with research on Micro and nanotechnologies to fabricate structures and devices oriented towards:

- Gas and liquid sensors and systems
- Thermoelectric micro-nanogenerators (Si NW based)
- Microfuel-cells for self-powered devices

The group originated in the early 90's with first developments in gas microsensors. Since then, the group has enlarged its areas of interest as described in the above paragraphs. In the last five years the group has involved the stable participation of around 10 doctors; 7 doctoral students have attained their PhD degrees, 10 patents have been filed, 76 papers and 3 book chapters have been published, and more than 100 communications have been sent to national and international conferences. In that period, the group has participated in 12 national projects and in 7 European/international grants/projects amounting to a funding of 1.5 M€. Currently on-going projects are:

- SiNERGY (Silicon friendly materials and systems for microenergy applications). EU funded project, led by IMB-CNM (CSIC); started in Nov 2013

- TEMIN-AIR (Technological innovation in micro and nanosensors for the monitoring of air quality). Nationally funded project; started on Jan 2014
- DADDI2 (Autonomous disposable device for diabetes diagnostic). Nationally funded project; started on Jan 2014
- SUPERCELL (Single Use paPER fuel CELLs); ERC Consolidator Grant (Neus Sabaté); started Jul 2015

Candidate's profile

To be regarded as an eligible applicant, the candidate should have:

- PhD in Electrochemistry, Chemistry, Bioengineering or similar areas;
- Strong knowledge and experience in most of the following:
- Design and development of electrochemical sensors (amperometric, potentiometric and label-free sensors)
- Development of enzyme-based formulations for amperometric sensors
- Electrochemical characterization techniques such as Cyclic Voltammetry and EIS are required
- Proficiency in both written and spoken English is necessary.
- Experience in other areas such as fabrication techniques of electrodes with printing processes such as screen-printing or inkjet printing will be highly valued.

Planned Secondments

No secondments are initially foreseen. In any case, the Fellow will receive support to participate actively in any meetings with partners of any related ongoing project. He/she will receive specific training in micronanofabrication and electronic device and systems characterisation as needed to acquire or consolidate scientific and technological background, and his/her participation is expected in appropriate workshops and conferences.

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