Applications are invited for the following a PhD studentship for the following project:

Directed Self-Assembly of Synthetic Nanoparticles and Loading of Natural Cell Derived Nanoparticles

The position will be based with *Prof Donal O'Shea* at the Dept of Chemistry, RCSI and be part of the Engineered functional materials platform within the Advanced Materials and Bioengineering Research Centre (AMBER) **centre.**

Summary of project

Directed self-assemblies in water are known as the most efficient means of forming complex higher ordered structures in nature. The project will develop straightforward and robust methods for particle assembly which utilises the amphiphilic tri-block co-polymer poloxamer-188 and a hydrophobic fluorophore as the two designer components, which have a built-in ability to convey spatial and temporal information about their surroundings to an observer. Templating of particle self-assembly is attributed to interactions between the fluorophore and hydrophobic segment of the poloxamer. Particle fluorescence in water is quenched but can be induced to selectively switch on in response to temperature, surface adsorption and cellular uptake. The ability of the particles to dynamically modulate emission intensity will be exploited for selective labelling and real-time imaging of hydrophobic surfaces, and real-time monitor cellular delivery. For more details see: O'Shea D F. et al. Directed self-assembly of fluorescence responsive nanoparticles and their use for real-time surface and cellular imaging, *Nat. Commun*., **2017**, *8*: 1885.

The recognition of the biological, diagnostic and medical importance of exosomes (naturally occurring nanoparticles) has given rise to an urgent need for efficient labelling of these extracellular vesicles in ways that do not alter their inherent characteristics. Project goal is to develop an endogenous method to NIR-fluorescent labelled exosomes using an amphiphilic probe without the need for immunolabelling or synthetic or chromatographic manipulation of exosomes. Comparative analyses of labelled and unlabelled exosomes with NTA, AFM, flow cytometry and immunoblot analysis all show a high degree of similarity. Spectroscopic and imaging analysis will be performed to visualise purified NIR-exosomes. For more details see: O'Shea D F. et al, Endogenous exosome labelling with an amphiphilic NIR-fluorescent probe, *Chem. Commun*., **2018**, *54*: 7219

The ideal applicants will have a 1st Class Honours Bachelor's degree in Chemistry or Biochemistry or a related discipline.

The researcher will work closely with other members of a multidisciplinary project team. Excellent written and oral communication skills are essential.

How to apply:

CVs with the names and addresses of three referees should be submitted to:

Prof Donal O'Shea, Dept of Chemistry, RCSI, 123 St. Stephens's Green Dublin 2, Ireland:

email donalfoshea@rcsi.ie

Positions will remain opened until filled but preferred start date is *September 2 2019*. Only short-listed applications will be acknowledged.

This position is funded by the SFI-research centre AMBER.

The AMBER research centre, as a community of researchers, welcomes its responsibility to provide equal opportunities for all. We are actively seeking diversity in our research teams and particularly encourage applications from underrepresented groups.