



## PostDoc Job Opportunity



DUBLIN CITY UNIVERSITY	First Name	Last Name	email	Institute	Address
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School:	Mechanical and Manufacturing Engineering				
Research Centre/ group affiliation:	DCU Biomaterials Research Group				
Research group/ centre website:	<a href="http://www.biomaterials.ie">www.biomaterials.ie</a>				

### Brief summary of research group/centre activity:

DCU Biomaterials Research Group is a commercially focused group who work closely with other groups within as well as outside DCU to develop innovative medical devices. The group works with clinicians and radiologists as well as external marketing and regulatory consultants to bring novel injectable biomaterials for the treatment of cerebral aneurysms and the development of sustained nitric oxide releasing biomaterials for the treatment of peripheral artery disease. The group has a wide variety of expertise, including orthopaedic and vascular biomaterials, organic and inorganic chemistry and engineering. The group has a large quantity of state of the art materials manufacturing, processing and analytical equipment at its disposal and has access to a full cell culture suite.

### Description of postdoctoral project on offer:

An aneurysm is a localised dilation of a blood vessel wall which, if untreated, can rupture causing internal haemorrhaging, resulting in disability or death. Aneurysms are caused by degradation of the vessel wall to atherosclerosis or infection. The cerebral aneurysm devices market is a multi-million dollar market with the overall size estimated at \$600m in 2013. This market is currently poorly served by the current market solutions. Small vessels of the brain, in which aneurysms occur, are prone to both ischemic stroke and haemorrhage making navigation of the torturous vessels a delicate and risky procedure. Such procedures in these arteries is often further complicated by plaque deposition and vasospasm (spasmodic contraction of the vessel wall). In addition to this, the effects of a haemorrhage or stroke are often devastating to patients and legal settlements are expensive. In the case of cerebral aneurysms, haemorrhaging often triggers vasospasm. Vasospasm, which constricts blood flow to the brain, occurs in 50% of patients and accounts for 25% of severe disability and death.

The ideal solution to this issue is to inject a gel into the aneurysm where it thickens filling the aneurysm space fully. If this gel could adhere to the aneurysm wall this would be an advantage and would likely minimise recanalization. This would not alone result in better occlusion and lower recurrence but would also have the advantage of treating wide-neck and complex shaped aneurysms which cannot easily be filled using coils. However, development of a gel which is fluid enough to pass through a microcatheter and yet can maintain cohesion (not disperse) in the high flow environment is not an easy task. Other injectables have been altered for application in this market, such as Onyx® (Covidien, MA, USA) but they have had poor uptake by clinicians in the treatment of aneurysms due to poor flow, cohesion, setting and adhesion properties and high recanalization rates (12-36%).

In this project, a novel injectable hydrogel will be produced that will have properties suitable for the treatment of cerebral aneurysms, among other applications. The postdoctoral researcher will gain expertise in formulation, manufacturing, mechanical testing, chemical analysis, rheology and cell culture testing of a novel biomaterial.

The successful candidate will join the Biomaterials Research Group and contribute to the team effort to develop a number of commercially applicable biomaterials and medical devices and will have the opportunity to interact with medical clinicians, marketing and regulatory consultants in developing new products.

**Please indicate the core skills or disciplines that are required for this position:**

An ideal candidate will have a background in biomaterials, bioengineering, biomechanics or some related field and will typically have a PhD in that field. The candidate will demonstrate their ability to work in a team environment and be willing to learn new skills. Demonstration of an active interest in the commercialisation of medical devices and regulatory approval would be a distinct advantage.