### Research theme
Cardiovascular and Inflammation

### PI name and contact details
Dr. Sarah O’Neill  
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### PI web page / link to CV
http://pi.rcsi.ie/pi/soneill/

### Brief summary of PI’s research area/activity/key words
Dr. O’Neill’s expertise is in platelet and integrin biology. She has vast experience in exploring all aspects of platelet function with a particular focus on the role of platelet surface receptors. She has vast experience in exploring the intricacies of integrin activation and their impact on the activation status of the platelet. Sarah has expertise in redox biology with a focus on oxidative and reductive stress. Her research team focuses on the reactivity of platelets in a changing redox environment. Therefore, Sarah is bringing a wealth of expertise to this project that suitably complements that of the co-Principle Investigators.

### Co-PI name and contact details
Dr. Zeibun Ramtoola  
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### Co-PI web page
http://pi.rcsi.ie/pi/zramtoola/pi.asp

### Title of project
Cardiovascular risks to benefit balance of nanoparticles used in drug delivery and targeting

### Brief project description
The explosion in the use of nanoparticles for various applications, including the field of nanomedicine, drug delivery and targeting has led to concerns as to their safety. The size and surface properties of these particles which are critical factors influencing their interaction and uptake by various cells, tissues and organs are potential risks factors. Due to their small size they can cross various physiological barriers and enter the systemic circulation via inhalation or across the skin. With their high surface area to volume ratio, nanoparticles have enhanced potential to interact at both a molecular and cellular level. Indeed, there is increased potential for the interaction of these particles with platelets but with adverse consequences. The disruption of normal platelet function results in the inadvertent generation of a thrombus and may lead to myocardial infarction or stroke. The surface of the platelet is rich in proteins with cysteine residues that act as “redox switches”, sensing and reacting to changes in the surrounding environment, and therefore represent a key target for signalling cascades. The concept of redox regulation as a dynamic signalling system cells has been emerging over the past number of years. The aim of this study is to investigate the potential of modified nanoparticles, to target this redox signalling of platelets so as to prevent unintentional thrombus formation.

### Skills & techniques that the student will learn from the project
Skills: Project and time management; Written and oral communication; Experimental design; Budgetary management  
Techniques: Synthesis and characterisations of nano-particles; Confocal microscopy; Scanning electron microscopy; Flow cytometry; Cell culture; Isolation of platelets from whole blood; Platelet function assays

### Key distinguishing points about this RCSI project
This is a multidisciplinary project with access to relevant expertise in the research facilities of Molecular and Cellular Therapeutics and the School of Pharmacy. Data from this project will be submitted for consideration to International Conferences in the relevant fields and for publication in high impact journals.
| Which undergraduate disciplines are relevant for this project | Biochemistry, Pharmacology, Cardiovascular and Respiration (CVR), Immunology, Pharmaceutics; Drug Delivery |