

# International Alliance for Cancer Early Detection (ACED)

## Manchester PhD Supervisors 2024/25

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### **Dr Mahetab Amer**

Division of Cell Matrix Biology & Regenerative Medicine

*Research interests:*

My research interests focus on developing personalised early detection strategies for metastatic cancers (those metastasising to bone) using tissue engineering approaches to model the tumour microenvironment and study changes in cell signalling in different mechanical microenvironments, thereby discovering new biomarkers to improve early diagnosis and patient outcomes.

*Research question to form basis of PhD project:*

How does biomaterial design influence the dormancy and reactivation of metastatic cancer cells, and what are the underlying molecular mechanisms involved?

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### **Professor Sue Astley**

Division of Informatics, Imaging & Data Science

*Research interests:*

I am interested in the use of AI to improve risk prediction and early detection of breast cancer. My group has developed methods to quantify image based risk, and evaluated this on large clinical datasets. I am also interested in real world evaluations of new technologies for improving risk and early detection of cancer, both in quantifying performance and assessing how users interact with tools.

*Research question to form basis of PhD project:*

Investigating the impact of decisions on using AI systems for cancer early detection.

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### **Dr Adam Byron**

Division of Molecular & Cellular Function

*Research Interests:*

Our research aims to understand how cellular interactions with, and mechano-responses to, the tumour microenvironment elicit signals that alter gene expression and trigger cancer development. We use systems-level approaches, integrating state-of-the-art proteomics, bioinformatics, super-resolution imaging and advanced materials, to discover how cancer cell adhesion networks become dysregulated early in tumorigenesis.

*Research question to form basis of PhD project:*

Developing advanced culture models and biomaterials to understand how lung cancer cells respond to changes in their microenvironment, revealing biomarkers for early detection.



**Dr Alexandra Clipson**

CRUK National Biomarker Centre

*Research interests:*

At the National Biomarker Centre, we are developing a program of work to determine the utility of liquid biopsies for the early detection of cancer in multiple malignancies. We are developing multi-modal approaches harnessing multiple analytes detected in blood, including cell free DNA (cfDNA) and cell free RNA (cfRNA).

*Research question to form basis of PhD project:*

Can changes in the immune and microenvironmental cfDNA and cfRNA be detected in the blood of early-stage patients? How do they compare to more advanced cases? Can a multi-modal single blood test improve sensitivity for detecting early-stage cancer?



**Professor Philip Crosbie**

Division of Immunology, Immunity to Infection and Respiratory Medicine

*Research interests:*

Professor Crosbie's main clinical and research interest is lung cancer with a specific focus on biomarkers for early detection and screening. He is the Early Detection lead for Cancer Research UK's Lung Cancer Centre of Excellence.

*Research question to form basis of PhD project:*

Developing strategies to improve the precision of lung cancer screening.



**Dr Ben Dickie**

Division of Informatics, Imaging & Data Science

*Research interests:*

My group develops novel MRI techniques for imaging cerebrovascular dysfunction applied to neurodegeneration and cancer.

*Research question to form basis of PhD project:*

MRI measurements of cellular water-exchange as novel biomarker of glioblastoma treatment resistance.



### **Dr Andrew Gilmore**

Division of Cancer Sciences

Wellcome Centre for Cell-Matrix Research

*Research interests:*

We are interested in early stages of breast cancer initiation, with a particular interest in the influence of the extracellular matrix microenvironment, its link to mammographic breast density, and how this leads to increased cancer incidence. We use tissue biopsies from clinical studies as well as ex vivo organoid cultures.

*Research question to form basis of PhD project:*

Identify tissue biomarkers for breast cancer risk using mammographic density to determine if they can be used to identify early stages of cancer initiation.



### **Professor Tracy Hussell**

Lydia Becker Institute of Immunology and Inflammation

*Research interests:*

Using proteomic analysis of the nasal cavity, the group has discovered a protein signature that supports early diagnosis leading to improved survival in lung cancer. We will apply this approach to head and neck cancers.

*Research question to form basis of PhD project:*

Can you apply nasal proteomic analysis to facilitate early diagnosis in head and neck cancer?



### **Dr Ireny Iskandar**

Division of Pharmacy and Optometry

*Research interests:*

Development of a risk model to identify individuals (particularly young individuals who are never or light smokers) at risk of developing lung cancer which could be used in health screening programmes.

*Research question to form basis of PhD project:*

What are the epidemiological risk factors and causes of lung cancer in individuals who are non-smokers or light-smokers?



### **Dr David Jenkins**

Centre for Health Informatics

*Research interests:*

My research focuses on using real world health data to improve healthcare, with keen interests in both applied and statistical methodology. The primary area of my research is clinical prediction modelling, specifically updating and monitoring of models.

*Research question to form basis of PhD project:*

Understanding and overcoming heterogeneity and fairness when training and testing clinical prediction models for use in cancer detection/screening.

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**Dr Colin Lindsay**

Division of Cancer Sciences

*Research interests:*

Our interest is KRAS, the most commonly mutated oncogene in cancer, which confers transformation and increased pathogenicity across a multitude of different preclinical models when it is switched on. However its mutation has recently been noted to also be present in the normal tissue of lung and pancreas.

*Research question to form basis of PhD project:*

Is KRAS mutation necessary or sufficient for lung tumorigenesis to occur?  
Can novel KRAS inhibitors be exploited as tractable tools for cancer prevention?

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**Professor Angeliki Malliri**

Division of Cancer Sciences

*Research interests:*

Interested in identifying early changes in KRAS-mutant lung adenocarcinoma, a cancer diagnosed late when it has already spread. For this, we are combining animal models of this cancer with KRAS-initiated mouse/human cells cultured in a novel in vitro model we are developing together with bioengineer Prof. Cartmell and Dr Gilmore.

*Research question to form basis of PhD project:*

What are the early changes in KRAS-mutant-initiated lung epithelial cells cultured in a novel lung in vitro model? The model is designed to mimic lung extracellular matrix structure but also which can simulate the breathing motion experienced by cells in the lung alveoli.

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**Dr Samuel Merriel**

Centre for Primary Care & Health Services Research

*Research interests:*

My main research interests are identifying methods for improving early cancer detection in primary care; developing and evaluating new diagnostic tests for primary care; and interventions for reducing cancer inequalities.

*Research question to form basis of PhD project:*

How can inequalities in cancer early detection be addressed using an intersectional approach in primary care?



**Dr Christine Schmidt**

Division of Cancer Sciences

*Research interests:*

Ovarian cancer remains the deadliest gynaecological cancer. This could be changed if earlier detection was possible. Therefore, we aim to (1) define the molecular makeup of pre-invasive ovarian cancer lesions arising inside the fallopian tube using diverse omics approaches and (2) engineer cellular microrobots that could serve as specific lesion-sensors.

*Research question to form basis of PhD project:*

Can we exploit the unique window-of-opportunity of pre-invasive ovarian cancer development inside the fallopian tube for early detection methods?



**Professor Richard Unwin**

Division of Cancer Sciences

*Research interests:*

My laboratory develops cutting edge multiplex assays for protein quantification in clinical samples. Our major tool is mass spectrometry (MS), which allows us to access protein modification and isoforms that are not measurable using affinity reagents e.g. antibodies.

*Research question to form basis of PhD project:*

Measuring protein isoform switches as early markers of cancer development.



**Dr Emma Woodward**

Division of Evolution & Genomics Sciences

*Research interests:*

My interest is in harnessing the unique insights from the high-risk hereditary cancer predisposition exemplar as a model for cancer early detection. This provides a unique biological opportunity to investigate and detect the early events in tumourigenesis using a model cohort whose organ-specific cancer risks are both high and well-defined.

*Research question to form basis of PhD project:*

What are the genomic and spatial transcriptomic events that facilitate development of pancreatic adenocarcinoma and can they be modelled for individuals with hereditary homologous recombination repair deficiency?



## **Dr Santiago Zelenay**

[CRUK Manchester Institute](#)

*Research interests:*

By combining fundamental and translational research, my group aims to deepen our understanding of the mechanisms that regulate the establishment and maintenance of tumour inflammatory environments that either stimulate or hinder immune-mediated tumour development and to identify strategies to distinguish aggressive from benign tumours.

*Research question to form basis of PhD project:*

What is the contribution of COX-2-associated immune-evasive inflammatory responses to early tumour development? Can we measure it in a pre-cancer state, and if so, does it predict aggressive tumour behaviour?