

## Postdoctoral Research Fellow

### ERC Starting Grant: Visualising Supramolecular Assembly by Preparative Mass Spectrometry (VISUAL-MS)

We are seeking to recruit a Postdoctoral Research Fellow to join a highly motivated multidisciplinary research team that will tackle a challenging 5 year European Research Council (ERC) Starting Grant project. The successful applicant will be based at the Department of Chemistry of the University of Warwick and work under the supervision of Professor Giovanni Costantini. The post is associated with a salary in the range £27,578-£35,938 depending on experience and qualifications and is available initially for a 12 month period, with potential to extend funding for up to a total of 3 years, subject to evaluation. Applicants should be available to start work as soon as possible.

#### Background

The ability to investigate the structure and the assembly of individual functional adsorbed molecules with sub-nm resolution is an essential, and yet missing, step in the development of a molecular scale foundation of many contemporary research fields. In order to achieve these goals, ultra-high resolution microscopy techniques are needed. However, these require that complex molecular units are deposited onto well-defined substrates under controlled conditions and are analysed in situ. This is beyond the current state-of-the-art. In fact, thermal sublimation in ultra-high vacuum is the strategy of choice for small and heat-resistant molecules, but larger functional (bio)molecules are not compatible with this process. The ERC funded research project VISUAL-MS (total of 5 years) will address this challenge by adapting techniques developed within the field of mass spectrometry for transferring intact fragile molecules into the gas phase, by soft-landing them onto atomically clean substrates. The resulting unique deposition set-up will successively be combined with in-situ scanning probe microscopy. This interdisciplinary approach will expand the boundaries of modern surface science by enabling the application of high resolution diagnostic techniques to essentially any type of complex functional molecule adsorbed on a substrate. As such, it represents an essential step change in analytical capability and will provide ground-breaking new insight into a number of fundamental molecule-substrate interactions.

#### Research Objectives

You will be involved in an extensive instrument-development programme aimed at constructing a novel type of ion soft-landing apparatus and integrating it with state-of-the-art scanning probe microscopy techniques. This unique instrument will afford a ground-breaking new approach to the controlled functionalisation of surfaces and you will use it to investigate the interaction of functional (bio)molecules with well-defined substrates under extremely controlled conditions.

You will be expected to:

- have a leading role in designing, building and testing an advanced ion beam deposition apparatus based on Electrospray Ionisation;
- use ion trajectory simulation packages such as SIMION to design and optimise ion transfer, focussing and selection devices;
- use LabView in order to drive and integrate the various components of the setup;
- be or become rapidly proficient in ultra-high vacuum scanning tunnelling microscopy (UHV-STM);
- combine the developed deposition system with in-situ UHV-STM;
- use the new instrumentation for studying the interaction of complex molecular units with well-defined substrates;
- produce regular written and oral reports pertaining to the project as requested; attend regular project meetings and give regular presentations to the project team; attend national and international conferences giving poster and oral presentations; write papers for publication in peer reviewed scientific journals;
- play an active role in the Costantini research group, participating in all group meetings and activities;
- supervise research students and be responsible for the maintenance and installation of equipment and training of personnel on equipment.

**We are looking for someone who has:**

- strong motivation and work ethic;
- the ability to think creatively and to work both independently and as part of a team on research programmes;
- an excellent PhD degree in condensed matter physics, physical chemistry or materials science;
- good interpersonal and communication skills including the ability to work effectively in a multi-disciplinary project area of research;
- the ability to keep up to date with new developments in the field;
- the capability to initiate, plan, organise, implement and deliver programmes of research work to tight deadlines;
- the skills to give presentations to both national and international audiences;
- the ability to inspire and enthuse undergraduate and postgraduate students in research;
- good writing skills and record of publication;
- interest in interdisciplinary research and willingness to learn new techniques.

Further specific requirements.

Essential:

- proven experience in at least one of the following:
  - ultra-high vacuum scanning probe microscopy;
  - development of mass spectrometric instrumentation;
- proven experience in vacuum technology or/and surface science.

Desirable:

- experience in instrumentation development;
- experience with SIMION and LabView.

We expect that the proposed programme will be of very high impact and we are seeking an enthusiastic and committed person to join our research team.

**Location and Environment**

You will be working in the research group of Professor Giovanni Costantini, which is part of the Physical Chemistry Research Cluster/Section in the Department of Chemistry at the University of Warwick. The project will be conducted in collaboration with an extended and experienced multidisciplinary research team. Further information on the Costantini group can be found at:

<http://www2.warwick.ac.uk/fac/sci/chemistry/research/costantini/costantiniigroup>

**How to apply**

Details on the application procedure can be found on the Costantini group webpage. Any informal enquiries relating to the project and/or suitability should be emailed to: [g.costantini@warwick.ac.uk](mailto:g.costantini@warwick.ac.uk).

**Deadline**

The deadline for applications is **29<sup>th</sup> May 2013**. Candidates may be called for interview at **mid June 2013**.

**Awards available:** 1 award available

**Funding Details:** salary in the range £27,578- 35,938 depending on experience and qualifications

**Length of Award:** initially 12 months, possible extension up to a total of 3 years, subject to evaluation

**Eligibility:** UK, EU and Overseas applicants

**Deadline:** 29<sup>th</sup> May 2013