2016 Taster Month Student Guide

National Student Association for Medical Research (NSAMR) Taster Month – Student Guide

November – December 2016

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Foreword

For the majority of clinicians, providing excellent medical care and promoting health are the principal aims of a medical career. Yet, with the ever changing and highly dynamic nature of medicine, research plays a crucial role in advancing our knowledge in pathophysiology of disease and improving treatments and health care delivery.

Alongside their clinical duties, clinical academics wear a double hat by combining working as a doctor with research and teaching responsibilities. Bringing information and ideas from the clinical world into research serves an important role in translational medicine. This also makes for a very exciting, yet challenging and fulfilling career.

NSAMR Medical Research Taster Month provides an excellent opportunity for you to get a taste of what research is all about and how research findings and processes translate into medicine. In the past few months, our research team has worked hard in recruiting a diverse and wide-range of research groups spanning from primary care to surgery across multiple universities and institutes in UK. You will get a chance to shadow some of the pioneer clinical academics and scientists in the field, to observe clinical problems leading to research questions, and to evaluate research findings feeding back to clinical applications.

We hope that you find this Student Taster Guide useful. This booklet contains all participating research group's research interest and activities. We also highlight some of the departmental events in November, in which all medical students from across UK are welcome to participate. So if you are even slightly curious and intrigued about what research and academic medicine entail, wait no further and apply now to this exciting national scheme!

Robert Michael Lundin
Chairman, National Student Association for Medical Research

Serena Banh
Research Lead, National Student Association for Medical Research

Acknowledgement

NSAMR Research Team would like to express our special thanks of gratitude to all participating research groups for generously contributing their time in hosting students and making contributions in fostering the next generation of clinical academics.

We would also like to specially thank Professor David Webb and the British Pharmacological Society in supporting our first national taster scheme.

Last, but not least, we would also like to thank all participating student research society, particularly KCL Clinical & Academic Research Society for their contributions.

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Introduction

What is NSAMR?

The National Student Association for Medical Research (NSAMR) is a student-led, non-profit research organization. NSAMR is supported and funded by the Wellcome Trust, and its main objective is to provide local and national research opportunities to medical students in the UK. Through our collaboration with affiliated research societies at medical schools, we aim to foster interdisciplinary medical research through a range of exciting formats and create opportunities for medical students to support their pursuit in academic medicine.

NSAMR activities are organized by teams covering research, journal, mentoring, outreach, IT, events and conferences. Visit our website and learn more about the different opportunities!

What is National Medical Research Taster Month?

National Medical Research Taster Month is a single or multiple days event held during November – December 2016, where students visit a research group to see what it is like to work in academia. The event is targeted for Year 1 and Year 2 medical students with little to no previous experience in research. Students interested in this national scheme can apply for taster session, stating their specialty interests and which research group they would like to join. With over 50 research groups taking part in this scheme, these personalized and focused taster sessions will provide you will a flavor of what a career in academic and research is like.

Why National Medical Research Taster Month?

Following changes to the Foundation Programme Application, it has become increasingly important for medical students to be involved in research. Academic Foundation Posts (AFPs) are becoming increasingly competitive, students need to show interest in research from an early stage during their medical studies. However, research opportunities can be hard to come by, particularly for younger students with little prior experience in research. Through National Medical Research Taster Month, NSAMR hopes to break down the barrier of access to researchers and knowledge of opportunities. We hope that the relationships formed during the scheme will lead to other research opportunities, such as funded vacation or summer studentships, intercalated degree projects and beyond. The research groups as part of the scheme have been carefully selected to provide you with an opportunity to observe cutting edge translational research that may, one day, shape clinical practice.

Application Procedure

Who can apply?

National Medical Research Taster Month is open for all medical students studying in the UK. Preference will be given to Year 1 and 2 medical students with little to no prior experience in research.

Application Process and Details

1. Application form and deadline

If you wish to apply for a taster session then you will need to complete an application form online. The closing date for application is on **November 2nd at 11pm**.

2. Selecting your choices and dates

Based on the information (Page 12 - 63) provided by research groups, students can select up to 5 research groups. Each research group is assigned a **Selection Code**. Choices should be ranked from 1 (most interested) to 5 (least interested). Enter the **Selection Code** carefully and indicate the appropriate date of choice if the group provides more than 1 option. For example:

Research Group Hosting Dates

1) November 9th, 16th, **or** December 7th, 2 students on each day
This research group is offering 3 one-day visits, students will enter the **Selection Code** and indicate **one date** on the application.

2) November 9th **and** 10th, 2 students
This research group is hosting 2 students for a 2-day visit. You will only be required to enter the **Selection Code** in the application.

3) Flexible, 2 students
This research group has no particular visiting date, and successful applicants will be able to organize their visits directly with the group. You will only be required to enter the **Selection Code** in the application.

3. Travel Bursary and external visit

There is no restriction to where and which research group you wish to visit, however you are solely responsible for all travel and schedule arrangements. A total of 5 travel bursaries (up to £50 each) will be awarded to selected students. You will need to complete a separate application form for travel bursary.

Post Application

Confirming Acceptance

Successful applicants will be notified of allocated taster sessions between November 3rd to 5th. You will have **48 hours** to confirm your spot. If not, the spot will be re-allocated to another student.

Notifications will be sent out through email, so please make sure that your inbox can receive emails from nsamr.ac.uk

Once you have confirmed your acceptance, NSAMR will introduce allocated students to the relevant research group through email. It is then your responsibility to contact the research group to schedule and confirm the time and location to start your taster visit.

Like any professional placement, you **MUST** notify the research group and NSAMR if you cannot make it to the taster sessions anymore.

Travel Bursaries Recipients

Students who are awarded travel bursaries will be notified at the same time through email. Please collect and keep your travel receipts, as NSAMR will reimburse you up to £50 of your travel cost.

Student Attendance Certificate

After completing your visit, please visit our website to complete the **Student Feedback Form**. Upon completion of the form, each student will receive a participation certificate.

Advice & Tips

Preparation prior to visit

You are not expected to have any research experience prior to your visit, but preparing yourself and anticipating your visit will most definitely impress the research group. Prior to your visit, read up on relevant material relating to the research of the group or the research field. You can search for biomedical and clinical literature on search engine such as PubMed or MEDLINE, which cover millions of journal articles from different specialties and research fields. These literature databases will allow you to search for publications produced by a particular research group as well.

During your visit

Treat your taster sessions like any other professional placement. Some of the visits will include placements in hospitals or clinics, so make sure your outfit is appropriate.

Students are not expected to learn any hands-on or practical techniques during these sessions, but more on understanding the purpose of doing research in medicine and what an academic career could entail. Do not hesitate to ask your hosts questions on research techniques, their daily activities or difficulties they face as an academic. Taster days are designed for you to discover the realm of academic medicine in a **focused and personalized visit**, so treasure this learning opportunity and be proactive!

Future opportunities

If your visit has sparked an interest in you to participate in research projects, great! Follow up with the project supervisor and do not hesitate to express your interest. Typically, most summer vacationship application deadlines are between end of January to early March. This gives you plenty of time to work with your potential supervisor to complete the application and draft up a research proposal together.

FAQ

What happens on taster day?

You will have a chance to shadow academic clinicians or scientists and their research groups for the day. Potentially, you will shadow in a clinic to observe clinical problem leading to research conducting in the group; participate in a research meeting to understand research reasoning and discussion or shadow a post-graduate student / academic performing experimental techniques and manipulation or analyzing data.

Am I allowed to apply to research group outside of my university?

Yes. For the 5 choices you can make, there is no restriction on location. Keep in mind that most of these taster sessions last for a day or two, and it is your decision and responsibility in arranging travel and organizing your own schedule.

What types of research groups are hosting?

NSAMR Research team has worked hard to recruit a diverse selection of research groups for taster month. Research groups include fields from clinical epidemiology and public health research, all the way to basic science research involving the understanding of pathophysiology and mechanism of disease. We have recruited over 50 research groups for this national scheme, which will create opportunities for more than 200 students.

What if the taster sessions clash with my class schedule?

Most research groups have indicated specific hosting dates, so you could anticipate and arrange for your own schedule. If the research group has put down “flexible”, you should contact the research group directly to arrange for an appropriate time and date. If the taster sessions coincide with lectures or clinical teachings, it is your own responsibility to make appropriate arrangements.

For any other enquires, please do not hesitate to contact our research team at research@nsamr.ac.uk

Research Group Index Page

England

Scotland

England

Participating Groups and Selection Code:
Hammersmith Medicines Research – BLM 1

Research Group	**Hammersmith Medicines Research**
Principal Investigator(s)	Dr. Malcolm Boyce
Location	Cumberland Avenue, London
Area of Research	HMR specialises in clinical pharmacology studies. We have ~240 staff, and a large, state-of-the-art and purpose-designed unit on a single site with 145 beds and an on-site pharmacy and laboratory. We can provide a full service for most types of study design and most types of IMP – 'small molecules' and biological products – from design through to clinical study report. HMR was founded in 1993. Since then we've done more than 700 trials, many of them first administration to humans.
Associating medical specialties	Clinical Pharmacology and Therapeutics
Special research techniques	Most of the studies are first-in-man studies, and often involve new procedure and novel biomarkers.
Available Dates	November 9th, 16th or December 7th ; 2 students on each day
Selection Code	BLM 1

Imperial College London

Participating Groups and Selection Code:
Imperial Liver Cancer Group – IPC 1

Research Group	**Imperial Liver Cancer Group**
Principal Investigator(s)	Dr. Rohini Sharma
Location	Hammersmith Hospital, Imperial College
Area of Research	- Early phase clinical trials - Biomarker discovery - PET imaging - Late stage clinical trials - Metabonomics
Associating medical specialties	Oncology
Special research techniques	PET imaging, metabonomics, sequencing
Available Dates	Flexible (not Wed or Thurs), 1-2 students on each day
Selection Code	IPC 1

KING'S College LONDON

Participating Groups and Selection Code:

Neuroinflammation and Alzheimer's Disease – KCL 1
Childhood Epilepsy – KCL 2
Cell Migration and Motility – KCL 3

KCL Department of Infectious Diseases, Faculty of Life Sciences & Medicine:

- Agromayor Group – KCL 4
- Huthoff Group – KCL 5
- Henckaerts Group – KCL 6
- Catanese Group – KCL 7
- Doores Group – KCL 8
- Swanson Group – KCL 9
- Martin-Serrano – KCL 10

Academic Event at KCL:

Event: Catching the Academic Bug - What's a clinical academic career really like?
Date: 23rd November, 2016
Time: 14:00-16:00pm
Venue: PII Lecture Theatre, 2nd Floor, Borough Wing, Guy's Hospital, London Bridge

The Programme of Infection and Immunity at KCL is proud to announce an Open Afternoon for all interested medical students across London. From the ever-popular iBSc in Infectious Diseases and Immunology to conducting cutting-edge research as an Academic Foundation Trainee, listen to first-hand experiences and find out about clinical academic careers, the types of clinical research programmes available and how to get involved with this world-class institution! This promises to be a fantastic event and all universities across London are welcome to attend. We look forward to seeing you there!

Research Group	**Neuroinflammation and Alzheimer's Disease**
Principal Investigator(s)	Dr. Angela Hodges
Location	Maurice Wohl Clinical Neuroscience Institute James Black Centre Institute of Psychiatry, Psychology & Neuroscience (IoPPN)
Area of Research	There are approximately 46.8 million Alzheimer's disease patients across the world today. Older people are at the greatest risk of developing Alzheimer's disease so numbers are set to double in the coming decades as people live longer. There is currently no cure, only medications able to offer modest symptomatic relief. Converging lines of evidence suggest neuroinflammation contributes to the pathogenesis of most late-onset neurodegenerative diseases including Alzheimer's disease. Many of the genetic risk variants for Alzheimer's disease encode innate immune system molecules. In post mortem brain, a prominent neuroinflammatory response can be detected at prodromal stages of disease which closely associate with disease progression and dementia symptoms. Therapeutic modulation of neuroinflammatory pathways may therefore have significant disease-modifying benefit for Alzheimer's disease and related dementias. We have screened immune genes associated with a brain co-expression module in people with and without Alzheimer's disease to identify new rare gene variants associated with disease which may together define a functional pathway of disease vulnerability. Work is in progress to validate these candidate gene variants and undertake functional studies. This work includes developing microglial cell models of the Alzheimer's neuroinflammatory susceptibility gene TREM2 and other functionally related Alzheimer's disease risk genes, and developing assays and relevant markers for identify compounds which may be developed as a treatment for Alzheimer's disease. The models are being evaluated using data generated from people with Alzheimer's disease and brain tissue from people with and without the risk variants.
Associating medical specialties	Neurosciences, Immunology
Special research techniques	Cell culture, CRISPR gene editing, phagocytosis assays, immunohistochemistry
Available Dates	Dec 7th or 8th; 2 students on each day
Selection Code	KING 1

Research Group	**Childhood Epilepsy**
Principal Investigator(s)	Professor Deb Pal and Dr Laura Addis
Location	Maurice Wohl Clinical Neuroscience Institute
Area of Research	Our multidisciplinary group is focussed on finding the causes of childhood epilepsies. These epilepsies are treated with antiepileptic drugs that suppress seizures but cannot change the course of the disease. The only way to achieve a cure or develop preventive treatments is to know what causes the disorder. We are discovering that many childhood epilepsies have a genetic cause, or genetic component. In our group we seek to find these genetic causes through high throughput sequencing techniques, as well as association and linkage studies, and studies of copy number variation. We also carry out functional analysis of patient mutations in ion channel genes. Through this analysis we can then start to shape the treatments that our patients receive and understand patterns of inheritance and disease progression.
Associating medical specialties	Neurosciences
Special research techniques	Exome sequencing, gene panel sequencing, brain connectivity measured with EEG and fMRI, functional analysis of ion channel mutations, neuropsychology
Available Dates	November 23rd and 24th, 2 students
Selection Code	KING2

Research Group	**Cell Migration and Motility**
Principal Investigator(s)	Dr. Claudia Linker
Location	Randall Division of Cell and Molecular Biophysics, Third floor, New Hunt's House, Guy's Campus, London
Area of Research	Cell migration is a crucial for life, from embryonic development to wound healing and immune response. Aberrations in cell migration cause catastrophic developmental defects and are the root of major pathologies, as cancer metastasis. It is hence, fundamental to understand the cellular and molecular mechanisms that govern this process. Examples of our research questions are: what are the signals that command epithelial cells to move? Is there any coordination between the motile cells, or are these just individual cells moving independently but in the same direction? How do cells know the direction they should follow? To tackle these questions we use Neural Crest cells and Zebrafish embryos as our model system; and different techniques including high resolution live microscopy, computational analysis of movement and specific gene targeting. These combination of experimental tools and model system, allow us to determine the function of different molecules during migration. Understanding this process in normal conditions will allow us to define the alterations produced by pathologies and may identify new therapeutic targets.
Associating medical specialties	Oncology, Cell and Developmental Biology
Special research techniques	Immunocytochemistry, In Situ hybridization, PCR, Gel electrophoresis, Molecular cloning, Micro-injections, drug assays, high resolution microscopy, computational data analysis.
Available Dates	November 22nd or 23rd, 2 students on each day
Selection Code	KING 3

Research Group	**Agromayor Group**
Principal Investigator(s)	Dr. Monica Agromayor
Location	Guy's Hospital, London
Area of Research	Our research is focused on investigating the mechanisms by which mammalian cells orchestrate the cytoskeletal and membrane remodelling processes occurring during similar biological processes like cell migration, the last steps of cell division, viral infection or membrane repair after infection with pore-forming bacteria.
Associating medical specialties	Infectious Diseases
Special research techniques	We use a multidisciplinary approach involving the latest imaging, biochemical and genetic techniques
Available Dates	Flexible (1 day visit), 1 student
Selection Code	KING 4

Research Group	**Huthoff Group**
Principal Investigator(s)	Dr. Hendrik Huthoff
Location	Guy's Hospital, London
Area of Research	Both treated and untreated HIV-infections are frequently associated with metabolic complications and recent studies are increasingly implicating metabolic factors as predictive for progression to AIDS. However, little is known about the bioenergetic and biosynthetic demands imposed on host cells by HIV. As HIV is entirely dependent on the host metabolism, this represents a novel and unexplored target with potential for the development of antiretrovirals. We investigate the metabolism of HIV-infected CD4+ T cells that are the primary target for its replication. Differences in the metabolism compared with uninfected cells are investigated by parallel metabolic and transcriptional profiling using chromatography coupled mass spectrometry, respirometry and microarray technologies. This is expected to reveal viral dependency on specific metabolites and metabolic pathways. Following the hypothesis that HIV directly modulates the metabolic state of the cell, a mutational analysis of the viral proteins will seek to reveal its mode of control. Jointly, these studies will inform experiments that aim to inhibit HIV replication by interfering with the host-cell metabolism using RNA interference and small molecule inhibitors.
Associating medical specialties	Infectious Diseases
Special research techniques	Molecular genetic, cultured cell, biochemical techniques
Available Dates	Flexible (1 day visit), 1 student
Selection Code	KING 5

Research Group	**Henckaerts Group**
Principal Investigator(s)	Dr. Els Henckaerts
Location	Guy's Hospital, London
Area of Research	Our research focuses on adeno-associated virus (AAV), an intriguing parvovirus which displays features that are unique among DNA viruses. In addition, AAV vectors have become frontrunners for gene therapy in humans based on results from a number of successful clinical trials. Although AAV is the most commonly used vector, there are limitations due to its restricted biological activity and the challenge with respect to commercial manufacturing. Owing to its complex life cycle and dependence on helper viruses, molecular insights into viral replication are essential for the development of vectors with increased bioactivity and production schemes that promise maximal output. My laboratory aims to provide the critical link between basic AAV research and AAV gene therapy. In addition, we are involved in a number of AAV gene therapy projects ranging from the development of a new AAV vector platform to the assessment of new gene therapies for rare diseases. In this context we have established collaborations with investigators at King's College and other UK universities and affiliated with industrial partners.
Associating medical specialties	Infectious Diseases
Special research techniques	Cell and molecular biology techniques
Available Dates	Flexible (1 day visit, after November 15th), 1 student
Selection Code	KING 6

Research Group	**Catanese Group**
Principal Investigator(s)	Dr. Maria Teresa Catanese
Location	Guy's Hospital, London
Area of Research	Our goal is to gain insights into the subversion strategies devised by HCV (i.e. signal transduction, cytoskeleton rearrangements and cellular uptake pathways, vesicle trafficking and inter-cellular communication) that promote successful viral entry, dissemination and escape from extracellular inactivation.
Associating medical specialties	Infectious Diseases
Special research techniques	Cutting edge microscopy and molecular biology techniques
Available Dates	Flexible (1 day visit), 1 student
Selection Code	KING 7

Research Group	**Doores Group**
Principal Investigator(s)	Dr. Katie Doores
Location	Guy's Hospital, London
Area of Research	Currently our research is focused on studying the immune response to carbohydrate antigens on HIV-1 and bacteria. The HIV envelope glycoprotein, gp120, is covered in a dense array of host derived N-linked glycans and it is becoming increasingly apparent that the sugars on the surface of HIV are the target for a number of highly potent broadly neutralizing antibodies (bnAbs). We are interested in understanding how bnAbs against the glycans on HIV evolve in vivo so that this can be applied to the design of an HIV vaccine that would target the carbohydrate structures on HIV.
Associating medical specialties	Infectious Diseases
Special research techniques	Biochemistry and molecular biology techniques
Available Dates	Flexible (1 day visit), 1 student
Selection Code	KING 8

Research Group	**Swanson Group**
Principal Investigator(s)	Dr. Chad Swanson
Location	Guy's Hospital, London
Area of Research	Our research focuses on how viral and cellular gene expression is post-transcriptionally controlled by pre-mRNA splicing, RNA stability, nuclear export and translation. In particular, we are interested in how RNA binding proteins control HIV-1 replication, Ebola virus replication and CD4 T cell function.
Associating medical specialties	Infectious Diseases
Special research techniques	Molecular, biochemical and genetic techniques
Available Dates	Flexible (1 day visit), 1 student
Selection Code	KING 9

Research Group	**Martin-Serrano Group**
Principal Investigator(s)	Dr. Juan Martin-Serrano
Location	Guy's Hospital, London
Area of Research	We are primarily focused in the study of cellular proteins that are involved in retroviral assembly. In particular, we study the last event in the release of infectious Human Immunodeficiency Virus (HIV-1) and other retroviruses from the infected cell, a process that requires a membrane scission event that separates the nascent viral particle from the plasma membrane. This event is mediated by a late budding activity (L-domain) encoded by the viral protein gag, which facilitates viral egress by recruiting the Endosomal Complex Required for Transport (ESCRT) machinery. The ESCRT machinery has been primarily involved in essential aspects of cell biology such as endosomal sorting into the Multivesicular Bodies, a process that requires membrane scission events that are topologically equivalent to retroviral budding. Working with retroviruses has broadened our interests to the multiple aspects of cell biology that are facilitated by the ESCRT machinery. Our work in this area has uncovered the essential role of the ESCRT machinery in cytokinetic abscission, the final step in cell division that separates the daughter cells.
Associating medical specialties	Infectious Diseases
Special research techniques	Microscopy and molecular biology techniques
Available Dates	Flexible (1 day visit), 1 student
Selection Code	KING 10

UNIVERSITY OF LEEDS

Participating Groups and Selection Code:
Beech Laboratory – LEE1
Breast Research Group – LEE2

Research Group	**Beech Laboratory**
Principal Investigator(s)	Professor David Beech, Dr Marc Bailey
Location	LIGHT Laboratories, Leeds Institute of Cardiovascular & Metabolic Medicine
Area of Research	Cardiovascular disease is the most common cause of death in the western world. The Beech group are interested in vascular calcium channels, how they work, how they are involved in vascular physiology and most critically their involvement in vascular disease. We have particular interests in atherosclerosis, angiogenesis (the formation of new blood vessels) in relation to cancer, aneurysm formation and obesity. One of the key aspects of our work is the potential to target the vascular calcium channels with new drug type molecules as a therapeutic strategy for cardiovascular disease.
Associating medical specialties	Cardiovascular Disease
Special research techniques	We express calcium channels in cells to study their function in the lab, investigate the channels in cells grown from patient tissues (harvested from the hospital), use pre-clinical disease models with pre-clinical imaging technologies and generate and test novel drug like molecules.
Available Dates	November 11th or November 25th; 3 students on each day
Selection Code	LEE 1

Research Group	**Breast Research Group**
Principal Investigator(s)	Professor Valerie Speirs
Location	St James's University Hospital, Leeds
Area of Research	Areas of breast cancer biology that the group is involved in include: • Understanding the central role of estrogen receptors (ERs) -alpha and -beta(and variants thereof) and their associated secondary signalling cascades in the hormone responsiveness of the normal and malignant mammary gland • Identification of novel factors involved in endocrine resistance • Understanding the biology of male breast cancer • Developing novel in vitro cell culture models from clinical samples to use to understand breast cancer biology, in particular stromal-epithelial interactions • Breast tissue banking
Associating medical specialties	Oncology
Special research techniques	3D cell culture; tissue banking; digital pathology; cell culture; immunohistochemistry
Available Dates	November 23rd or 30th, 2 students on each day
Selection Code	LEE 2

UNIVERSITY OF LEICESTER

Participating Groups and Selection Code:
Le Quesne Lab - LEIC 1
Leicester Renal Research Group - LEIC 2
Stover Research Group - LEIC 3
Lymphoid Malignancies Group - LEIC 4

Research Group	**Le Quesne Lab**
Principal Investigator(s)	Dr John Le Quesne
Location	MRC Toxicology Institute, University of Leicester
Area of Research	We are a very diverse group, spanning basic biochemistry, cell biology, tissue-based methods, and computer image analysis, and we have mixed backgrounds in basic science, academic medicine and histology. Our lab often includes several students, both undergraduate and postgraduate, studying medicine and basic science subjects. We are interested in the biology of tumour cells and how they thrive in and exploit their environment in the context of healthy host tissues. Most of our work focuses on lung cancer, which is the commonest cause of cancer death in the UK and worldwide. We are applying diverse methods to several basic questions of tumour biology: i) How can we better classify tumours in terms of their cellular behaviour? ii) How do genomic changes relate to/influence cellular behaviour? iii) How do early tumours acquire the extra properties ('hallmarks') required for lethal malignancy? iv) How are different programmes of cellular behaviour acquired and expressed by tumour cells, and how do these change over time? v) How do subpopulations of cancer cells vary within a single case (tumour heterogeneity)? vi) How can we quantify cellular behaviour in fixed tissue sections? vii) How is protein synthesis reprogrammed to support the malignant programme in tumour cells?
Associating medical specialties	Oncology
Special research techniques	We are using state-of-the-art quantitative methods to extract data from the enormous archives of diagnostic material from resected lung tumours that are stored as fixed tissue in hospital pathology departments. This involves the creation of large tissue microarrays with accompanying detailed patient data. These arrays are then used as the substrate for novel multiplex in situ tests (immunohistochemistry/in situ hybridisation) which allow us to measure the expression of multiple genes at the single-cell level. This approach is very new and extremely powerful, and depends upon the use

	of novel technologies which permis the simultaneous detection and quantification of multiple fluorescent labels simultaneously, and powerful computer image analysis methods. We also use laser microdissection to single out microscopic regions of tumours for focussed next generation sequencing studies of DNA from regions of tissue demonstrating particular behaviours. In addition to these tissue-based approaches, we apply a range of cell biological and biochemical methods to help us understand how gene expression is dysregulated in tumour cells. Our findings from archival tissues are translated into cell and biochemical models for mechanistic testing, and conversely, mechanistic hypotheses from cell-based experiments are tested for relevance in our human tissue collections.
Available Dates	Flexible (1 day visit), 2 students
Selection Code	LEIC 1

Research Group	**Leicester Renal Research Group**
Principal Investigator(s)	Professor Nigel Brunskill, Dr Jonathan Barratt, Dr James Burton, Dr Alice Smith
Location	Maurice Shock Medical Sciences Building & John Walls Renal Unit
Area of Research	The Renal Research Group undertakes research from bench to bedside. Members of the group conduct basic laboratory research using cutting edge technology to study the pathogenesis of a range of kidney diseases using in vitro and in vivo models. There is a strong clinical research theme examining the impact of kidney disease and dialysis treatment on cardiovascular function, alongside the effect of exercise interventions on muscle physiology. In parallel, we have a strong interest in big data and its use in studying the epidemiology of acute kidney injury and chronic kidney disease in the population. We also deliver a large number of clinical trials through the renal CRN group and are currently undertaking over 20 national studies in renal disease.
Associating medical specialties	Renal Medicine
Special research techniques	Genome wide association studies (GWAS), immunophenotyping, mass spectrometry, primary human renal cell culture, microRNA manipulation, laser capture microdissection.
Available Dates	November 9th, 23rd or 30th; 3 students on each day
Selection Code	LEIC 2

Research Group	**Stover Research Group**
Principal Investigator(s)	Dr Cordula Stover
Location	Maurice Shock Medical Sciences Building
Area of Research	The Health Survey for England 2014 revealed that nearly 62% adults were overweight. Our lab investigates the systemic inflammatory component of a high fat diet using in vitro and in vivo models. Several projects focus on dietary intervention, changes in progression of tumour growth in the obese, and the impact on bone density. The UK Renal Registry 2014 recorded an annual growth for renal replacement therapy of 3%, so our work is also interested in various renal disease models. UK Sepsis Trust in 2015 suggests that there are 150,000 cases of sepsis in the United Kingdom annually. One project is investigating cellular aggregate formation in whole blood. Working out mechanisms of disease improves understanding thereof.
Associating medical specialties	Immunology
Special research techniques	Immunofluorescence, FACS, mouse models, microCT, MRI, in vivo imaging
Available Dates	November 10th, 18th, 25th; December 2nd or 9th; 2 students on each day
Selection Code	LEIC 3

Research Group	**Lymphoid Malignancies Group**
Principal Investigator(s)	Professor Simon Wagner
Location	Hodgkin Building
Area of Research	The group consists of an Academic Clinical Lecturer, clinical research fellow, research technician, post-doc and three PhD students. We are developing new diagnostic tests, based on droplet digital PCR, for T-cell lymphoma, which are a notoriously difficult to diagnose group of diseases. We are also modelling the key mutations in cell lines in order to understand the biology of these diseases. T-cell lymphomas require signalling through the T-cell receptor and in cell lines and primary human cells we are exploring the use of small molecule inhibitors as potential therapeutics. We are developing the hypothesis that plasticity in differentiation pathways of CD4 T-cells can be exploited for therapy. We have a long-standing interest in chronic lymphocytic leukaemia. We are determining the usefulness of a microRNA as a biomarker and also investigating its function in the biology of CLL. A further project is investigating agents that might be therapeutically useful in poor prognosis high grade i.e. clinically aggressive, B-cell lymphoma. We have determined a class of serine/threonine kinase inhibitor that appears to alter the "secretome" i.e. growth factors secreted by the lymphoma. We are carrying out a systematic analysis of the secretome using multiplex ELISA in order to define the most important growth factors sustaining lymphoma growth.
Associating medical specialties	Haematology
Special research techniques	The group focuses on translational research on lymphoid malignancies. We are interested in digital pathology to understand the role of infiltrating T-cells as drivers or markers of prognosis in B-cell lymphomas. This involves antibody staining of tissue sections followed by scanning and automated identification and counting. This information can be correlated with clinical characteristics in univariate or multivariate analysis. We are also pursuing cell free DNA as a source of material to be used in droplet digital PCR to improve diagnosis in T-cell lymphomas. Finally we are employing multiplex ELISA to measure growth factors secreted by high grade B-cell lymphoma.
Available Dates	Flexible, 2 students
Selection Code	LEIC 4

UNIVERSITY OF LIVERPOOL

Participating Groups and Selection Code:
Paediatric Pharmacology – LIV 1
MRC Centre for Drug Safety Science – LIV 2
Wolfson Centre for Personalized Medicine - LIV 3

Research Group	**Paediatric Pharmacology**
Principal Investigator(s)	Dr Dan Hawcutt
Location	Alder Hey Children's Hospital
Area of Research	A multidisciplinary team researching pharmacogenomics, pharmacovigilance, and pharmacokinetics (including early phase trials) in children
Associating medical specialties	Paediatrics, Clinical Pharmacology and Therapeutics
Special research techniques	We have particular expertise in early phase clinical trials in children, and pharmacogenomics
Available Dates	December 8th, 1 student
Selection Code	LIV 1

Research Group	**MRC Centre for Drug Safety Science**
Principal Investigator(s)	Professor Chris Goldring, Dr Parveen Sharma
Location	The University of Liverpool Department of Molecular and Clinical Pharmacology, MRC Centre for Drug Safety Science, Institute of Translational Medicine
Area of Research	Drug-induced liver injury (DILI) is a leading cause of patient morbidity and mortality. Predicting the fate of a drug in an individual patient is the ultimate goal in personalised medicine. Variations in amounts and isoforms of key enzymes involved in drug metabolism have led to a better understanding in how individual patients metabolise certain drugs. The cytochromes P450 (CYPs) constitute the major enzyme family capable of most drugs and xenobiotics metabolism and knowledge of the levels and isoforms of the major CYPP450s involved is thus a prerequisite for predicting variable pharmacokinetics and drug response and are therefore of particular relevance for clinical pharmacology. We have the availability of rarely obtained human liver tissue to analyse CYP enzyme distribution and function in actual human patients to gain a better understanding of the human liver.
Associating medical specialties	Molecular Pharmacology and Drug Safety Science
Special research techniques	Quantitative immunoblotting
Available Dates	December 7th or 8th, 3 students on each day
Selection Code	LIV 2

Research Group	**Wolfson Centre for Personalised Medicine**
Principal Investigator(s)	Professor Sir Munir Pirmohamed
Location	University of Liverpool, Waterhouse Building
Area of Research	The Wolfson Centre for Personalised Medicine is part of the Institute of Translational Medicine at the University of Liverpool. It houses a multidisciplinary team of personalised medicine researchers engaged in collaborative research with partners across the globe, including those in academic and industry settings. The primary focus of the Centre is the identification of predictive biomarkers of drug safety and efficacy with the aim of translation from 'bench-to-bedside'. The 'bench to bedside' concept begins with the discovery of a biomarker associated with variable drug response that subsequently undergoes several stages of research and development before clinical implementation and assessment of its impact on population health. Studies at the Centre are undertaken utilising the latest genotyping and phenotyping, point-of-care technologies, and big data analysis with the ultimate aim of developing easy access for patients to truly personalised medicine. Of particular interest is identification of predictive genetic biomarkers for predisposition to adverse drug reactions. Collaboration with biotechnology and academic partners is aimed at developing simple, reliable companion genotyping diagnostics with the ultimate aim of translation into clinical practice. In addition to translation into clinical practice, the Centre puts significant emphasis into education of clinicians and scientists alike, as well as public engagement activities to promote personalised medicine.
Associating medical specialties	Cardiovascular Disease, Neuroscienes, Infectious Diseases, Paediatrics, Clinical Pharmacology and Therapeutics, Alcohol-related research
Special research techniques	Broad examples of techniques used: DNA extraction and genetic analysis, Proteomics, Metabolomics, Pharmacokinetics/pharmacodynamics, Big data analysis (pharmacoepidemiology)
Available Dates	December 2nd, 2 students
Selection Code	LIV 3

The University of Manchester

Participating Groups and Selection Code:
Nanomedicine Lab – MAN 1

Research Group	**Nanomedicine Lab**
Principal Investigator(s)	Professor Kostas Kostarelos
Location	Institute of Inflammation and Repair, University of Manchester
Area of Research	The research efforts taking place within the Nanomedicine Lab are bridging the gap between fundamental nanomaterials engineering and pharmaceutical development towards the realisation of advanced therapeutic modalities. Our mission is to pioneer the cutting-edge and emerging discipline of nanomedicine. Preclinical development of nanomedicine constructs based on novel nanomaterials of synthetic and biological nature: - Development of novel viral and non-viral gene therapy vectors - Engineering and pharmacological development of carbon nanomaterials (fullerenes, nanotubes, graphene - Delivery & genetic manipulation of embryonic, progenitor, and induced pluripotent stem cells - Advanced delivery systems for radio- and chemo-therapeutic agents against cancer - Descriptive and predictive modeling of delivery systems' pharmacological performance - Pharmacological and toxicological profile of novel nanomedicines We are engineering delivery systems for drugs, cells, proteins, radionuclides and genes towards therapeutic and diagnostic clinical applications.
Associating medical specialties	Cardiovascular Disease, Neuroscience, Oncology, Clinical Pharmacology and Therapeutics
Special research techniques	Great emphasis is placed at the interface between in vitro and in vivo studies employing, among many other techniques (molecular biology, material characterization, nanosafety) imaging at cellular level and whole body imaging in order to rationally design and engineer delivery systems that can be translated into clinically effective therapeutics and diagnostics.
Available Dates	December 1st, 8th or 9th; 2 students on each day
Selection Code	MAN 1

Participating Groups and Selection Code:

Childhood Lymphoma Research Group – NEW1

Research Group	**Childhood lymphoma research group**
Principal Investigator(s)	Dr Vikki Rand, Dr Chris Bacon, Dr Simon Bomken
Location	Wolfson Childhood Cancer Research Centre
Area of Research	We are interested in defining the genomic changes driving childhood lymphoma, especially Burkitt and diffuse large B cell lymphoma. This work is currently being performed on both a large UK cohort of sporadic lymphomas (Children's Cancer & Leukaemia Group cohort) and in endemic (African) Burkitt lymphomas under the care of colleagues at collaborating centre in Blantyre, Malawi. Genomic changes are assessed for prognostic impact as well as possible therapeutic targeting with novel small molecular inhibitors. To support the output from the genomic studies, functional assessment of potential therapeutic targets is performed with small scale screens and individual target validation studies. We are also developing pre-clinical models of aggressive B-NHL by xenografting patient-derived samples into immune-compromised mice. These models allow testing of potential new treatments against a more representative lymphoma model.
Associating medical specialties	Oncology
Special research techniques	Genomic analyses (exome sequencing, RNA sequencing, SNP arrays), functional genomic screening (RNAi/CRISPr), disease modelling and novel therapy testing.
Available Dates	Flexible, 4 students
Selection Code	NEW 1

Participating Groups and Selection Code:

Herbal Medicine Research Lab – OXF 1

Research Group	**Herbal Medicine Research Lab**
Principal Investigator(s)	Dr Yu-Ming Ma
Location	Department of Physiology, Genetics and Anatomy, Sherrington Building
Area of Research	My research group is newly established (less than a year) to study the effects of Chinese herbal medicine in the forms of single and combined components on the cardiovascular system, aiming to widen our search on safe and effective treatments on cardiovascular diseases, and especially on cardiac arrhythmias.
Associating medical specialties	Cardiovascular Disease
Special research techniques	We mainly study the effects of the medicines on the cardiac electrophysiological properties of the isolated cardiac myocytes using patch-clamp electrophysiological techniques.
Available Dates	November 9th or 23rd; 2 students on each day
Selection Code	OXF 1

University of Reading

Participating Groups and Selection Code:

Thromboinflammatory Research Group – RAD 1

Research Group	**Thromboinflammatory research group**
Principal Investigator(s)	Dr Sakthivel Vaiyapuri
Location	Institute for Cardiovascular and Metabolic Research, School of Pharmacy, Hopkins building, University of Reading
Area of Research	Inflammation is an underlying feature in many human disease. It is a protective and a complex biological response of body tissues involving immune cells, blood vessels and molecular mediators against harmful stimuli such as pathogens, damaged cells or irritants. Platelets (small circulating blood cells) are involved in blood clotting to prevent excessive bleeding. However, their inappropriate activation under pathological conditions leads to thrombosis resulting in major cardiovascular diseases such as heart attack and stroke. Platelets apart from the maintenance of haemostasis, they are also involved in thrombosis under pathological conditions and inflammatory responses by acting both as an effector and target cells at the site of inflammation. We are researching to understand the functions of inflammatory molecules such as formyl peptide receptors and toll like receptors present on the surface of blood cells such as platelets, monocytes and neutrophils in the regulation of multicellular interactions at the interface between thrombosis and inflammation. In addition, we are also interested in the isolation and characterisation of various snake venom proteins to determine their sequence-structure-function and evolutionary relationships. This will tremendously assist in the development of specific diagnostic tools for the detection of snakebites at different parts of the world. Furthermore, since the majority of venom components are proteins, we are using an organic/synthetic chemistry approach to develop novel inhibitors in order to block the toxic activities of venom proteins. This will facilitate the development of a combination of chemical molecules that could collectively be used as a 'universal antidote' to treat snakebites.
Associating medical specialties	Cardiovascular Disease, Immunology, Infectious Diseases, Population/Public Health, Clinical Pharmacology and Therapeutics
Special research techniques	Flow Cytometry, Confocal and Fluorescent Microscopy, Immunoblotting techniques, Platelet Aggregation Assays, Pharmacokinetic analysis
Available Dates	November 18th, 24th, 25th or December 2nd - 3 students on each day
Selection Code	RAD 1

The University Of Sheffield.

Participating Groups and Selection Code:
Dockrell Research Group – SFD1
Sheffield Myeloma Research Team – SFD2
Department of Neuroscience - SFD3
Genome Stability Group - SFD4

Research Group	**Dockrell Research Group**
Principal Investigator(s)	Professor David Dockrell, Dr Helen Marriott
Location	Department of Infection, Immunity, and Cardiovascular Disease
Area of Research	The group focuses on host responses to bacteria and viruses and investigates how these define susceptibility to infection. A major focus is examining how microbicidal responses can be enhanced therapeutically to target antimicrobial resistance. The group uses primary cells, including those from various patient groups combined with in vivo models of infection and combines candidate approaches with screens to identify key host responses.
Associating medical specialties	Immunology, Infectious Diseases
Special research techniques	Cell culture, microbiology, flow cytometry, microscopy, western blotting, RNA sequencing
Available Dates	November 9th, 16th, 23rd, 30th or December 7th; 2 students on each day
Selection Code	SFD 1

Research Group	**Sheffield Myeloma Research Team**
Principal Investigator(s)	Dr Michelle Lawson
Location	University of Sheffield
Area of Research	My research team works on multiple myeloma, a disease caused by the growth of cancer cells in the bone marrow. A frequent consequence of this disease is the damage it causes to bones which leads to patients having a higher fracture risk than normal. At present we can give patients drugs that prevent further bone destruction but we cannot repair the bone damage. Therefore, my work focuses on developing new drugs that build new bone to repair the damage that the cancer has caused. To do this we have developed several preclinical models of bone cancer to study therapeutic agents in the early, mid and late stages of the disease. This has led to an increased understanding of the role of the bone microenvironment and how it influences tumour growth. In addition, some of these drugs are now used in the treatment of myeloma patients.
Associating medical specialties	Oncology, Orthopaedics, Rheumatology, and Musculoskeletal Sciences
Special research techniques	The effect of various treatments in pre-clinical models of multiple myeloma 1. Assessing drug effects on bone disease by micro-computed tomography, bone histology, and bone serum markers, 2. Assessing drug effects on tumour burden by luminescent imaging of tumours cells, flow cytometry & histology.
Available Dates	November 9th, 16th, 23rd, 30th or December 7th; 1 student on each day
Selection Code	SFD 2

Research Group	**Department of Neuroscience**
Principal Investigator(s)	Dr. James Alix
Location	Sheffield Institute for Translational Neuroscience (SITraN)
Area of Research	This is a series of talks organised by the Department of Neuroscience. Members of the different neuroscience research groups will give a short 10 min talk about the research they do. The aim is to give an introduction to the research that goes on in the Department of Neuroscience.
Associating medical specialties	Neuroscience
Special research techniques	-
Available Dates	November 21st; 20 students
Selection Code	SFD 3

Research Group	**Genome Stability Group**
Principal Investigator(s)	Dr. Spencer Collis
Location	University of Sheffield
Area of Research	The overarching research goal of my laboratory is to identify and functionally characterise novel factors that are important for the maintenance of genomic integrity; a vital process that prevents the accumulation of potentially pro-mutagenic lesions which can lead to the development and progression of several human disease, in particular, cancer. Ultimately, the goal of our research is to establish if such factors may be potential novel anti-cancer targets and/or biomarkers that can be exploited to improve the biological effectiveness of existing chemo- and radio-therapeutic regimes. To achieve these goals, we collaborate with a range of scientists and clinicians to maximise the potential therapeutic impact of our basic biological discoveries. For more information on the Collis lab, please visit: http://genome.sheffield.ac.uk/people/dr-spencer-collis/ and https://www.sheffield.ac.uk/oncology-metabolism/staff/collis
Associating medical specialties	Oncology
Special research techniques	We use a combination of cell and molecular biology approaches in a range of human cell models including; cloning, immunofluorescence, live-cell imaging, western blotting, cell cycle analyses, DNA repair assays and survival assays.
Available Dates	December 2nd, 2 students
Selection Code	SFD 4

Participating Groups and Selection Code:

Paediatric Surgery Research Group – SGU1

Research Group	**Paediatric Surgery Research Group**
Principal Investigator(s)	Mr Stefano Giuliani
Location	St. George's University Hospital NHS Foundation Trust
Area of Research	We do research on: prenatal and neonatal surgical outcomes; necrotizing enterocolitis and coagulopathy; oncology, anorectal malformation, transition of care
Associating medical specialties	Oncology, Paediatrics
Special research techniques	Microarray in NEC, pathways of transition of care, prenatal counselling
Available Dates	November 16th, 1-2 students
Selection Code	SGU 1

Participating Groups and Selection Code:

Philips Lab for Neural Tissue Engineering – UCL 1
Molecular Diagnostics and Therapeutics Group – UCL 2
Clinical Pharmacology & Therapeutics – UCL 3
Neuroendocrinology Research Group – UCL 4
Scrambler Group - UCL 5

Research Group	**Phillips Lab for Neural Tissue Engineering**
Principal Investigator(s)	Dr James B Phillips
Location	Eastman Dental Institute
Area of Research	Our lab has expertise in nervous system tissue engineering that focuses around two major themes: **1) Nervous system repair** We have developed living engineered neural tissue containing aligned therapeutic cells to promote peripheral nerve repair. This is undergoing optimisation and translational development in collaboration with commercial sector and clinical partners. Our work on the CNS has primarily focussed around spinal cord repair, exploring the use of novel cell delivery systems to promote regeneration after injury. Specifically, we have collaborative projects with academic neurosurgeons at Queen's Square and are investigating ways in which olfactory ensheathing cells may be used to promote regeneration. We are also exploring ways in which microelectrodes may be interfaced with engineered neural tissue to improve muscle stimulation in spinal cord injured patients. In addition to using therapeutic cells and biomaterials to build engineered tissues we are also developing drug and gene therapies that could improve regeneration and functional recovery after nervous system injuries. **2) Advanced 3D culture models for neuroscience research & drug discovery** Engineered tissues can be used as 3D culture systems, providing powerful models for research. We have created culture systems to investigate how neurons and glial cells interact and respond to injury, and for testing potential therapeutic interventions.
Associating medical specialties	Neuroscience, Regenerative Medicine & Tissue Engineering

Special research techniques	Our group is highly multi-disciplinary and employs a range of novel techniques. We use a wide range of in vitro and in vivo models and have particular expertise in building tissues using 3D hydrogel environments and nervous system cells. Cells range from therapeutically relevant clinical grade human stem cells and their derivatives for tissue engineering, to primary neurons and glia, cancer cells, research grade cell lines and induced pluripotent stem cells for in vitro modelling. We use a broad range of advanced microscopy, imaging and molecular analysis techniques for understanding cell behaviour and have specialist expertise in analysing cells in soft 3D environments. An important aspect of nervous system tissue engineering is understanding the mechanical environment, so we have developed novel methods for measuring the mechanical properties of soft tissues and materials. In addition to laboratory models we collaborate closely with mathematicians and have developed powerful in silico models to simulate key features of the nervous system damage and repair environment.
Available Dates	Flexible (Fridays), 2-4 students
Selection Code	UCL 1

Research Group	**Molecular Diagnostics and Therapeutics Group**
Principal Investigator(s)	Dr Hayley Whitaker
Location	Gower Street, London
Area of Research	The Whitaker lab identifies, validates and develops novel biomarkers and therapeutics for cholangiocarcinoma and prostate, pancreatic, ovarian and bladder cancers. We focus on membranous and secreted proteins which can be detected in biological fluids or easily targeted for therapy. We also aim to understand why a molecule is a biomarker - is the biomarker itself promoting cancer development or is the biomarker changing as a result of the cancer?
Associating medical specialties	Oncology
Special research techniques	Immunohistochemistry pipeline for rapid, automated, tissue staining, tissue microarrays from imaged guided biopsy, ELISA to measure molecules in fluids, ex-vivo culture of human tissue.
Available Dates	November 16th, 23rd, 30th or December 7th; 2 students on each day
Selection Code	UCL 2

Research Group	**Clinical Pharmacology & Therapeutics**
Principal Investigator(s)	Professor Oscar Della Pasqua
Location	University College London
Area of Research	The Clinical Pharmacology & Therapeutics Group is part of the School of Life and Medical Sciences at UCL. Our research focuses on methodologies for evaluating novel medicines for children (from neonates to adolescents). By collecting data on drug exposure and on biomarkers we use quantitative pharmacological concepts (modelling and simulation) to personalise treatment. This allows us to identify the contribution of different sources of variability in pharmacokinetics and in response and consequently to establish guidelines for patient selection and appropriate dosing recommendations.
Associating medical specialties	Oncology, Infectious Diseases, Population/Public Health, Paediatrics, Clinical Pharmacology and Therapeutics
Special research techniques	Virtual clinical trials (modelling and simulation techniques)
Available Dates	November 25th, December 2nd or 9th; 2 students on each day
Selection Code	UCL 3

Research Group	**Neuroendocrinology Research Centre**
Principal Investigator(s)	Professor Mehul Dattani
Location	UCL Great Ormond Street Institute of Child Health
Area of Research	Our research focusses on understanding the aetiology, genetics, physiology and long-term outcomes of various childhood neuroendocrine disorders and midline forebrain neurodevelopmental abnormalities, including congenital and acquired hypopituitarism, septo-optic dysplasia, and suprasellar/ hypothalamo-pituitary tumours. Many of these disorders lead to long-term quality of life issues including panhypopituitarism, hypothalamic obesity, neurodisability, autism, sub fertility and even increased mortality, and our research aims to improve the care we provide patients by increasing our understanding of these problems. Ongoing projects include studies on the molecular genetic aetiology of congenital hypopituitarism and hypogonadotrophic hypogonadism, the role of appetite-regulating hormones in hypothalamic obesity, the pathogenesis of childhood craniopharyngioma and hypothalamic hamartoma, the efficacy of various hormone replacement therapies and the identification of novel treatments for these conditions. Our research group is part of the London Centre for Paediatric Endocrinology & Diabetes, consisting of a multidisciplinary clinical and research team spanning Great Ormond Street Hospital for Children, University College London Hospital and UCL Great Ormond Street Institute of Child Health. Together, we care for one of the largest single-centre cohorts of children and adolescents with congenital and acquired hypothalamo-pituitary dysfunction, with patients being seen

	from infancy and often into young adulthood. The group is led by Professor Mehul Dattani, a recognised international expert in septo-optic dysplasia, a congenital neurodevelopmental disorder leading to various midline forebrain and optic pathway abnormalities and hypopituitarism. Together, the group has published over 200 papers, books and book chapters on neuroendocrinology
Associating medical specialties	Neurosciences, Oncology, Paediatrics, Endocrinology
Special research techniques	Sanger sequencing, PCR/ quantitative PCR, In situ hybridisation, Immunohistochemistry, Luciferase assays, Novel immunoassays for various peptide hormones
Available Dates	Flexible (1 day visit), 2 students
Selection Code	UCL 4

Research Group	**Scambler Group**
Principal Investigator(s)	Professor Peter Scambler
Location	UCL Institute of Child Health
Area of Research	The main focus of the team is to identify the genetic causes of human congenital malformation syndromes and elucidate the developmental processes disrupted in these conditions. Previous and current work indicates that this can uncover novel genetic mechanisms and offer insights into general mechanisms of development and even common disease. For instance, the deletion 22q11 causing DiGeorge syndrome is the largest known genetic risk factor for schizophrenia. Clinical and diagnosis and prognosis can be improved, and in some cases there is the prospect of new therapeutic intervention. Of particular interest to the group are the 22q11.2 deletion syndrome (22q11DS) and CHARGE syndromes, and in researching these conditions our primary concern are the congenital heart and vascular defects seen when the main causative (haploinsufficient) genes – Tbx1 and Chd7 – are mutated. As these two genes encode transcriptional regulators identification of their targets is core to our work. This has led to further investigations of specific signalling pathways and processes e.g. the CXCL12/CXCR4/CXCR7 axis, SEMA3c and retinoic acid signalling.
Associating medical specialties	Cardiovascular Disease
Special research techniques	The approaches used include creation and analysis of models in mouse and zebrafish. We explore novel methods of imaging the phenotypes observed (in collaboration with UCL's CABI). Genetic approaches include high resolution, genome-wide, screens and sequencing (collaboration with UK10K project).
Available Dates	Flexible (1 day visit, from November 28th), 2 students
Selection Code	UCL 5

Scotland

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UNIVERSITY OF ABERDEEN

Participating Groups and Selection Code:
IFCC-Cytometry – ABDN 2
Gastroenterology Group - ABDN 3
Arthritis and Regenerative Medicine Laboratory - ABDN 4
ACTRA – ABDN 6
Aberdeen Applied Renal Research Collaboration – ABDN 7

MRC Centre for Medical Mycology:
- Brown Group – ABDN 1
- Neil Gow Aberdee Fungal Group – ABDN 5
- Deborah Lockhart Group – ABDN 8

Academic Events in Aberdeen:
Register for attendance with Aberdeen Student Society for Academic Medicine (ASSAM) at assam@nsamr.ac.uk

1) **Annual Academic Careers Evening**
   Date: 22nd November, 2016
   Time: 17:30 - 20:30
   Venue: Suttie Lecture Theatre, Suttie Centre

   The Annual Academic Careers Evening has been one of the most successful and popular event amongst Aberdeen academics and research community. Inspiring and experienced academic clinicians, representing diverse medical specialties, are invited to this event to share their academic journeys. Medical students will have an opportunity to gain invaluable advice from them. We also include a dinner break to allow medical students to network with academics, clinicians and trainees.

2) **Aberdeen Summer Research Studentship (ASRS) Symposium**
   Date: 23rd November, 2016
   Time: 17:00 - 20:00
   Venue: Level 7 Conference Room, Institute of Medical Sciences

   All 2016 ASRS recipients will be presenting their summer projects on the evening of 23rd November to the Aberdeen research community. This is a great opportunity to find out more information and the types of projects on offer. You will get also get an opportunity to ask questions and see for yourself what you can achieve within the 8–week studentship.

Research Group	**Brown Group within MRC Centre for Medical Mycology**
Principal Investigator(s)	Professor Gordon Brown
Location	MRC Centre for Medical Mycology, University of Aberdeen
Area of Research	My area of expertise is in Immunology and focuses on understanding how our immune system recognizes and controls microbial infections. I am particularly interested in sensors, called receptors, that are found on immune cells and that are able to detect microbes and trigger immune responses. These sensors are critical components of immunity, and defects in these molecules result in higher susceptibility to infection. My laboratory is working on a specific group of these sensors that are called C-type lectins, which we discovered to be essential for protection against fungal infection. Our research is therefore focused on identifying all of the C-type lectin sensors that contribute to anti-fungal immunity and on understanding how these sensors are employed by immune cells during infection with fungi and other pathogens. We have made many important discoveries in this area, for example we found that C-type lectins are able to mediate the uptake and killing of fungi by immune cells. Our research is important because it provides us with an understanding of why certain people show increased susceptibility to fungal disease. It also provides crucial information that is required for the development of new therapies for treating fungal diseases.
Associating medical specialties	Immunology, Infectious Diseases
Special research techniques	Flow cytometry, in vivo models, tissue culture, confocal microscopy, genetic manipulations (molecular biology), immunohistochemistry
Available Dates	November 9th or 16th; 2 students on each day
Selection Code	ABDN 1

Research Group	**Iain Fraser Cytometry Centre**
Principal Investigator(s)	Dr. Raif Yuecel
Location	Institute of Medical Sciences, University of Aberdeen
Area of Research	Flow cytometry is a powerful tool for the multiparameter analysis of particles, microorganisms and cells of all types. The Iain Fraser Cytometry Centre (IFCC) provides a state-of-the-art multi-user facility providing cell or particle analytical and sorting capacities to the researchers. Our research is mainly focused on different application possibilities of Cytometry, such as the investigation of cellular signalling in human blood, stem cell analysis, cancer research, biomarker discovery (e.g. microvesicle), immunology, marine and ocean biology (e.g salmon, amoeba or oil-bacteria, etc) or microbiology (fungal research).
Associating medical specialties	Cardiovascular Disease, Neuroscience, Oncology, Immunology, Infectious Diseases, Orthopaedics, Rheumatology, and Musculoskeletal Sciences, Marine & Ocean Research
Special research techniques	Flow Cytometry and In vivo Imaging (In vivo FX MS Bruker)
Available Dates	November 9th or 16th; 2 students on each day
Selection Code	ABDN 2

Research Group	**Gastroenterology Group**
Principal Investigator(s)	Dr Georgina Hold
Location	Institute of Medical Sciences, University of Aberdeen
Area of Research	Understanding the link between gastrointestinal diseases, inflammation and the gut microbiota
Associating medical specialties	Immunology, Infectious Diseases, Gastroenterology
Special research techniques	Clinical sample collection/processing, gut microbiota analysis and functional studies looking at specific bacteria and their role in disease.
Available Dates	Flexible, 2 students
Selection Code	ABDN 3

Research Group	**Arthritis and Regenerative Medicine Laboratory**
Principal Investigator(s)	Professor Cosimo De Bari
Location	Institute of Medical Sciences, University of Aberdeen
Area of Research	Our research focuses on the stem cells that are naturally present in the joints, investigating the way they function in joint health and diseases such as osteoarthritis and rheumatoid arthritis. Our studies combine in vitro assays, preclinical models and clinical tissues to ensure that our findings are clinically relevant. Our ultimate goal is to target these stem cells to prevent disease progression and restore joint homeostasis.
Associating medical specialties	Orthopaedics, Rheumatology, and Musculoskeletal Sciences
Special research techniques	We use a large variety of techniques. They include histology, immunohistochemistry, double and triple immunofluorescence stainings, flow cytometry and cell sorting, stem cell culture, and molecular biology. We employ genetically modified mice that allow monitoring stem cells and their progenies using fluorescent markers. We carry out in vitro and in vivo functional studies.
Available Dates	Flexible, 2 students
Selection Code	ABDN 4

Research Group	**Neil Gow - Aberdeen Fungal Group**
Principal Investigator(s)	Professor Neil Gow
Location	Institute of Medical Sciences
Area of Research	Fungi are aesthetically beautiful organisms that are central to world ecology and provide vital food and drink products, drugs and materials. But there is a sinister side to them that is not properly appreciated. Fungal skin infections affect one in three people worldwide but, more seriously, fungi also kill over a million people through infection every year and more people die of fungal infections than malaria, tuberculosis or breast cancer. My group is focused on life-threatening fungal diseases. These infections pose difficulties in diagnosis, there are no vaccines for fungal disease, and treatment options are limited. Fungi have a cell wall that is composed of signature molecules that are not represented at all in the human body. The cell wall is therefore the target which immune system uses to recognise the presence of a fungal invader and it is also an excellent target to aim the design of antifungal drugs. For these reasons my group's speciality is to understand how the fungal cell wall is made, how it is detected by our immune system and how we might kill fungi by blocking cell wall assembly. This research is therefore informing the design of new generations of antifungal drugs and diagnostic tests.
Associating medical specialties	Immunology, Infectious Diseases
Special research techniques	CRISPR Cas9, fungal immunology, cryo-imaging
Available Dates	Flexible, 2 students
Selection Code	ABDN 5

Research Group	**Academic Centre for Applied Clinical and Translational Research into Ageing (ACTRA)**
Principal Investigator(s)	Dr Roy Soiza, Professor Phyo Myint, Professor Christine Bond
Location	Polwarth Building, Foresterhill & Aberdeen Royal Infirmary, University of Aberdeen
Area of Research	Pharmacoepidemiology and medicine management in care home setting
Associating medical specialties	Cardiovascular Disease, Population/Public Health, Geriatrics, Primary care
Special research techniques	ONTOP systematic review; focus on multimorbid older people with polypharmacy
Available Dates	November 21st onwards, 5-7 days, 1 student
Selection Code	ABDN 6

Research Group	**Aberdeen Applied Renal Research Collaboration**
Principal Investigator(s)	Dr Angharad Marks
Location	Foresterhill Campus, University of Aberdeen
Area of Research	The Aberdeen Applied Renal Research Collaboration sits within the Chronic Disease Research Group. Our interest lies in improving outcomes for people with kidney disease whether that is chronic kidney disease or acute kidney injury. We use data from routine health care data to examine the associations between risk factors for outcomes and outcomes in patients with kidney disease. We aim to be able to predict outcomes to enable delivery of best care. We also aim to improve information available about what those risk factors are so that with time we can reduce the likelihood of acute kidney injury occurring. We also aim to improve the long-term outcomes in people with both chronic kidney disease and acute kidney injury, so that there is less need for dialysis and transplantation.
Associating medical specialties	Population/Public Health, Renal Medicine
Special research techniques	Prognostic modelling; data-linkage of routine health care data.
Available Dates	November 8th and 9th; 2 students
Selection Code	ABDN 7

Research Group	**Deborah Lockhart Group**
Principal Investigator(s)	Dr. Deborah E. A. Lockhart
Location	MRC Centre for Medical Mycology, Institute of Medical Sciences
Area of Research	Have you ever wondered how new medicines evolve? This is precisely the question that inspired me to take time out as a microbiology registrar to pursue scientific research. I have a particular interest in life threatening invasive fungal infections that affect people with defective immune systems. Currently, clinical management is hampered by difficulties in establishing a prompt diagnosis and limited treatment options. For starters, think about the number of antibacterial drug classes versus those for fungal diseases such as invasive Candidiasis and Aspergillosis. My scientific research focuses on the fungal cell wall - a 'sugary coat' that surrounds fungal cells - as a source of new antifungal drug targets. The fungal cell wall is essential for survival and also protects fungi from our immune cells. To date only the Echinocandin class of antifungals exploit this as a target but I believe many of the undiscovered pathways and networks that make up this complex polysaccharide may hold the key towards ultimately unlocking the next generation of antifungal drugs.
Associating medical specialties	Oncology, Infectious Diseases, Microbiology
Special research techniques	My research uses combination of genetic and chemical approaches to validate potential antifungal drug targets. This is one of the earliest stages in pre-clinical drug discovery. Specific examples of the genetic approaches include: fungal gene knockouts; phenotypic analysis and in vivo infection models. Chemical approaches involve screening targets against chemical 'building blocks' and X-ray crystallography to visualise binding interactions at the molecular level. Lots of exciting things!
Available Dates	November 28th, December 5th or 9th, 1-2 students on each day
Selection Code	ABDN 8

Participating Groups and Selection Code:

Langston Lab - DUN1
Birt-Hogg-Dubé lab - DUN 2
Institute of Motion Analysis and Research - DUN 3

Research Group	**Langston Lab**
Principal Investigator(s)	Dr Rosamund Langston
Location	Ninewells Hospital
Area of Research	We are a systems and behavioural neuroscience group interested in the mechanisms underlying learning and memory, particularly episodic memory. This type of memory is late to develop in childhood and very vulnerable to early stage dementia in later life. We use mouse models of Huntington's Disease and rat models of development, along with human cognitive testing, to try to study where in the brain and at what ages episodic memories are made and lost.
Associating medical specialties	Neurosciences, Mental Health
Special research techniques	We use translational episodic memory tasks in rodents and humans, immunocytochemistry, proteomics and electrophysiology to study mechanisms underlying episodic memory.
Available Dates	November 30th or December 7th, 2 students on each day
Selection Code	DUN 1

Research Group	**Birt-Hogg-Dubé Lab**
Principal Investigator(s)	Professor Maurice van Steensel
Location	School of Life Sciences, University of Dundee
Area of Research	Our group is interested in finding out why people with the rare genetic disorder Birt-Hogg-Dubé syndrome (BHD) get kidney cancer. The disease is a good model for sporadic kidney cancer, which is still difficult to treat. We hope that by understanding BHD, we will be able to figure out how to better treat kidney cancer.
Associating medical specialties	Oncology, Dermatology
Special research techniques	3D cell culture, zebrafish modelling, high content phenotypic screening.
Available Dates	Flexible, 2 students
Selection Code	DUN 2

Research Group	**Institute of Motion Analysis & Research**
Principal Investigator(s)	Professor Rami Abboud, Dr Tim Drew, Dr Graham Arnold
Location	TORT Centre, Ninewells Hospital, Dundee
Area of Research	Biomechanics and motion analysis are the core for our research group interest to support the provision of a comprehensive clinical service. Our main aim is to understand what is best for patients to alleviate pain and correct deformity and what is best for athletes to enhance performance and provide better protection against injury.
Associating medical specialties	Orthopaedics, Rheumatology, and Musculoskeletal Sciences
Special research techniques	High tech motion analysis and biomechanical instrumentation to alleviate pain, correct deformity and enhance performance
Available Dates	Last week of November, 3 students on each day
Selection Code	DUN 3

Participating Groups and Selection Code:
Walmsley Group – EDIN 1
Imaging Cancer Inflammation – EDIN 2
Drake Group – EDIN 3
Tommy's Centre for Maternal and Fetal Health – EDIN 4
Sleep Research Unit – EDIN 5
Mood Disorder and Resilience – EDIN 6
Centre for Cognitive Ageing and Cognitive Epidemiology – EDIN 7
Fitzpatrick Lab – EDIN 8
Hurd Lab – EDIN 9
Hill Group – EDIN 10
Mouse Models of Genetic Disease – EDIN 11
Advanced Imaging Resource – EDIN 12
Bickmore Lab – EDIN 13

Research Group	**Walmsley Group**
Principal Investigator(s)	Dr Sarah Walmsley
Location	Queen's Medical Research Institute
Area of Research	Our research focuses on understanding how oxygen sensing and energy states regulate neutrophil function, with the aim of validating the therapeutic potential of manipulating these pathways in patients with chronic neutrophil dominant lung disease.
Associating medical specialties	Respiratory Medicine
Special research techniques	Inflammation modelling
Available Dates	Flexible, 2 students
Selection Code	EDIN 1

Research Group	**Imaging Cancer Inflammation**
Principal Investigator(s)	Dr Yi Feng
Location	Queen's Medical Research Institute
Area of Research	We use a combination of live imaging and genetic analysis in zebrafish larvae, to study the earliest events of tumour initiation and progression, in vivo and in real time. We focus on the interactions between transformed-cell, normal host tissue and infiltrating innate immune cells which, as we have demonstrated, mount a trophic inflammatory response toward the emergent transformed-cells. Our research is aimed at understanding the underlying cellular and molecular mechanisms regulating tumour initiation, and the contribution of inflammation to tumour promotion with the aim of identifying fundamental mechanisms, which will underpin novel therapeutic approaches. Main areas that we focus on in the lab: 1. To Investigate the regulatory mechanism(s) that select for such a Trophic Inflammatory phenotype by responding leukocytes. Are there distinct transformed-cell derived signals for the induction of a trophic innate immune phenotype? 2. To Establish the gene-expression signature, and visualise the characteristic behavior, of innate immune cells with "Trophic inflammatory" phenotype and identify other Trophic factors released in response to the emerging transformed cell 3. To Test whether we can change the phenotype of innate immune cells responding to transformed-cell growth and whether this is effective in preventing tumour progression.
Associating medical specialties	Oncology, abnormal inflammation
Special research techniques	Confocal microscope; in vivo live imaging; zebrafish models for tumour initiation
Available Dates	November 10th or December 2nd, 2 students on each day
Selection Code	EDIN 2

Research Group	**Drake Group**
Principal Investigator(s)	Dr Mandy Drake
Location	Centre for Cardiovascular Science, Queen's Medical Research Institute
Area of Research	I am a paediatric endocrinologist and head a research group interested in the role of epigenetic factors, particularly DNA methylation, in disease. Our research includes studies aimed at delineating how events in early life (pre-or early postnatal) influence the risk of conditions such as obesity, type 2 diabetes and neurodevelopmental disorders. Our current work in this area is focussed on how preterm birth affects neurodevelopment and whether changes in DNA methylation play a role. We also have a programme of work studying DNA methylation in 2 diabetes and obesity
Associating medical specialties	Cardiovascular Disease, Neurosciences, Paediatrics
Special research techniques	We use molecular biology techniques to study changes in gene expression and DNA methylation in tissue samples and cells. We also use organotypic brain slices to study the effects of manipulation of the environment on the epigenome in the brain
Available Dates	November 22nd or 30th; 2 students on each day
Selection Code	EDIN 3

Research Group	**Tommy's Centre for Maternal and Fetal Health**
Principal Investigator(s)	Dr Sarah Stock, Professor Rebecca Reynolds, Dr Fiona Denison, Professor Jane Norman
Location	MRC Centre for Reproductive Health, Queen's Medical Research Institute
Area of Research	The Edinburgh Tommy's Centre funded by the charity Tommys opened in May 2008 and is located within the MRC Centre for Reproductive Health. The Tommy's Centre aims to conduct world class research that will have a direct impact on the health of pregnant women and their babies and to translate our research into improved health outcomes both locally and worldwide. Research themes include preterm labour and stillbirth, fetal growth restriction and the effect of obesity on pregnancy and pregnancy outcome.
Associating medical specialties	Obstetrics & Gynaecology
Special research techniques	The group has expertise in laboratory studies, preclinical models and imaging, clinical trials and epidemiological and data linkage studies. This allows us to have a true 'bench to bedside' approach to improving care for mothers and babies, as well as looking at outcomes on a population level.
Available Dates	November 16th or 23rd; 2 students on each day
Selection Code	EDIN 4

Research Group	**Sleep Research Unit**
Principal Investigator(s)	Dr Renata L. Riha
Location	Dept. of Sleep Medicine, Royal Infirmary Edinburgh
Area of Research	The Sleep Research Unit has been established to conduct enquiry and research into all aspects of human disorders of sleep. The Unit aims to further understanding, particularly in the areas of sleep-related breathing disorders, parasomnias and narcolepsy, including the genetic basis, social and psychological impact and medico-legal aspects of these conditions. Our expertise lies in running clinical trials and we have strong collaborative ties with research units in the UK and Europe, as well as within our own institution reflecting our cross-disciplinary interests in sleep affecting all areas of health and vice versa (respiratory medicine, cardiology, endocrinology, obstetrics, intellectual disability, biochemistry (mouse models), radiology, the Wellcome Trust Core Genetics Unit including the Generation Scotland project). We also have a very strong focus on education and have been running an internationally acclaimed Sleep Medicine course for 12 years and additionally run courses in sleep technology.
Associating medical specialties	Cardiovascular Disease, Neurosciences, Paediatrics, Obstetrics & Gynaecology, Sleep
Special research techniques	The Sleep Research Unit is embedded in the Department of Sleep Medicine at the Royal Infirmary of Edinburgh (part of the NHS Lothian and University Hospitals Trust) – the largest teaching hospital in East Scotland with over 1,000 beds.The Unit is part of the University of Edinburgh who have funded facilities for conducting basic lab research, a MRI scanner, and dedicated facilities in the Wellcome Trust Genetics Core Facility and Cardiovascular Research Facility, funded separately by the UK Government or charities. We collaborate with other centres and experts in the UK and Europe and guarantee that cross-centre studies would be fruitful and successful. The infrastructure is available to support all students and researchers in terms of independent advice, Human Resources, email, regular scientific seminars etc.
Available Dates	Flexible (Thursdays), 2 students
Selection Code	EDIN 5

Research Group	**Mood Disorder and Resilience**
Principal Investigator(s)	Professor Andrew McIntosh, Dr Heather Whaley, Professor Ian Deary
Location	Royal Edinburgh Hospital and 7 George Square
Area of Research	We are interested in understanding the mechanisms of mood disorders and resilience through genomics and clinical, cognitive and imaging assessment
Associating medical specialties	Neurosciences, Population/Public Health, Mental Health
Special research techniques	Stratification based on aetiology Longitudinal assessment of >10K subjects "Big data"

Available Dates	Flexible, 3 students
Selection Code	EDIN 6

Research Group	**Centre for Cognitive Ageing and Cognitive Epidemiology**
Principal Investigator(s)	Professor Andrew McIntosh, Professor Ian Deary, Dr Tom Russ
Location	7 George Square
Area of Research	We are interested in why some people age cognitively better than others, and in better understanding its associations with mental and physical disease
Associating medical specialties	Cardiovascular Disease, Neuroscience, Population/Public Health, Old Age Medicine and Psychiatry
Special research techniques	Genomics (GWAS, sequencing, methylation, gene expression) Brain imaging Analysis of U.K. BIOBANK
Available Dates	Flexible, 3 students
Selection Code	EDIN 7

Research Group	**Fitzpatrick Lab**
Principal Investigator(s)	Professor David Fitzpatrick
Location	MRC Human Genetics Unit, Institute of Genetics and Molecular Medicine
Area of Research	Our research aim to understand the genetic causes of disorders of human development. We have been particularly interested in severe malformations of the eye such as anophthalmia (missing eye(s)), microphthalmia (small eye(s)) and coloboma (incompletely formed eye(s)). We have identified many genes that when mutated cause eye malformations and we are now interested in how these genes alter the normal processes of development to result in the clinical problems.
Associating medical specialties	Paediatrics
Special research techniques	We are using stems cells to understand the earliest steps that occur in the embryo to form an eye. This uses specialist culture techniques and fluorescent markers of gene activation.
Available Dates	November 30th and December 1st, 1 student
Selection Code	EDIN 8

Research Group	**Hurd Lab**
Principal Investigator(s)	Dr Toby Hurd
Location	MRC Human Genetics Unit, Institute of Genetics and Molecular Medicine
Area of Research	A growing number of human genetic diseases termed "ciliopathies" arise due to mutations in genes that regulate the formation or function of a microtubule-based organelle termed the cilium. Cilia regulate a diverse array of cellular functions critical to development, tissue homeostasis and sensory perception. The most common ciliopathies affect the kidney, manifesting as progressive loss of renal function in both children (nephronophthisis, ARPKD) and adults (ADPKD) ultimately leading to renal failure, dialysis and kidney transplant. Moreover, extra-renal manifestations such as retinal degeneration (progressive loss of visual acuity) are frequently observed in syndromic ciliopathies. We wish to understand at the molecular and organismal level how mutation of causative genes alters cellular function and ultimately leads to onset and progression of disease.
Associating medical specialties	Cardiovascular Disease, Neurosciences, Nephrology
Special research techniques	Genome editing to create human pathogenic mutations in mice and cultured cells. Super-resolution microscopy
Available Dates	November 30th and December 1st, 2 students
Selection Code	EDIN 9

Research Group	**Hill Group**
Principal Investigator(s)	Professor Bob Hill
Location	MRC Human Genetics Unit, Institute of Genetics and Molecular Medicine
Area of Research	Our interests are in understanding the events that occur during mammalian development taking the approaches of both the developmental biologist and the geneticist. The group is comprised of seven people including a senior scientist, postdoc, student, and three research assistants. We investigate the embryonic mechanisms that organise the overall design of the developing organ systems. These mechanisms define the structures and their final arrangement in composing the embryonic anatomy. Our aims are to investigate developmental and gene regulatory processes that participate in organogenesis and understand how genetic inaccuracies lead to human congenital abnormalities. We aim to identify the transcriptional network of genes that specify cellular identity in the well-established and highly accessible genetic system of the developing limb bud and how these organise the development of the skeleton. The relationship of enhancer structure to function is poorly understood and our work aims to understand how enhancers are activated during development, and once activated, how enhancers situated a long distances from their target promoters (up to a million bases away) conveys this information to regulate accurate temporal and spatial gene expression.

Associating medical specialties	Paediatrics
Special research techniques	The techniques used in the lab range from embryological methodologies to genomic techniques. We make mouse mutations using CRISPR/Cas9 to explore the regulatory mechanisms during developmental gene expression. To analyse gene expression, we examine reporter gene expression and to examine native gene expression we use in situ hybridisation methods. Genomic technologies such as ATAC-Seq, ChIP-Seq, and several techniques based on 3C methodologies are used to probe chromatin structure.
Available Dates	November 30th and December 1st, 1-2 students
Selection Code	EDIN 10

Research Group	**Mouse Models of Genetic disease**
Principal Investigator(s)	Professor Ian Jackson
Location	MRC Human Genetics Unit, Institute of Genetics and Molecular Medicine
Area of Research	We are a small group (2 postdocs, 2 technicians) currently focussed on mouse models of human eye disease. We are currently working primarily on models of retinal degeneration. Other mouse mutant lines give eye phenotypes when heterozygous but when homozygous are embryonic (foetal) lethal. We are working on one such mutation that when homozygous results in omphalocoele, and other mutant alleles of the same gene gives Bochdalek-type diaphragmatic hernia. We also have a project using population genetics to dissect the genetic basis of normal human hair colour variation and to model the variants in mice.
Associating medical specialties	Neurosciences, Population/Public Health, Paediatrics, Obstetrics & Gynaecology, Ophthalmology
Special research techniques	Mouse genome engineering (CRISPR-Cas9 editing), Mouse genetics, Histopathology, Ophthalmic techniques applied to mice
Available Dates	November 30th and December 1st, 2 students
Selection Code	EDIN 11

Research Group	**Advanced Imaging Resource**
Principal Investigator(s)	Dr Ann Wheeler
Location	MRC Human Genetics Unit, Institute of Genetics and Molecular Medicine
Area of Research	We develop novel methodologies for visualising cancer and other diseases. Working together with medical researcher from the whole of the IGMM.
Associating medical specialties	Oncology
Special research techniques	We have a host of novel imaging techniques including super-resolution light microscopy, Light sheet microscopy, Optical Projection Tomography and methodologies for analysis of quantitative histopathology as well as expertise in organoid and organotypic imaging. We also develop new

	methods for visualising samples including 3D ex-vivo models which better represent disease pathologies.
Available Dates	November 30th and December 1st, 1 student
Selection Code	EDIN 12

Research Group	**Bickmore Lab**
Principal Investigator(s)	Dr Iain Williamson
Location	MRC Human Genetics Unit, Institute of Genetics and Molecular Medicine
Area of Research	Our research group is comprised of several research scientists/postdocs and PhD students and is mainly wet lab-based. We are a basic science research lab, however many of our interests are in gene regulation and genome organisation components implicated in congenital diseases and cancer, and the impact of hormonal stress response on gene transcription and chromosome conformation. Scientific themes are: chromatin structure, nuclear organisation, gene regulation, epigenetics and enhancers.
Associating medical specialties	Oncology, Immunology, Anaesthesia, Congenital diseases
Special research techniques	Conventional and super-resolution sub-cellular imaging, chromosome conformation capture, chromatin immunoprecipitation, genome and epigenome editing.
Available Dates	November 30th and December 1st, 1-3 students
Selection Code	EDIN 13

Participating Groups and Selection Code:

Glasgow Brain Injury Neuroinformatics Advanced Research Group (G-BINARY) – GLA 1
Systems Biology of Vascular Disease – GLA 2
Academic Geriatric Medicine – GLA 3

Research Group	**Glasgow Brain Injury Neuroinformatics Advanced Research Group (G-BINARY)**
Principal Investigator(s)	Dr. Laura Moss, Dr. Ian Piper
Location	Institute of Neurological Sciences, Queen Elizabeth University Hospital, Glasgow
Area of Research	The Glasgow Brain Injury Neuroinformatics Advanced Research Group (G-BINARY) is a collaboration between scientists (Computer Science, Mathematics, Neuroscience & Clinical Physics) and Neuro clinicians (Neurosurgery, Neurointensive Care and Neuropathology). Our aim is to improve the acute clinical management of brain injured patients through the novel development and application of advanced computational, artificial intelligence and knowledge discovery methods to high resolution physiological monitoring and clinical management data collected from patients managed within neurointensive care and neurospecialist wards.
Associating medical specialties	Neurosciences, Anaesthesia
Special research techniques	The novel development and application of advanced computational, artificial intelligence and knowledge discovery methods to high resolution physiological monitoring and clinical management data.
Available Dates	Flexible, 3 students
Selection Code	GLA 1

Research Group	**Systems Biology of Vascular Diseases**
Principal Investigator(s)	Professor Christian Delles, Dr Stuart Nicklin, Dr Delyth Graham, Dr William Mullen, Dr Holger Husi
Location	Institute of Cardiovascular and Medical Sciences - BHF Glasgow Cardiovascular Research Centre
Area of Research	We are interested in the pathogenesis of (cardio)vascular diseases and generate and explore large-scale datasets from omics experiments with a focus on proteomics. We compare between humans and different rodent species and take significant results further to appropriate validation and intervention studies.
Associating medical specialties	Cardiovascular Disease
Special research techniques	Proteomics, western blotting, immunohistochemistry, PCR, systems biology
Available Dates	November 15th or 29th; 1-2 students on each day
Selection Code	GLA 2

Research Group	**Academic Geriatric Medicine**
Principal Investigator(s)	Professor David Stott, Professor Peter Langhorne, Dr Terry Quinn
Location	New Lister Building, Glasgow Royal Infirmary
Area of Research	Our department has a particular interest in the common causes of physical and cognitive decline associated with older age. Research activity has focussed on diseases such as stroke, dementia and thyroid disease but often we have used these diseases as a platform to explore broader concepts relevant to ageing. Our research is predominantly clinical and we strive to produce outputs that have immediacy and relevance to patients, practice and policy. Within this remit we have a portfolio of active research that spans the translational spectrum, from mechanistic work (for example studies describing association between markers of haemostasis and vascular dementia); through large scale clinical trials (for example an international study of thyroxine treatment in subclinical hypothyroidism) to health services research (for example delivering evidence based stroke care in lower income countries). Tackling age related diseases requires a multidisciplinary approach and within our department we have researchers from medical, nursing, psychology and neurosciences backgrounds. We are a collaborative unit and we have strong links with other research groups both within Glasgow (as part of the Glasgow Ageing Research Network [GARNER] group) and Internationally. Nurturing and developing the next generation of researchers with an interest in ageing is integral to our unit. We host a range of researchers from medical students on research electives or self-selected study; BSc, MSc, PhD and post-doctoral researchers. For those with an interest in research but not in a research post we offer weekly academic seminars, a regular journal club and specific training events.

Associating medical specialties	Cardiovascular Disease, Neurosciences, Mental Health, Geriatric Medicine
Special research techniques	Methodological rigour is central to our unit's activities and we strive to raise standards and develop new methods of research, analysis and dissemination of results. We have strong links with Cochrane and National Institute of Health Research Complex Reviews Support Unit (NIHR-CRSU) and are working together on novel methods of data synthesis, particularly around diagnostic test accuracy. We use technology to progress our research and with colleagues in Glasgow have developed new methods of video and app based assessments. We make use of existing "big data" sets and have projects that link clinical information to national and international registries.
Available Dates	December 1st or 8th; 2 students on each day
Selection Code	GLA 3

University of St Andrews

Participating Groups and Selection Code:
Reynolds Lab – STA1
Health Psychology – STA2

Research Group	**Reynolds Lab**
Principal Investigator(s)	Dr Paul Reynolds
Location	School of Medicine, University of St Andrews
Area of Research	Cancer is a remarkably heterogeneous disease and the increasing complexity of molecular changes during tumour evolution highlights the importance of identifying events that drive this process. The Reynolds lab is interested in identifying those molecular changes which drive tumour formation with particular emphasis on 1) novel proteins in the Hippo signaling pathway and 2) resistance mechanisms to therapeutic drugs in cancer. We are employing biochemistry, molecular biology and cell biology approaches to investigate the nature and context of these factors and how they impact upon carcinogenesis. An understanding of their biology may also contribute to the development of better strategies to identify aggressive tumours early, before the development of metastasis. Another interest is exploring models of physiological tissue settings and disease pathologies where the Hippo pathway plays a role.
Associating medical specialties	Oncology, Renal
Special research techniques	sgRNA genome editing technology, generation of novel cell lines, high content image analysis of cells, cellular assays.
Available Dates	November 8th, 15th or 23rd, 1 student on each day
Selection Code	STA 1

Research Group	**Health Psychology**
Principal Investigator(s)	Dr Jo Cecil
Location	School of Medicine, University of St Andrews
Area of Research	My research focus is on the bio-psychological controls of appetite, eating behaviour and obesity. My work employs behavioural, psychological, physiological and genetic approaches to understand individual susceptibility to obesity. I have conducted research in adults and children to characterise resistance and susceptibility to weight gain and have investigated the relationship between genotype and behavioural phenotype in the maintenance of energy balance, where variants of candidate genes for common obesity including PPARG and FTO have been shown to moderate appetite and energy intake. I am also interested in taste preference phenotypes which ultimately drive food choice and dietary intake, such as liking for vegetables, individual differences in fat taste perception and trait eating behaviour. Currently, my laboratory is investigating dietary health through portion control by examining and exploiting environmental 'prompts'. The portion size effect, where larger amounts of food are consumed when larger amounts are offered, is a robust effect found in adults and children. Our research investigates the effect of downsizing the portion size of high energy dense foods and how manipulating variety can facilitate downsizing effects in young children. This research is important because portion control has been identified as a key initiative in which to address obesity in a cost-effective way.
Associating medical specialties	Population/Public Health, Paediatrics, Obesity, Eating behavior
Special research techniques	behavioural, psychological, physiological, genetic approaches, working with children and adults in laboratory and free living contexts
Available Dates	November 24th and 25th, 1 student
Selection Code	STA 2