We look forward to having you with us at the MRC Cancer Unit as part of our Unit’s Open Day to mark the MRC Festival of Medical Research, 2017.

Our Unit’s mission is to advance our understanding of the earliest steps in the emergence of cancer, and to use this knowledge for early diagnosis, risk stratification and clinical intervention, through the development of innovative enabling technologies.

Here is a preamble, compiled by the research labs you will be visiting, to some of the scientific themes they will highlight during your visit to our Unit. Besides the interactive lab-sessions, there will also be a career’s session during which you will have an opportunity to chat with members of our Unit and find out about a whole range of career paths.

We hope you will enjoy your visit!

**The tissue microenvironment and how it influences Cancer**

The Shields lab focuses on understanding how the tumour environment (such as in the confocal image alongside), which consists of many cell types besides tumour cells, supports tumour development. These cells interact with one another to constantly change and adapt the local environment. This makes the tumour microenvironment challenging to study, but is also what makes it exciting! In your short time in our lab you will be looking at some of these cell types under the microscope. We will also take you through how different cells need different conditions to keep them happy outside of the body. You will get the opportunity to handle the cells yourselves and learn some basic cell maintenance that we do on a daily basis in the lab. Lastly, we will show you an example of some complex multi-cell systems that we
Innovative methods of Screening for Cancer

In the Fitzgerald lab we are interested in the DNA changes that occur as cancer develops. We study this so that we can detect cancer earlier before it becomes untreatable. Specifically we work on cancer of the oesophagus (gullet) and a pre-cancerous tissue – Barrett’s oesophagus. While Barrett’s oesophagus alone is an almost completely harmless condition, occasionally, Barrett’s patients will develop oesophageal cancer, often a deadly disease. In order to monitor these patients we have developed a cell sampling device called the Cytosponge™, a “Pill on a string” (shown alongside) which is swallowed and expands in the stomach to a small sponge. This sponge is then pulled back up out of the oesophagus and collects cells along the way which we can then test to identify patients likely to develop oesophageal cancer and treat them before they ever get cancer at all. To test the cells we extract the DNA from them and then look for mutations or other changes in the DNA which indicate the potential to develop cancer. We can also examine the expression of proteins such as TFF3, a known biomarker for Barrett’s oesophagus, using a variety of methods including immunocytochemistry and ELISAs. At the Open-Day you will get the opportunity to practise your pipetting skills and set up an ELISA. We’ll also demonstrate the Cytosponge™ to you using our life-sized model (Norman). We’re really looking forward to welcoming you to the Hutch and the Fitzgerald Lab!

Metabolism in Cancer and how Computational Models can help

The Frezza and Hall labs will present a combined interactive session showing how targeting metabolism within a cell can be an effective cancer treatment. We will demonstrate to you both experimental and computational techniques that allow us to explore the ways in which cancer cells are different to normal cells, but also how we can target them specifically with drugs.
Drug discovery, the Cell Cycle and Cancer

In the Venkitaraman lab we work on discovering new and better drugs for the treatment of cancer. You will see how we use robotics to automate our experiments and enable us to test thousands of drugs each day. We will show you one of our projects to target the cell cycle in cancer cells. We work on a specific phase of the cell cycle called mitosis, and you will hear more about a protein called PLK1 and will see the consequences for mitosis when this protein is inhibited.

The top panel in the right hand image shows an untreated cell undergoing mitosis. The bottom panel shows a cell arrested in mitosis by treatment with a PLK1 inhibitor. DNA (blue), microtubules (red) and kinetochores (green) are marked.