

## **Project Title**

Magnetic resonance detection of functionalized extracellular vesicles to understand their role in breast cancer development and metastasis formation

## **About This PhD Project**

Institute of Cancer Research

Supervised by Prof. Molly Stevens and Dr Simon Robinson

The student will be registered at Imperial College, leading to the award of a PhD from Imperial College, London

## **Project Description**

Extracellular vesicles (EVs) are small cell-derived vesicles that can be isolated from body fluids such as plasma and urine. Cancer cells typically produce a higher number of EVs that contribute to tumour progression, invasion and metastasis. However, it is notoriously challenging to study EVs in vivo and detection is usually accomplished histologically. In this project, we will develop Magnetic Resonance Imaging (MRI)-labelled EVs to enable in vivo tracking of EVs, enabling us to study the tropism of EVs derived from metastatic and non-metastatic models of breast cancer. The student will be trained to use a novel platform called SPARTA™ (Single Particle Automated Raman Trapping Analysis) to characterise EVs, will develop EVs functionalisation methods using paramagnetic nanoparticles, and we will investigate EV distribution in cancer models in vivo using MRI. The proposed project is extremely timely and directly answers many important questions on EV biology and their use as biomarkers for cancer. The Stevens (Imperial College London) and the Robinson (Institute of Cancer Research, Sutton site) groups will bring together an innovative way to address this issue. Together they hold extensive expertise in nanotechnology, biosensing and cancer imaging, making this an exciting multidisciplinary collaboration. The PhD student will work in state-of-the-art facilities at Imperial College and at the ICR, supported by a constant and highly expert supervision from the PIs and their research associates.

## **Keywords /Subject Areas**

Breast cancer  
Metastasis  
Extracellular vesicles and exosomes  
Magnetic Resonance Imaging  
In vivo studies  
Nanoparticles

## **Candidate profile**

Candidates must have a first class or upper second class honours BSc Honours/MSc in Life Science, Chemistry, Physics or Engineering.

## **How to apply**

Full details about these studentship projects, and the online application form, are available on our website, at: [www.icr.ac.uk/phds](http://www.icr.ac.uk/phds) Applications for all projects should be made online <https://apply.icr.ac.uk/> . Please ensure that you read and follow the application instructions carefully.