

Vacation Scholarships 2016



134 applications were received and 74 applications accepted an offer of award.

Miss Emma Foster & Profesor Phyo Myint, University of Aberdeen

Determinants of post stroke falls and fractures over long term follow up of a regional stroke register

Stroke is the number one cause of disability globally. Stroke can lead to weakness of the limbs and/or balance problems. Therefore, people who survived stroke are at higher risk of falls. Since most people with stroke will lose their bone mass through reduced activity they also have increased risk of fracture when they fall. This project will examine the factors that are linked to increased risk of falls and fractures during a long term follow up over 10 years to provide new insight into what preventive strategies may be developed to reduce risk of falls and fractures after stroke.

Mr Nikolaos Tzoumas & Dr Neeraj Dhaun, University of Edinburgh

Assessment of retina and choroid using optical coherence tomography in health, hypertension and chronic kidney disease

There is an urgent need for new antibiotics to counter increasing resistance to antibiotics globally. There exists a relationship between diseases affecting the blood vessels in the kidneys and in the eyes. However, this is largely unexplored.

Using a novel, quick, and non-invasive method, we have found that the layers in the back of the eye are thinner in patients with kidney dysfunction than in health. This thinning relates to the degree of kidney dysfunction, the amount of protein in the urine (a predictor of heart disease), and measures of inflammation.

We would now like to examine this in more varied patients. Ultimately, these eye changes may help us to manage patients with kidney disease.

Mr Georgi Georgiev & Dr Megan MacLeod, University of Glasgow

Turning off memory CD4 T cells in non-lymphoid organs

Rheumatoid arthritis (RA) is a chronic autoimmune disease that causes painful joint swelling. Autoimmune diseases happen when the immune system targets tissues of the body rather than controlling bugs. White blood cells called CD4 T cells play an important role in tissue damage in RA. A potential treatment strategy for RA is to turn off these cells. The RA relevant CD4 T cells are activated many years before symptoms develop. These memory CD4 T cells are difficult to turn off. We will use mouse models to investigate what happens to memory CD4 T cells when we try to turn them off.

Miss Teodora Filipescu & Dr Nazir Lone, University of Edinburgh

A national study of long term outcomes of patients admitted to Scottish intensive care units with epileptic seizures

Epileptic seizures ('fits') are common although most seizures resolve with minimal treatment. However, in some cases seizures do not respond to treatment and patients require admission to intensive care units (ICUs) to allow more advanced treatments to be given, including life support. Little research has been published relating to the long-term consequences of admission to ICU with seizures. Using a 'big data' approach, the project will use a large database to describe the long-term outcomes of patients admitted to all Scottish ICUs, and identify those at risk of dying or hospital readmission. This may enable clinicians to better target follow-up care for patients and ultimately improve outcomes.

Miss Amy Campbell & Professor Blair Smith, University of Dundee

Benzodiazepine and opioid prescribing and healthcare use in Scotland

Benzodiazepines are a group of drugs that include sleeping and anti-anxiety tablets such as Diazepam and Temazepam. In recent years, research has discovered that these drugs have a lot of side effects and can be addictive. In Scotland, between 2003 and 2012, the total number of benzodiazepine prescriptions reduced but this varied depending on the patient's background and where they lived. This study hopes to use data collected from GP prescribing of benzodiazepines to explore why these differences happen and to look further into serious outcomes of these prescriptions such as patients needing to attend at A&E, being admitted into hospital and dying. In addition, this study will look at the link between prescriptions of benzodiazepines and opioids (a class of painkillers that includes codeine and morphine) as well as how this relates to a patient's individual illnesses and general health.

Mr Frazer Buchanan & Professor William Stark, University of Dundee

Towards genomic surgery with zinc finger recombinases

Many genetic diseases could be treated if we had tools for precise alteration of the DNA molecules within cells. This project aims to develop a family of synthetic enzymes called zinc finger recombinases (ZFRs), which can recognize two specific sequences in a cell's DNA, cut the DNA strands, and rejoin the cut ends in a new arrangement, allowing a "bad" gene to be cut out, or a "good" gene to be inserted. We plan to create ZFRs that can cut out the piece of DNA encoding HIV from the human cellular DNA.

Miss Maria Fjeldstad & Dr Tara Spire-Jones, University of Edinburgh

Studying the amyloid cascade hypothesis in a novel model of Alzheimer's disease

Alzheimer's disease is the most common cause of dementia in the elderly affecting approximately 55,000 people in Scotland. Currently we have no effective treatments to slow or reverse the disease process. In order to develop effective medicines, we need to better understand how the brain degenerates during Alzheimer's disease. To that end, our lab has developed a new disease model to test how two of the key pathologies in the disease, called amyloid beta and tau, are related. The student will help characterise this new model using advanced microscopic techniques.

Miss Laura Machado & Dr Rainer Ebel, University of Aberdeen

Chemical profiling of marine-derived fungal strains for natural products with anti-inflammatory activity

There is an urgent need for new drugs to improve the quality of living of patients suffering from arthritis and inflammatory disorders. In the UK alone, rheumatoid arthritis affects more than 400,000 people per year. Autoinflammatory diseases occur when, for reasons that still remain unclear, the immune system in the body mistakenly attacks itself, producing joint swelling or inflammation— amongst the most common symptoms. Inflammatory abnormalities are involved in a variety of human diseases, from rheumatoid arthritis to sarcoidosis.

Our approach is focused on isolating and characterising active compounds in extracts of fungal strains that have previously been shown to display anti-inflammatory potential. The goal of this project is to contribute to the early stage of drug discovery for musculoskeletal conditions, ultimately seeking an improvement in the quality of living of those who have to live with constant and sometimes unbearable pain from arthritis and inflammatory diseases.

Miss Altha Macphail (University of St Andrews) & Professor Matthew Dalby, University of Glasgow

Nanokicking for generation of tissue engineered bone graft

Bone graft is the second most transplanted tissue after blood and supply of viable bone graft is limited. Rather, surgeons often use allogenic, decellularised (thus non-viable) graft. We have developed a new bioreactor, or cell culture system, that stimulates cells to produce bone in the lab. It does this by providing 15 nm vibrations, or kicks, to the cells growing in 3D environments on the bioreactor – this is called nanokicking. This project will investigate nanokicking in osteoblasts (bone producing cells) and pre-osteoblasts (cells with the potential to form bone if stimulated correctly) grown in 3D scaffolds.

Ms Iqra Sarwar & Professor Cherry Wainwright, Robert Gordon University

The effect of endocannabinoid-PUFA conjugates on vascular smooth muscle cell proliferation

The development of arterial plaques leads to a risk of coronary heart disease (CHD), from which there were 73,680 reported deaths in the UK in 2014 (7,541 in Scotland). High levels of blood cholesterol encourage fat accumulation, invasion of inflammatory cells and growth of smooth muscle cells in the artery wall. Intake of fish-oil derived omega-3 fatty acids (PUFA's) helps to reduce blood cholesterol, but there is evidence they also interfere with these cellular events, one possible mechanism involving the PUFA combining (conjugating) with chemicals in the body called endocannabinoids (EC), which have been shown to inhibit smooth muscle cell growth. These conjugates have been reported to act at the same receptor as the EC's, with greater potency. This project will measure the effects of two PUFA's (EPA and DHA), and their EC conjugates, on cell proliferation in cultured smooth muscle cells, which could identify novel forms of dietary supplement to reduce cardiovascular risk.

Miss Catriona Nicolson & Professor Lesley Forrester, University of Edinburgh

Activating the expression of erythroid genes using a novel strategy

Blood transfusion is used as a life-saving treatment but it is completely reliant on donors and there can be problems with transfusion-transmitted infection and immune compatibility. One solution is to generate red blood cells in the laboratory from stem cells. However the procedure is not efficient and the cells produced are not exactly like the ones made in the body. We are trying to solve this problem using molecular switches, called transcription factors. We are developing a novel strategy whereby we can turn on specific transcription factors in cultured cells and alter their fate, in our case we hope to turn on the genes involved in the production of fully mature red blood cells.

Miss Cali Anderson & Professor Eleanor Davies, University of Glasgow
Circulating Biomarkers of Endocrine Hypertension

High blood pressure contributes to many diseases such as heart attacks and strokes, which are detrimental to human health. Some types of high blood pressure are caused by increases in hormones and cause considerable damage to many organs. These forms of high blood pressure are very difficult and expensive to diagnose early. We wish to investigate if there is a simple marker which in the blood that can tell us if a patient has this condition. This will help us to diagnose quickly, treat appropriately and avoid the detrimental effects.

Miss Caecilie Benckendorff & Professor Marcel Jaspars, University of Aberdeen
Discovery of New Anticancer Drugs from Hyper-arid Deserts

Cancer is one of the leading causes of death worldwide. According to Cancer Research UK, in 2012 14 million new cases were reported and 8 million deaths were caused by cancer. The search for newer, better drugs to treat cancer is therefore an increasing area of research. Currently there is a growing interest in bacterial species from extreme environments, such as hyper-arid deserts, as they are capable of producing compounds that have potential in treating or preventing cancer. The scholar will work as part of a larger directed effort in the research lab to discover novel compounds with anticancer potential.

Miss Olivia Kemp & Professor George Baillie, University of Glasgow
Factors that control protein levels of HSP20

HSP20 is a cardioprotective protein that can guard against certain forms of heart disease. HSP20 levels in cells are influenced by natural protein turnover and increases in HSP20 concentration could be beneficial for those at risk of heart disease. The Baillie lab has identified proteins from a degradation pathway that bind to HSP20 and may orchestrate its destruction. The project seeks to verify if the destructive proteins are the cause of low HSP20 levels. If so, a new therapeutic strategy could be blocking the interaction between HSP20 and these destructive elements.

Mr William Clackett & Professor Aleksandar Jovanovic, University of Dundee
Does increased expression of SUR2A affects cardiac action in vivo?

SUR2A is a protein serving as a part of ion channels in the heart known as KATP channels. We have recently found that an increase in SUR2A throughout the body increases physical endurance as well as heart resistance to the heart attack. We have devised strategies to increase SUR2A in a clinically viable way, but it is yet unknown whether increased SUR2A would have any (adverse) effects on cardiac action. The first thing that we plan to assess is whether increased SUR2A would affect heart rate at rest and under different levels of physical activity. To do that, we will apply a recently developed methodology known as telemetry that will be used to continuously monitor cardiac action for several days in normal mice and genetically-modified mice that have increased levels of SUR2A.

Miss Aoife Magee & Professor Gwyn Gould, University of Glasgow
An siRNA screen for membrane trafficking molecules involved in cytokinesis.

This project will investigate the final step of the cell division cycle where the newly formed 'daughter cells' separate. We know that cells need to redistribute their contents, including the membranes that surround different cell components, during this process to equally divide, but the mechanisms which control this are not completely understood. When these mechanisms go wrong, cancerous growth may result. This summer studentship will allow Aoife the chance to identify key components of this machinery. We will use selective gene inactivation strategies to identify such components. This will offer her the chance to learn state-of-the-art technology.

Mr Jonathan May & Dr Stephanie Russ, University of Aberdeen
Understanding the impact of stress on safety behaviours in healthcare: a simulation study

Doctors frequently experience high levels of stress in their working lives which can impact adversely on health and cause reduced efficiency of thought processes – posing additional risks to patient safety. This project aims to further understanding around the precise conditions that are most stress inducing in acute care scenarios and to explore the relationship between stress and performance of tasks which are relevant to patient safety. Simulation methods are opening up opportunities to study stress and its effects in real time and, as such, we will study these factors using a simulated scenario devised for second year medical students.

Mr Edward Christopher & Professor Maria del Carmen Valdes-Hernandez, University of Edinburgh

Evaluation of computational methods for estimating the cortical stroke lesion evolution from magnetic resonance images

On brain MR images, stroke lesions coalesce with other manifestations of white matter disease and inflammation producing the same signal change. Dedicated special MR sequences only allow to distinguish 60% of the strokes during a short period of time after they occur. This makes difficult to locate and delineate stroke lesions and consequently leads to erroneous prognosis, incorrect estimation

about the extent of the damage caused by the stroke and may lead to false diagnosis. On a previous project we developed an atlas of brain vascular territories to aid on the identification of the stroke lesion boundary, but further research points to a wider and generalised influence. With this project we aim to apply different criteria to identify, on MR images of stroke patients, the extent of the damage directly influenced by the stroke, evaluate their applicability to clinical research on stroke and suggest modifications and alternatives for further developments.

Miss Magdalena Mladenova & Dr Andrew Roe, University of Glasgow

When and where: the role of host D serine in development of bacterial neonatal meningitis

Our work looks at bacteria that cause disease in different parts of the body. We use the model bacterium *Escherichia coli* as it causes thousands of infections each year with diseases ranging from those in the bladder, brain, gut and blood. We recently found that one rare amino acid, produced by humans in brain tissue and in the urine, acts as a key signal for some strains to cause infection. We found a new "sensing system" that the bacteria use to measure the levels of this amino acid inside a human and help the bacteria decide whether or not to attach at a particular site. In this work, the student will see if this sensing system is also important for *E. coli* strains that cause meningitis in young babies. To achieve this, the student will remove the sensing system from the bacteria and see how this affects the ability of the bugs to attach to human cell lines. This work might help in the design of new vaccines to combat meningitis in babies.

Mr Simonas Griesius & Dr Sheriar Hormuzdi, University of Dundee

Electrical Synapses in the Spinal Cord: Cellular distribution and changes in expression during development

The perception of pain originates from neurons within the spinal cord. This perception is the result of a complex network of neurons containing many different channels and molecules. Dr Hormuzdi is studying a special type of channel that is able to pass signals rapidly from cell-to-cell and has recently shown that this channel is found in the spinal cord thereby suggesting that it may play a role in detecting and transmitting the feeling of pain. I aim to examine this channel in the cells of the spinal cord in the hope that our study will lead to new means of treating pain.

Ms Lizi Hegarty (Trinity College Dublin) & Professor Alison Murray, University of Aberdeen

The effect of hypertension and brain lesions on cognition in three Aberdeen samples

High blood pressure is common and has a negative effect on brain health. We have demonstrated in the Aberdeen Birth Cohorts of 1921 (aged 78) and 1936 (aged 68) that high blood pressure has a negative effect on change in intelligence across the lifespan and that this is mediated by lesions on brain magnetic resonance imaging (MRI) scans. Here we propose to add information currently being collected in a younger sample, for whom there are similar childhood intelligence measures, the Aberdeen Children of the 1950s, as part of a larger Wellcome Trust funded study. The student will develop statistical models of change in intelligence from childhood to late mid-life and measure the influence of high blood pressure and brain MRI lesions.

Miss Anna Rose & Dr Mairead Black, University of Aberdeen

Comparing the intestinal microbiome of offspring delivered by caesarean section with those delivered vaginally: a systematic review of the literature

Children born by caesarean section are more likely to develop asthma than those born vaginally. This may be due to less exposure to 'good bacteria' from the mother during birth resulting in compromised immune function, or may be explained by other factors. Many animal and human studies show differences in gut bacteria following caesarean and vaginal birth. However, reported studies may represent citation bias (ie. studies showing no difference receive less attention). It is therefore necessary to systematically review the published literature to assess whether current studies support that caesarean delivery is linked to altered offspring gut bacteria.

Miss Bethany Thompson (University of St Andrews) & Dr Phey Ming Yeap, University of Dundee

Texture analysis in cardiac analysis

Texture analysis is the use of pixel mapping techniques to measure signal homogeneity and heterogeneity within an image. It has been in use for photographic analysis for over 40 years, however it is only in the last 10 years that it has started to be used in medical analysis, most notably in cancer images. A recent in house proof of concept study has shown that texture analysis may add valuable information to cardiac assessments. Thus the aim of this study is to determine the effects of contrast, and MRI magnet on texture analysis measures as well as determining its reproducibility.

Miss Gioia Riboni Verri Jones & Dr Arimantas Lionikas, University of Aberdeen

Can differential expression of genes contribute to variation in muscle mass?

In addition to locomotion, respiration and glucose homeostasis, skeletal muscle plays an important role in energy expenditure. Low muscle mass correlates with low energy expenditure and preponderance to

obesity. Muscle mass can range between 19 and 50 kg in adult healthy males. Approximately half of this variation is determined by genes, whose identity is poorly understood. Intensity of expression of a gene can differ markedly among individuals leading to the differences in traits affected by that particular gene. Our study has implicated seven genes as potential modifiers of muscle mass in the mouse model. The aim is to examine if intensity of expression of these genes in the muscle is determined by innate genetic mechanisms which could affect muscle mass.

Miss Rachel Stewart (University of St Andrews) & Ms Helen McLeod, University of Dundee
Perfused Thiel Cadaveric models for advanced interventional training

This work will focus on the development of cardiovascular applications of the Thiel cadaveric model as incorporated into courses for the training of advanced skills in interventional radiology. The aim is to create a perfused cadaver, with flow being delivered to the target vessels, providing a realistic model to conduct advanced clinical interventions within the context of a clinical simulation.

Miss Jennifer Wood & Dr Charis Marwick, University of Dundee
Relationship between antimicrobial use and resistance in E.coli bacteraemia

Antibiotics are essential for healthcare but, increasingly, bacteria are becoming resistant to antibiotics making infections difficult to treat. In the population, increased use of antibiotics increases resistance but surprisingly little is known about the effect of individual antibiotic exposure. In this study we will analyse anonymised information (so we can't tell who individuals are), including age and sex, previous hospital admissions and antibiotics prescribed in the previous year, on patients admitted to hospital with specific bloodstream infections. We will calculate their risk of resistance associated with antibiotic use, information which can be used to improve antibiotic prescribing guidelines.

Mr Theodosios Balaskas & Dr Angharad Marks, University of Aberdeen
What role has comorbidity in differences in outcomes of men and women with less advanced CKD?

Chronic kidney disease (CKD) is common, and for some people eventually leads to needing dialysis or a transplant, high risk of death and other bad outcomes such as heart attacks. Some of the risk factors for CKD are the same as those for heart attacks e.g. underlying heart disease. Amongst people with CKD we will investigate whether differences in these risk factors (comorbidities) account for differences in these outcomes and whether this varies between men and women. This may be useful to help tell people whether they are at a high risk of a bad outcome and guide care.

Mr Daniel Williams & Professor Shaun Treweek, University of Aberdeen
A systematic review of non-randomised evaluations of strategies to improve participant recruitment to randomised controlled trials: data extraction, interpretation and reporting

Clinical trials are important but recruiting participants is hard; around half fail to recruit enough. This means the health benefits the trial set out to deliver may be delayed while more trials are done. The treatment may simply be abandoned.

There is research on strategies to improve recruitment but most of it has been ignored. The project will extract data from these research studies (over 200), collate and interpret the results and summarise them in a useful form for trial designers. This new evidence will improve the chances that a trial will answer its research question and deliver health benefits.

Mrs Katie Myers & Professor Colin Farquharson, University of Edinburgh
Does deregulated PHOSPHO1 expression contribute to catabolic bone loss in hyper-parathyroid hormone disorders?

A healthy skeleton during ageing is protective against osteoporosis (low bone mass) which causes pain, immobility and fractures. Current therapies to combat osteoporosis include the use of parathyroid hormone (PTH) which when injected daily to patients can stimulate bone formation. Intriguingly, in human disorders characterised by a continuous over-production of PTH, low bone mass is observed. A better understanding of how PTH controls bone mass will help develop therapeutic strategies against bone pathologies induced by excessive PTH. Towards this goal our preliminary novel data has indicated that the amount of PHOSPHO1 – a bone specific protein essential for bone formation – is increased by intermittent PTH treatment; an observation consistent with the anabolic effects of intermittent PTH on bone. The effects of continuous PTH exposure on PHOSPHO1 production is unknown and in this study we will correlate bone mass and PHOSPHO1 levels in mice treated with continuous PTH.

Mr Alexandros Constantinou & Professor Jane Rowe, University of Edinburgh
Where is complement receptor 1 stored in human brain endothelial cells?

Over half a million children under five develop cerebral malaria every year in Africa alone. The disease develops when parasites stick to the lining of the brain's blood vessels, leading to coma and death.

We know that malaria-infected red blood cells will stick to a receptor called complement receptor 1 (CR1) like velcro. Kenyan children are protected against cerebral malaria if they inherit a special form of CR1.

We already know that CR1 is found on red and white blood cells, but we wondered whether CR1 might also be on the lining of brain blood vessels, acting as a sticking partner for parasites in the brain.

We looked at the cells that line the brain blood vessels and found that they do contain CR1, which is stored in pools inside the cells. This project uses "glow-in-the-dark" markers to label parts of the cell and see where the pools are. This will help us discover what CR1 is doing in the brain, with the aim of using this knowledge to protect children against cerebral malaria.

Mr Peter Bruce-Wootton & Dr Jennifer Paxton, University of Edinburgh
Heterogeneous Hydrogels: Producing graded scaffolds for tissue-engineered musculoskeletal applications

The junctions between tissues of the musculoskeletal system have unique mechanical properties that are vital for normal function and movement. In particular, the interfaces between the soft tissue of tendon and the hard tissue of bone have a carefully constructed arrangement, forming a graded transition between the two tissues. This is largely achieved through an increase in mineral content from tendon to bone, with mineral providing increased mechanical properties across the transition. This project aims to investigate the formation of hydrogel scaffolds to mimic this transitional region and produce a tissue-engineered option to facilitate repair following tendon injury.

Miss Nicole Burke & Professor Colin Berry, University of Glasgow
An assessment of the relationships between global longitudinal strain and infarct characteristics in patients with recent non-ST elevation myocardial infarction.

Non-ST elevation heart attacks are the commonest heart attacks affecting the general population yet have a worse outcome compared with ST elevation heart attack. They have also been studied less extensively. Our group has recently completed a study looking at patients with this type of heart attack using state-of-the-art cardiac magnetic resonance imaging (MRI). 106 heart attack survivors had MRI within 1 week of the heart attack. In this Vacation Scholarship, we propose to 1) analyse heart muscle strain and compare the data with the size of the heart attack and its characteristics and 2) compare the data with heart strain data from 80 healthy volunteers who also had an MRI scan.

Mr Ben Fox & Dr Gordon Cramb, University of St Andrews
Characterising the physiological role of phospholipase C X-domain-containing (PLCXD) proteins in the zebrafish (*Danio rerio*).

Phospholipase C X-domain-containing (PLCXD) proteins are part of a larger family of proteins that are involved in cell-cell signalling. Very little is known about the specific cell signalling function of these proteins, but they are known to be expressed in all life forms; everything from bacteria to Man. Some of these proteins may be involved in disease processes, but in order to find out how they act in disease we must first find out their normal function. Only when we do this can we discover how to act on and treat such diseases.

Miss Eleanna Kritikaki & Dr Xinhua Shu, Glasgow Caledonian University
Promotion of the removal of cholesterol from retinal epithelium cells, a potential therapy for treating age related macular degeneration

Age-related macular degeneration (AMD) is most common cause of severe visual impairment in the elderly population in the western world. In the early stage of AMD, focal and diffuse extracellular deposits of debris accumulate between the retinal pigment epithelium (RPE) cells and a thin membrane, called Bruch's membrane. Pathological analyses show the deposits contain a variety of lipids, suggesting a dysregulation of lipid trafficking from RPE cells to Bruch's membrane. In this project we plan to identify compounds for promoting the removal of cholesterol from the RPE cells, which will offer therapeutic potential for treating AMD patients.

Miss Abinaya Murugappan & Dr Philip Riches, University of Strathclyde
The effect of femoral muscle activation on the measurement of tibiofemoral alignment in asymptomatic knees

Knee alignment (i.e. bow legged or knock kneed) is a fundamental measurement in the assessment, monitoring and surgical management of patients with knee osteoarthritis. Measuring knee alignment before during and after a knee replacement surgery can answer the important question what is the best target angle that surgeons should aim for during the operation, leading to increased implant survival and knee function. However, measures made before and after surgery differ from those measured during the operation, with muscle activation potentially having an effect on the measures. This project will determine whether tensing the thigh muscle affects our measure knee alignment.

Miss Alexandra Munro & Dr Catherina Becker, University of Edinburgh
Repairing the spinal cord

The zebrafish can repair its spinal cord after injury at any age. In contrast, such an injury in mammals, including humans, is permanent. We have developed a model for successful spinal cord repair using zebrafish larvae. Repair and swim recovery at this age is very fast (only two days), many fish can be kept

a small volume of water in petri dishes, and the entire fish can be analysed under a specialised microscope. In this project, the student will treat such fish with drugs to find new molecular mechanisms that contribute to successful spinal cord repair.

Miss Amara Darr & Professor Iain Gibson, University of Aberdeen
Can lithium ion-releasing biomaterials guide bone cell behaviour?

Over 3 million people suffer from osteoporosis in the UK, and the financial burden of treatment and care related to osteoporotic fractures is over £3 billion per year. Bone diseases such as osteoporosis are associated with a decrease in bone mineral density and an increased susceptibility to fracture. Studies have shown that patients receiving therapeutic lithium for the treatment of bipolar disorder exhibit side effects of increasing bone mineral density and reduced risk of bone fracture. This project will test if lithium ions can be released from bone replacement implants to mimic the therapeutic effects observed in these patients.

Mr Michael Clark & Dr Deborah Dewar, University of Glasgow
Does chronic disruption of the light/dark cycle alter the inflammatory response of the brain to experimental stroke?

The ways in which we are exposed to patterns of light and dark is emerging as potentially harmful to health. Internal daily rhythms are normally aligned with light/dark cycles but we are increasingly exposed to light and dark in a more erratic manner through patterns of living and working, e.g. shift work. When internal daily rhythms become misaligned with the light/dark cycle this can be bad for health. For example, shift workers suffer metabolic changes which are linked to stroke. In this project we will examine the effects of rhythm misalignment on the brain damage after experimentally-induced stroke in rats.

Mr Thineskrishna Anbarasan & Dr Jacob George, University of Dundee
Efficacy of medical therapy in renovascular disease

Atherosclerotic renal artery stenosis (RAS) affects up to 5% of patients diagnosed with hypertension and is associated with increased risk for cardiovascular events and overall mortality. Current treatment options for RAS indicate medical therapy as first-line which commonly involves the use of ACE inhibitors (ACEIs) and angiotensin receptor blockers (ARBs), but they can have a side effect of impairing renal function. Retrospectively analysing data of patients prescribed these drugs will allow understanding of whether a type of anti-hypertensive drug correlates to improved patient outcomes. These results can potentially revise existing clinical guidelines on the medical therapy for patients with RAS.

Miss Sol Vendrell Fernandez & Dr Daniel Walker, University of Glasgow
Determining mechanisms of protein antibiotic killing of Pseudomonas aeruginosa

We are rapidly approaching a crisis in the treatment of bacterial infections, a consequence of the steep rise in antibiotic resistance and the lack of any new antibiotics. The situation is acute for multidrug resistant Gram-negative bacteria such as *Pseudomonas aeruginosa* which causes life-threatening infections. An alternative strategy to develop new antibiotics is to utilise the potent narrow spectrum protein antibiotics produced by bacteria for intraspecies competition. In *P. aeruginosa* these antibiotics are known as pyocins and the aim of this project is to discover how pyocins are able to cross the bacterial outer membrane and kill cells.

Miss Inari Kolu & Professor Sheila Graham, University of Glasgow
Does Cidofovir increase human papillomavirus oncogenicity?

Cidofovir is a drug used to treat viral infections. In particular, it is used to treat recurrent respiratory papillomatosis (RRP) warts that are caused by human papillomavirus (HPV) infection of the larynx. Some years ago researchers proposed that Cidofovir may cause cancer formation in HPV-infected tissues. We have performed some experiments using short-term treatment with the drug that indicate that this is not true. We propose to extend these observations using longer term drug treatment with the aim to prove that Cidofovir remains a safe and effective drug for treating RRP.

Miss Angeline Maher & Professor Mihalios Panagiotidis, Heriot Watt University
Novel insights of hyperthermia induced effectiveness of braf-targeted therapy in malignant melanoma

At an early stage, malignant melanoma can be cured but when progressed to the metastatic stage many patients do not respond to current systemic therapies. Thus, there is a great need for strategies to improve existing therapeutic regimens. Vemurafenib & Dabrafenib are drugs targeting the BRAF gene and consequently have improved overall patients' survival. Hyperthermia represents the fourth mostly exploited modality in cancer treatment and many studies support its significant therapeutic potential. We will aim to determine the potential of hyperthermia in potentiating therapeutic effectiveness of Vemurafenib & Dabrafenib as targeted therapies in malignant melanoma. In the context of personalised medicine, this is of paramount importance as it provides a way for more efficient and less toxic therapies for the management of the disease.

Mr Jinzhang He & Professor Bruce Guthrie, University of Dundee

A systematic review and meta-analysis of the applicability of clinical trial evidence to real-world patients

Decisions about which treatment to use are largely based on evidence from randomised controlled trials. However, these trials are usually carried out in highly selected groups of people, raising questions about how applicable such evidence is to the whole range of real-world patients. Groups commonly excluded are older people, women, people with other conditions or taking many unrelated drugs, and people with limited life expectancy for any reason. As a result, for some conditions it is known that the majority of people with the condition are excluded from the trials which determine guideline recommendations. However, although a number of individual studies in this area have been published, there has never been a systematic review of them all, and so the extent to which applicability is a general problem is uncertain. This project will complete such a systematic review and the findings will be of wide interest to research funders, clinicians and guideline developers.

Miss Ann Carroll & Dr Adam Hill, University of Edinburgh

Role of lipoxin a4 in bronchiectasis

Bronchiectasis is a chronic disabling condition, where patients suffer daily cough, sputum production and recurrent chest infections. There is an ongoing cycle of infection and inflammation in the airways with two-thirds of patients being infected at all times, leading to more inflammation. The inflammation that occurs is meant to clear the infection from the airways but in bronchiectasis this does not occur. LXA4, a natural lipid, is an important agent that in health switches off this process of inflammation.

This research offers a potential new non-antibiotic target to help treat patients with bronchiectasis as there are very few effective treatments available for this condition.

Mr Greg Swan & Dr Neil Henderson, University of Edinburgh

Analysis of hepatocyte cell cycle dynamics during liver regeneration using the Fucci2a bicistronic cell cycle reporter mouse

Liver disease is the 5th commonest cause of death in the UK. Chronic liver damage ultimately leads to cirrhosis (scarring) of the liver, and currently the only effective treatment is liver transplantation. However many patients die on the waiting list as demand for donor organs greatly outstrips supply. This project will use cutting-edge techniques to study in depth how liver cells (hepatocytes) divide and expand. By understanding more about how this process occurs, we hope to design new therapies that can augment hepatocyte growth and regeneration of the patients' own liver, thereby avoiding the need for liver transplantation completely.

Mr Eliot Mason & Dr Peter Robinson, University of Glasgow

Familial hypercholesterolaemia in Scottish children: effectiveness of the cascade screening programme and barriers to effective implementation

The study will evaluate the implementation of the NHS Scotland genetic cascade screening programme for familial hypercholesterolaemia (FH), focussing on the identification, assessment and management and preliminary outcomes of children with FH. It will measure the numbers of children identified, their geographical distribution, the referral patterns and their treatment. Preliminary evidence suggests there is considerable variation across Scotland. This will be audited against published guidelines. This information will be used to judge the effectiveness of the programme, and to identify variation in practice, gaps in service provision and barriers to implementation.

Mr Kyle Reid & Professor Gerry Graham, University of Glasgow

Evaluation of the anti-tumour effects of chemokine receptor expressing NK cells

Our research focuses on molecules, called chemokines, which regulate the movement of cells within the body. These molecules are very important in cancer as they are responsible for the accumulation of white blood cells at cancer sites. These white blood cells are important for fighting disease and preventing cancer development. Chemokines are also important in controlling the process called metastasis in which cancer cells move to form secondary cancers. By understanding how chemokines regulate white blood cell movement in metastasis we hope to be able to identify novel ways of treating cancer and metastasis.

Miss Kristen Sing & Dr Javier Tello, University of St Andrews

Defining the Role of Amygdalar Kiss neurons as regulators of Female Reproductive Physiology

Most mammals use external stimuli to appropriately balance reproductive responses with stress and defensive behaviours. Kisspeptins (Kiss) are a family of brain hormones that are critical for initiating and maintaining fertility. Cells containing Kiss are primarily located in the base of the forebrain, but little attention has been paid to Kiss neurons located in another part of the brain, called the amygdala. The amygdala is involved in motivational activities. Here, important sensory information is integrated and relayed to other parts of the brain to influence reproduction and stress. However, the contribution of amygdala Kiss neurons to regulating reproductive processes remains unknown. Our aim is to determine if exposure of male mice to sexually relevant cues activates amygdala Kiss neurons and regulates

reproductive processes. These studies will increase our understanding of how the brain controls reproductive processes and may lead to the development of new fertility therapies.

Miss Jaclyn Goldmacher & Dr Gurå Bergkvist, University of Edinburgh
Validation of a siRNA cocktail for targeting oncogenes in cancer cell lines

The main reason for treatment failure in cancer is that the cancer cells become resistant to treatments over time. Cancer cells have dysregulated growth and become immortal by high jacking certain cellular drivers. New cancer treatments block such drivers inside the cells, but over time cancer cells will switch to new drivers to keep growing. We are developing new ways of blocking several drivers simultaneously to prevent the cancer from performing this switch. By finding new ways of blocking these drivers in cancer cells we can improve the next generation of cancer drugs and help prevent resistance building up to them.

Mr Zhan Ng & Dr Peter Hall, University of Edinburgh

Discovering predictors of side effects from chemotherapy and their consequences for the NHS

Chemotherapy is known to have a variety of toxicities or side-effects, the severities of which may vary with certain individual patient's characteristics. In this study, NHS Lothian electronic clinical record will be processed to measure the toxicity rates of common chemotherapeutic drugs, patient characteristics that lead to increased toxicities, and the burden of those toxicities on the NHS. This will produce better insight into side-effects of chemotherapy, more personalised treatment and better resource allocation for hospitals. Overall, this project aims to improve the lives of cancer patients and prepare for the needs of the growing number of people surviving cancer.

Miss Vasilena Stefanova & Dr Christoph Scheepers, University of Glasgow

The pseudohomophone effect in written word processing: An eye-tracking investigation

In 2014, we published a paper on written word processing in dyslexic versus typical readers (see Section 7). The paper was groundbreaking in that we used a novel eye-tracking method to investigate the question of whether dyslexic readers differ from normal readers in the speed and accuracy of distinguishing different types of English words from non-words that varied in the degree to which they resembled actual words of the English language. One effect that was completely absent in our results was the so-called 'pseudohomophone effect', i.e., the previously reported finding that non-words like "lepht" (which sound like real words) are more difficult to reject than non-words like "lesht" (which sound unfamiliar). The aim of the present follow-up study is to find out whether the absence of this pseudohomophone effect was due to our new methodology or due to the stimuli used. This could have important implications for the diagnostic value of our eye-tracking method for dyslexia research.

Miss Veronika Zouharova & Dr Maria Gardani, University of Glasgow

Exploring the link between child's sleep problems and paternal mental health outcomes.

While a considerable amount of research has been conducted investigating the relationship between child's poor sleep and maternal mental health and general well-being (Lam, Hiscock & Wake, 2003 and others), studies exploring this link in fathers are scarce. With fathers being increasingly involved in daytime and night-time caregiving activities (Coleman & Garfield, 2004), gaining better knowledge of the association between child sleep problems and paternal mental health is crucial. The proposed study seeks to address this gap, specifically by investigating the association between sleep problems in the child and paternal stress, anxiety and depression.

Miss Chi Cheah & Dr Katharine Carter, University of Strathclyde

Studies on developing a vaccine against Leishmania species

Large scale production of protein based vaccines requires development of a manufacture method that is as cheap as possible. Many synthetic vaccines are produced in bacteria but they cannot produce the modifications to allow correct protein folding. We are using a lizard protozoan parasite, which can make the required modifications, to produce a protein vaccine that can protect against leishmaniasis. This allows us to work towards producing a vaccine candidate for leishmaniasis and determine the factors that influence protein production in this model. Currently 350 million people, living in 98 countries, are at risk of contracting leishmaniasis. Each year approximately 1.5 million new cases of cutaneous and 500,000 of visceral leishmaniasis are reported. Development of a vaccine would be a major benefit and working on this project would allow a student to develop their molecular and immunological skills.

Miss Arina Tamborska & Dr Gwo-Tzer Ho University of Edinburgh

Investigating the role of mitophagy in inflammatory bowel diseases

Inflammatory bowel diseases (IBD) are incurable illnesses, often affecting the young with devastating impact. Individuals with IBD may be malnourished, experience severe abdominal pains and diarrhoea. Recent human genetic studies have shown that a biological process, autophagy (cellular 'self-eating') is important in the cause of IBD. Living cells rely on autophagy to remove and recycle cellular products to remain healthy. Major targets for autophagy are the mitochondria (cellular 'batteries'). Damaged mitochondria are highly inflammatory. We have shown that IBD individuals have high mitochondria

products in the bloodstream which are likely leaked from the gut. We think that the autophagy process fails to remove damaged mitochondria ('faulty batteries'). In this study, we will check the evidence for this in gut tissue in IBD and test in gut cells in a dish, if blocking autophagy increases the leakage of mitochondria products. If correct, new drug treatments can be designed.

Miss Clarissa Ngiam & Dr Sarah Jones, University of Edinburgh
Biocompatibility of a Novel Calcium Phosphate (CaP) Ceramic with Intrinsic Osteoinductive Properties

Orofacial clefts represent one of the most common birth defects with an average worldwide prevalence of 1.7 per 1000 live births. Bone grafts may be used to repair clefts. Grafting currently has significant drawbacks, as additional surgery is required to harvest material with consequent patient pain, limited availability and when donor sourced, the possibility of disease transfer and immune response. This project aims to characterise the biocompatibility of synthetic graft materials using a novel cell-based assay. Synthetic materials may represent a credible solution to the clinical and ethical problems of current grafting techniques.

Miss Khowla Oun & Dr Ru Angelie Edrada-Ebel, University of Strathclyde
Potential novel antibiotics from microorganisms of under explored extreme marine habitats

Endophytic microorganisms with potentially novel biosynthetic capabilities to produce new antibiotics have been obtained from underexplored areas which experience environmental stress. Genomic and metabolomic tools will be employed to dereplicate microorganism in order to focus on those with novel chemistry and mechanism of action. The main objective of this summer project is to explore the production of new antimicrobials from actinomycetes and to pilot an efficient cultivation and production processes at a small scale which whilst maintaining or enhancing synthesis of the targeted bioactive compounds.

Mr Derick Liew & Dr Eva Gonzalez-Fernandez, University of Edinburgh
Evaluation of electrochemical biosensors for protease activity detection: optimisation of sensing film configuration

The proposed research project is linked to a 5-year EPSRC-funded project entitled Implantable Microsystems for Personalised Anti-Cancer Therapy (IMPACT) which ultimate goal is to deliver an implantable platform able to optimise cancer treatment by means of monitoring the tumour microenvironment. The system will integrate sensors able to give information about the tumour status which will allow to optimise the delivery of radiotherapy. The development of more sensitive sensors will benefit from obtaining more reliable information. The present project aims to optimise the performance of a biosensor that has been already reported by the team.

Mrs Ida Fischer & Dr Mícheál de Barra, University of Aberdeen
How people evaluate screening value after positive results: an analysis of online forums.

Cancer screening causes harm when people whose health would have been unaffected by cancer are nonetheless treated. For any screening test, these harms need to be carefully weighed against the benefits. Research demonstrates that the public and doctors underestimate screening harms. One explanation may be that people fail to consider the possibility that their health did not benefit from the screening / treatment. To test this idea we will analyse the content online health forums: the proportion of people who believe themselves to have benefited will be compared to the proportion of people who benefit in scientific research.

Mr Peter Pearson & Dr Wenlong Huang, University of Aberdeen
Combining a novel silk biomaterial and omega-3 docosahexaenoic acid for spinal cord repair

Following spinal cord injury, communication between the brain and the body below the injury level is disrupted due to the damage to the cord. A hostile injury environment prevents the spinal cord nerve cells to regenerate. To date, no single regenerative strategy has been translated to the clinic. Omega-3 DHA and novel silk biomaterial are two promising strategies that promote mammalian nerve cells to regenerate respectively. Here, we hypothesise that a combination of the two strategies, in the presence of an inhibitory environment, will lead to better regeneration of rat nerve cells in vitro. The project will inform future work with in vivo SCI model.

Miss Nicole Jackson & Dr Edward Rowan, University of Strathclyde
Isolation and pharmacology of proteins and peptides affecting the cardiovascular system isolated from Bitis nasicornis, the rhinoceros horned viper: an insight into hypertension

High blood pressure is an important medical condition and a better understanding of the causes of this condition is important. Venom from *B. nasicornis* (rhinoceros horned viper) has been shown to cause an increase in blood pressure by an unknown mechanism. We aim to isolate the molecule responsible for this increase in blood pressure and then attempt to gain an insight into its mechanism of action as this may underlie some of the causes of hypertension. If in fact a novel target is identified this could be exploited to reverse increases in blood pressure in humans.

Miss Shannon Clark & Dr Simon Milling, University of Glasgow

How do macrophages change in inflammatory bowel disease?

Inflammatory bowel disease (IBD) is a common and debilitating disorder, causing significant ill-health. In IBD, the normal functions of the immune system are not properly controlled; the cells and molecules that normally fight against infections then cause enormous damage. One of the most important molecules in this process is called tumour necrosis factor alpha (TNF α). Excessive production of TNF α by cells called macrophages is a critical factor driving disease. Our aim here is to apply recent advances generated in the host laboratory to understand how macrophages are altered and produce more TNF α in the intestines of patients with IBD.

Miss Louise Burnett & Dr Achim Schnauffer, University of Edinburgh

Identification of genes are required for kDNA maintenance and function in trypanosomastid parasites

Trypanosomes are single celled parasites that are the cause of severe diseases that affect both humans and cattle, making their study of interest for future therapeutic applications. Trypanosomes present a peculiar mitochondrial DNA (called kDNA) that is an attractive therapeutic target, as drugs directed at it would be unlikely to also affect the human mitochondria.

Within the laboratory, large scale RNA interference screens have provided several potential candidate genes without a currently known function, but with suspected involvement in kDNA maintenance. The phenotype of these genes will be confirmed by gene knockdown assays and their effect determined through various phenotypic experiments.

Ms Mara Kont & Dr Ramya Bhatia, University of Edinburgh

Quality assessment of samples in Scottish HPV archive- a Bio-Bank of cervical smear samples.

The Scottish Human papillomavirus (HPV) archive is a biobank of cervical smear samples from routine cervical screening, and acts as a resource for research into HPV related disease. These samples are provided to researchers investigating the epidemiology of the virus, presence and expression of the viral nucleic acid (DNA and RNA) and expression of viral and cellular proteins.

The aim of this project will be to assess the stability of DNA, RNA and protein levels in a set of 50 samples stored in the archive for different length of time at different temperatures. Insights gained from this project will provide information necessary for future maintenance and assurance to the use of the Bio-Bank for research.

Miss Eleanor Pumphrey & Dr James Chalmers, University of Dundee

Validating new methods for identifying neutrophil extracellular traps in-vivo

White blood cells called neutrophils kill bacteria and clear them from the lungs. They usually do this through eating the bacteria (phagocytosis) but occasionally they do this through a mechanism whereby the cell "explodes", releasing toxins that kill the microbe (known as neutrophil extracellular trap - NET - formation). This method is very damaging to the lung, and we believe it leads to diseases like COPD. In this project, Eleanor will look at neutrophils from patients with lung disease undergoing NET formation, to develop better ways of measuring them. This will make it easier to spot when patients are developing diseases at an earlier stage.

Miss Dimana Atanassova & Professor Stephany Biello, University of Glasgow

Can Exercise Attenuate the Effect of Acute Exposure to Urban Lighting on Behaviour and Brain?

There is increasing evidence that daily rhythms, sleep and urbanisation influence physical and mental health and that this may be independent of effects of diet and physical activity. Research indicates that at least some of this influence may be via brain inflammation. We will investigate the relationship between urban lighting and markers of behaviour, weight and brain inflammation, and whether these relationships are modulated by daily rhythms.

Mr Keir Murphy & Dr Federico Brucoli, University of the West of Scotland

Identification of the molecular targets of proximicins, potent anti-tumour natural products

Cancer is a leading cause of death worldwide with 340,000 new cases in UK alone (2012). The increasing number of therapeutic targets in cancer demands access to novel and diverse chemical scaffolds, which can result in new anti-cancer drugs. To this end, natural products, particularly derived from marine microorganisms, remain a remarkable source of therapeutic leads. In this project we wish to identify the molecular targets of proximicins, potent anti-tumour antibiotic isolated from marine Actinomycetes. Proximicins-tagged molecular probes will be synthesised and an assay will be employed to detect the interactions of these probes with a number (>9000) of potential cancer protein targets.

Miss Julija Maldutyte & Dr Cheryl Woolhead, University of Glasgow

Recombinant expression of beta-2-microglobulin in E.coli

Beta-2-microglobulin (B2M) is a protein that forms part of the MHC Class 1 molecule, a group of molecules found on mammalian cells which help the body identify infected cells. B2M can be used to increase the immunological potential of vaccines and producing it easily and cheaply would be very beneficial. One such way could be using recombinant protein expression in bacteria, such as E.coli, to make large quantities of high quality B2M cheaply and efficiently.

Mr Alexander Jamieson (University of Glasgow) & Professor Terence Gourlay, University of Strathclyde

Development of a novel limb salvage technology for military and civilian disaster situations

Limb loss due to traumatic injury is common for Military personnel injured in the battlefield and in civilian casualties in civil disaster situations. During this project we will build upon our experience in long term organ support and the development of oxygenator, pumping and sensor technology to develop a rapidly deployable limb support technology for long term support and recovery of injured limbs. This project will focus on the development and integration of the sensor technologies required to monitor and control the support system and ultimately will have a positive impact on the long term recovery of affected patients.

Mr John Holden (University of Glasgow) & Mr Danny Rafferty, Glasgow Caledonian University

What effect does STARFISH mobile phone app have on physical behaviour and cadence patterns in people living with stroke?

In Scotland we have a large number of stroke survivors, many of whom are left with lasting disability. Stroke survivors tend to do less exercise and spend more time being inactive than healthy people increasing the risk of cardiovascular disease, and another strokes. Health risks of sedentary bouts are independent of health benefits of physical activity. Cadence is the stepping rate per minute and is a measure of intensity. Pre-existing objectively collected free living physical behaviours of people living with stroke will be analysed to explore the effectiveness of a mobile phone application in reducing sedentary bouts and increasing cadence.

Mr Andrew David Clelland (University of St Andrews) & Professor Hamish Simpson, University of Edinburgh

Effect of demineralisation, decollagenisation and strain rate on bone fracture

Osteoporosis is a major healthcare problem, which is set to rise steadily with the aging population. The clinical significance of osteoporosis lies in the fractures that occur, which tend to be the result of a modest load applied quickly, such as that which would result from a fall from standing height. Pilot work has already been carried out to demonstrate that chemical processing of bone can replicate the increased fragility that occurs in osteoporotic bone. We aim to investigate the fragility of this bone over a range of strain rates replicating, standing, walking and a fall from standing height.

Miss Mikaela Frixou & Dr Jean Quinn, University of Glasgow

Colorectal cancer is one of the most common types of cancer. It is the third most common cancer in men and the second most common in women.

It is being increasingly recognized that an inflammatory response is an important factor associated with colorectal patient outcome and survival. In this project we will investigate what it is at the level of the cell that links inflammation with tumour growth. To do this we will stain human colorectal tumours for certain proteins and see if these are linked to inflammation associated with the tumour or general inflammation in the patient.

Mr Alistair Carr & Dr Charlotte Gilhooly, University of Glasgow

Analysis of medium term mortality and morbidity outcomes for burns patients in Scotland

This project will analyse the risk of death and serious complications requiring admission to hospital for burns patients in Scotland for up to a 4-year period following the burn. This data will be compared with Scottish population statistics who have not suffered a burn to allow detailed analysis of medium term outcomes. This will enable the NHS to accurately quantify the mortality and morbidity burden attributed to burn injury in the months to years after the burn occurs. This information will help to influence the design, planning and provision of health services for burns patients in Scotland by the National Managed Clinical Network - Care of Burns in Scotland.

Mr Ian Stephens (University College Dublin) & Dr Rick Maizels, University of Glasgow

Expression and Optimisation of TGF-beta mimics secreted by Heligmosomoides polygyrus

Helminth worms are exceptionally successful parasites and currently infect more than one quarter of the world's population. It is well known that the worms are able to infect so many people because they have developed mechanisms to effectively suppress the immune system of the people they infect, whilst causing relatively little harm in the way of side effects. Identifying the molecules that the worms secrete to achieve this may lead to new safe and effective medications to treat conditions such as allergy, multiple sclerosis and rejection of transplanted organs. Recent research from the Maizels laboratory has

shown that one type of helminth, *Heligmosomoides polygyrus*, secretes a family of molecules that act on a specific receptor on human immune cells. The purpose of this project is to further investigate these molecules, to see if they all act in the same way, whether some are more effective than others or lead to fewer unwanted side effects.

Miss Hannah Marlow & Dr Asier Unciti-Broceta, University of Edinburgh
Synthesis and phenotypic screening of novel anticancer kinase inhibitors

The project aims to provide the student with training in the fundamental techniques used for the preparation and biological screening of novel compounds, while at the same time will explore the development of small molecules of interest for the hosting lab. Specifically, the student will carry out the synthesis of novel derivatives of based on kinase inhibitors (so called lead compounds) discovered in the Unciti-Broceta's lab. Novel compounds will be screened against cancer cell lines to in the search for either novel or improved pharmacological properties.

Mr Arun Parajuli & Professor Harry Campbell, University of Edinburgh
Incidence and Mortality Pneumonia Associated with Low Birth Weight in Low and Middle Income Countries: A Systematic Review

Pneumonia remains an enormously significant and highly under-examined cause of global childhood mortality. Poor nutrition serves to worsen this issue by acting as a major contributing factor in the incidence of and mortality from infectious disease in developing and developed countries. The project involves production of a systematic review analysing existing evidence regarding the effect on incidence and mortality pneumonia in low and middle income countries by low birth weight. It seeks to examine the significance of this interaction in causing ill health as a means of highlighting the need to address this major source of morbidity and mortality-particularly in low in middle income countries.