Title of PhD project	**A new approach to understanding cancer cell heterogeneity**	
Supervisor	Dr Elena Sviderskaya	SGUL
Co-Supervisor	Professor Yuri Korchev	Imperial College, London
Co-Supervisor	Dr Kenneth Laing	SGUL
CASE Partner	ICAPPIC Ltd	
Brief description of project	Melanoma is a type of skin cancer that develops from the pigment-containing cells (melanocytes). It is the cancer with the most rapidly growing incidence in the UK. Melanocyte transformation into melanoma is associated with specific alterations in the cells. Cancer cell populations harbour significant heterogeneity in cellular morphologies, gene expression patterns, proliferation rates, metastatic potential and sensitivity to treatment. This heterogeneity is a major obstacle to understanding and treating cancer. This interdisciplinary project will combine novel advanced imaging techniques with cell and molecular biology methods to elucidate the interplay between phenotypic heterogeneity and genomic alterations of the cells that constitute cancer and thus can help in the development of improved cell-based diagnostics and therapies.	
Skills we expect a student to develop/acquire whilst pursuing this project	MRC skills priority - Interdisciplinary skills: Advanced mammalian cell culture, cell biology and molecular biology methods including cell proliferation, differentiation, senescence and apoptosis assays, immunostaining. Fluorescence and confocal microscopy. Advanced high-resolution scanning probe microscopy for live cell imaging and use of novel nano-sensors for analysis of tumour samples. Develop skills in processing and analysing interdisciplinary data.	

	Presentation of findings at academic meetings and in peer review publications.
Particular <u>prior</u> educational requirements for a student undertaking this project	BSc/BA, 2i or above in a science discipline. Preferably also Master's degree. Prior experience in basic laboratory skills is essential.
Project key words	Cancer Cell biology Molecular biology Single cell gene expression Nano-biosensors High-resolution microscopy
Possible under 1+4 route? Master's options identified.	Yes SGUL - MRes/MSc Translational Medicine SGUL - MRes Biomedical Sciences – Molecular Mechanisms of Cancer
MRC Core Skills developed through this project	Quantitative skills Interdisciplinary skills
MRC LID themes	Translational and Implementation Research
Further reading	High-resolution label-free 3D mapping of extracellular pH of single living cells Melanoma Single-Cell Biology in Experimental and Clinical Settings Single cell analysis to dissect molecular heterogeneity and disease evolution in metastatic melanoma Spearhead Nanometric Field-Effect Transistor Sensors for Single-Cell Analysis