**Session 17B │Long Term Health Conditions**

**Paige Stevenson, Faculty of Biological Sciences**

**Characterisation of Potential Anti-Chlamydial Drug Targets**

Microglia cells are the immune cells of the central nervous system; they play a key role in responding to infection and damage within the brain where they become activated to respond to the insult and restore conditions to normal. However, chronic activation of microglia is thought to be damaging and contribute to the pathology of neurodegenerative diseases such as Alzheimer’s. Microglia can exist in a number of phenotypic states including a dormant non-activated state, an anti-inflammatory and a pro-inflammatory state. The pro-inflammatory state is believed to be the phenotype that contributes most to neuronal damage and chemicals that can promote the anti-inflammatory state appear to have potentially therapeutic value. We will use a number of inhibitors of specific pathways in microglia cells to characterise the extent that these compounds influence the resting microglia phenotype as well as the microglia response to activating stimuli such as lipopolysaccharides and oligomeric Amyloid beta. We will measure the expression levels of specific markers associated with pro-inflammatory and anti-inflammatory states, such as the cytokines IL-6 and IL-10 respectively, to determine the responses of microglia to specific chemical treatments. Work will be conducted in a laboratory environment, using cell cultures and techniques such as PCR, a method of producing multiple copies of DNA. This will help us to achieve our aim of understanding how we can use specific chemical inhibitors to fine tune microglia response and provide potential treatment to those with neurodegeneration.

**Haydn Simper, School of Mechanical Engineering**

**A Physical Simulation of the Human Defecation System for the Investigation of Treatments for Faecal Incontinence**

Faecal Incontinence is a huge problem globally. With an array of causative factors contributing to its prevalence, the condition is complex, with a limited choice of treatments to improve the quality of life for those it afflicts. A common factor in the pervasiveness of this disorder is the weakening of coordinated defecatory muscles such as the puborectalis, pelvic floor and the internal/external anal sphincters.
To improve the quality of life of patients who exhibit faecal incontinence, numerous innovators have developed novel ways to restore function to defective defecatory systems. These treatments frequently exhibit implants which either actively or passively mimic the function of the anal sphincters, such that control of defecation is somewhat restored. One proposed treatment, undergoing exploration by a medical textiles company, affects a passive constriction around the anal canal. The implant, currently in a development phase, employs a complex woven structure which will be introduced in a minimally invasive surgery and over time integrate with tissues to mimic the occlusive pressure normally exhibited by a healthy sphincter.
In order to test such a proposal, this research involves the construction of a defecation simulator, enabling the proposed device and existing treatments to be compared to healthy and diseased baselines. The system will be used to evaluate: the occlusive pressure of the sphincter; mass retained; and time elapsed until breach of occlusive pressure, in each treatment scenario. Resultantly, development of the proposed device can be informed, potentially delivering a much-needed long term improvement in the treatment of faecal incontinence.

**Kevin Wang, School of Medicine**

**Deep Learning Algorithm for Colorectal Cancer Detection**

Background
Colorectal cancer (CRC) is the second largest cause of cancer mortality in the UK. With early diagnosis and appropriate treatment, 57% of patient can survive for 10+ years. Both diagnoses and treatment decisions are made manually on glass slides or digital slides. Manual analysis of tissues requires visual inspection of highly complex cellular structures, which is time consuming, subjective and prone to error. Artificial intelligence such as Deep Learning (DL) has the potential to automate this task, improving on speed, objectivity and accuracy. Current research at the University of Leeds uses DL algorithms to classify CRC tissue in order to automatically predict response to therapy. However, it requires cancer tissue to be annotated by a pathologist prior to analysis which has the same disadvantages.

This project aims to develop a DL algorithm to detect CRC on digital slides, as a pre-processing step for downstream image analysis.

Method
8000 CRC images from St James Hospital were colour-normalised before training the VGG19 network. The model is trained with 5-fold cross validation to identify 8 categories: tumour, stroma, lumen, muscle, mucin, vessels, necrosis and inflammation. The model will be validated using an external dataset from the National Cancer Institute. A heatmap will be generated to representing probability of cancer cells on a whole-slide image and compared with existing pathologist annotations.

Results
The algorithm is still being developed at the time of submission. Preliminary accuracy after the first round of training is 0.91 on the training set and 0.59 on the validation set.

**Session 17E │New Applications in Science**

**Anam Mohsin, School of Chemical and Process Engineering**

**Waste Management**

Waste management is a serious concern in the present day, specifically in the food industry, mainly due to large amount of waste produced during food processing. A third of the food produced globally is wasted, amounting to 1.3 billion tonnes annually. Fruits and vegetables produce 45% of the total waste in the food industry which is nutrient enriched. Waste reduction by extracting nutrients from food processing by-products has become an area of increased interest as it provides an opportunity to generate revenue from waste. Tomatoes form the second largest crop, with an annual production of 170 million tonnes, hence, they were considered a suitable resource for nutrient extraction. This project aims to extract proteins from tomato seed waste by optimising the extraction process and converting the protein into microgel particles which were subsequently tested at oil-water interfaces to stabilise food emulsions. A protein yield of 28.4% was obtained and tomato seed protein gel (TSPG) particles were prepared, within the desired size range of 20 - 200 nm. Their ability to stabilise oil-in-water emulsions was compared against whey protein gel (WPG) particles at different concentrations. The evaluation of the emulsions prepared using five different concentrations (0.1 wt%, 0.5 wt%, 1.0 wt%, 1.5 wt% and 2.0 wt%) of both types of gel particles showed TSPG particles demonstrated better emulsifying and stabilising properties compared to WPG particles. This proves tomato seed protein has the potential to be used as a vegan alternative to the standard benchmark used in the food industry: whey protein.

**Fangchen Liu, Department of Landscape Architecture**

**How Steep would You Go? Generating a Gradient (or Steepness) Map for Sheffield**

Using ArcGIS Analysis to Study The Inhibition of Recreational Routes (both cyclists and runners) by The Steepness of Sheffield’s Hilly Topography: How steep would you goï¼Ÿ

Sheffield’s cycle network is disjointed - requiring cyclists to navigate their own routes between the existing fragments. This could lead to people choosing unsuitably steep routes within areas they are unfamiliar with. The slope of a route might be a fundamental issue for novice cyclists/runners or within cycling projects such as 'Cycling Without Age' (where passengers from care homes are taken out for a ride with the use of specialist bikes that include seats for passengers). The problem of encountering unexpected steep slopes within a journey could become a barrier to the less experienced who may give up exercise if suitable routes were not located. Other groups (e.g. cycle and triathlon clubs) may specifically seek out steep routes for the challenge.

The goal of this study was to develop a map model that could locate these gradient features without first going into the field, thus saving time, money. ArcGIS analysis works by overlaying existing geo-referenced data into a computer program and adding the different data sets after assigning a numerical value to the important fields. For this project, freely available (Open Source) data, OS Open Roads map and LIDAR maps, are used for Sheffield urban areas. The model has demonstrated that it is possible to use this type of model and apply it to other cities and areas to produce a usable gradient map.

**Session 18C │ Social Change Inclusion & Engagement**

**Liv Powell, School of History**

**‘Practicing Great-Power Chauvinism and National Egoism’: Soviet Foreign Policy in the Far East, 1949-1964**

Despite its anti-imperialist rhetoric, the Soviet Union undoubtedly regarded the Communist states of Southeast Asia as pseudo-colonies, which greatly weakened its international position and contributed to its collapse in 1991. However, this topic is largely overlooked in the existing literature examining Soviet foreign policy. This research, therefore, attempted to address this gap by highlighting the Soviets exploitative foreign policy towards China and North Vietnam. To evidence the validity of this argument, a large range of primary and secondary sources from Russia, China, and Vietnam were utilised, particularly as primary material such as telegrams and reports revealed the intimate details of Soviet foreign policy. By including sources from these three countries, this research was both objective and addressed the lack of existing research considering more than one perspective.

This research explored four key aspects of Soviet imperialism in Southeast Asia, beginning with Stalin’s exploitation of China’s deteriorating economy, which laid the foundations for a hostile Russian-Chinese relationship, until his death in 1953. This was followed by a thorough investigation of both Khrushchev’s exploitation of China’s fears and weakened domestic situation, and his failure to support Mao following his failures to reform China’s economy and agriculture. Finally, the role of North Vietnam was considered due to its close relationship with both the Soviets and China, with this researching concluding that the Soviet Union’s imperialist foreign policy contributed to its collapse in 1991.

**Session 18D │Business and The State**

**Ziran Yang, Leeds University Business School**

**Investigation into the Nature and Causes of the Global Productivity Puzzle**

This paper concerns the international productivity slowdown, which has been widely acknowledged in the empirical literature, especially in the decade following the Global Financial Crisis (GFC). The economic stagnation has been particularly apparent in many advanced, formerly industrialised countries around the world; yet its causes remain uncertain. Building on the recent developments in the literature, this paper will focus on the causes of the global productivity puzzle in relation to integration considerations, among other factors. The paper will also collect, clean and prepare data on productivity, using a range of sources, including databases from the various institutions: OECD, World Bank, International Monetary Fund. Then a preliminary statistical analysis will be conducted with the collected data, involve utilising state-of-the-art statistical software package, STATA. In doing so, it aims to shed further light on the extent, significance and scale of the problem across a panel of OECD countries.

**Joseph Beaden, School of History**

**Nation of the Self: Interaction Visions of Nationhood in 20th Century Korea**

At the dawn of the 20th century, Korea faced a uniquely perilous political situation. Surrounded by three, much larger states, the country had yet to undergo the kind of economic transformation experienced by its neighbour, Japan. Without a modern military the peninsula was vulnerable to the imperial ambitions of its neighbours--ambitions that were to define the history of the region in the 20th century. The delicacy of the situation was reflected in the content of the nationalist movements that rose and fell from the opening of the country in 1876 to its liberation in 1945. Unable to see an obvious route to constructing a Korean nation-state, and largely ignored at the Paris Peace Conference, these movements took on a vast range of different ideological forms, that often reflected the context and perspective of their individual members.

Influenced by Siniša Malešević’s focus on organisational continuity and ‘micro-solidarities’ (2013), and Eric Kaufmann’s proposed ‘optical model’ for understanding nationalism (2008), this article compares various nationalist movements within Korea, around the turn of the 20th century. From the ‘Independence Club’ of the 1890s, to the cultural nationalist journal ‘Kaebyok’ of the 1920s, the article attempts to understand how the context of nationalist movements, and the strategic necessities of the Korean situation, shaped the outcomes of those movements. It argues that, though the content of a particular nationalism was defined by individual context, that content was always tempered by the practical necessities of Korea’s political, economic and intellectual context.

**Session 18E │ Biology**

**Lucy Belk, Medicine**

**Cardiac Protection with Anaesthetics**

Background: There is an increasing demand for cardiac surgery in the United Kingdom. Ischaemic-reperfusion injury is a recognised complication of cardiac surgery. Evidence from preclinical and clinical studies shows that administration of volatile anaesthetics before an ischaemic insult may have a role in cardiac protection by attenuating ischaemic-reperfusion injury. This is termed anaesthetic-induced preconditioning.

Aims: This manuscript aims to consider the clinical and preclinical evidence for APC in cardiac surgery and discuss the activation of mitochondrial adenosine triphosphate-sensitive potassium (mKATP) channels by protein kinase C as a mechanism for anaesthetic-induced preconditioning.

Content: Volatile anaesthetics bind to the G-proteins on the cardiomyocyte. A downstream cascade results in the phosphorylation of protein kinase C, activating the opening of the mKATP channel. This reduces damage to the cardiomyocytes by preconditioning via a number of pathways.

Conclusions: There is strong evidence for volatile anaesthetic-induced preconditioning in preclinical studies. Less consistent evidence is seen in human studies. There is preclinical evidence for the mechanism of anaesthetic-induced preconditioning by activation of mKATP channels by protein kinase C. Based on the evidence, guidelines for anaesthetic-induced preconditioning in cardiac surgery should be produced, to reduce mortality.

Keywords: cardiac surgery, volatile anaesthetics, cardiac protection, anaesthetic-induced preconditioning, mechanism

**Ioana-Aurora Veteleanu, School of Biomedical Sciences**

**Conversion of APOE Genotype from Îµ3 to Îµ2 Using a Novel Base Editing Approach**

A major genetic determinant in Alzheimer’s disease (AD) has been recognised to be the apolipoprotein E (apoE) gene, whose Îµ4 allele enhances the risk of developing the disease and lowers age of onset, while the Îµ2 allele has a protective role. Studies in rodents, in vitro, as well as in patient derived induced pluripotent stem cell derived-neurons, all demonstrate that apoE4 enhances disease pathogenesis, while apoE2 has the ability to rescue some of the negative effects apoE4 exerts over amyloid beta plaque formation and microglial immune responses. A single amino acid difference between ApoE3 (Arg158) and ApoE2 (Cys158) results in a protein conformational change that affects binding to apolipoprotein receptors, lipid transport capacity and debris clearance ability. Genome editing technologies currently available cause double strand breaks when attempting to introduce a point mutation, and cause random insertions or deletions. To convert the amino acid at position 158 from CGC to TGC, a base editing plasmid containing a Cas9 nickase, a cytidine deaminase enzyme and a uracil glycosylase inhibitor was transfected into cells. This novel base editing system, comprising elements of CRISPR/Cas9, allowed Arg158 to be changed to Cys158 in HEK239T cells, conferring them the Îµ2 genotype of APOE, and attempted in Îµ3/Îµ3 immortalized astrocytes from APOE-TR mice. This finding brings to light the concept of therapeutically converting APOE genotypes to Îµ2 in order to benefit from the protective effects this has over AD prognosis.

**Session 19B │ Innovative Materials & Treatments**

**Tal Randall, School of Psychology**

**Hiking in Nature - The Therapeutic Benefits on Students' Well-being: A Qualitative Photo-Elicitation Study**

An ever-increasing prevalence of mental health and well-being problems among the student population is of major concern. This poses significant implications for students and their academic performance. There is growing empirical evidence that displays the numerous benefits of interacting with nature. Hiking is an excellent way of becoming immersed in natural environments and receiving these benefits, thus, an ideal option for students to combat the challenges of university life. The aim of this exploratory study was to gain a deeper insight into university students’ personal hiking experiences and better understand the bio-psycho-social processes underpinning the benefits. The research question for this study was ‘What personal motivations do students have for hiking in nature and how do they perceive the benefits?’. The study used a qualitative approach and a photo-elicitation interview method. Seven volunteer university students were recruited from a city-based university in the north of England, ranging from second year to PhD level. Thematic analysis was used to analyse the data and generated five main themes: Vitalising and Calming Effects of the Natural World (containing two sub-themes: Finding Clarity in Natural Environments and Being Vitalised by What’s Natural); New Layers of Connection (containing three sub-themes: Appreciating my World, Being Naked in Nature and Going Back to my Roots); Escaping and Being Free; Creating Shared Memories; and Leaving my Comfort Zone and Overcoming challenges. From the findings, it can be concluded that various nature-based interventions should be implemented within educational institutions, for the benefit of students’ well-being.

**Session 19C │ Global Governance, Crime & Violence**

**Justin Robinson, School of Politics and International Studies**

**The Militarisation of the Living Room? Military Recruitment, Video Games and the British Armed Forces**

With the British Army’s latest recruitment campaign targeting €˜binge gamers’ and the US military still attempting to entice possible recruits with its long-running military videogame America’s Army, the importance of the relationship between videogames and militarism is at an undoubted high. This, combined with the ascension of videogames into the mainstream of popular culture entertainment, makes it an area ripe for academic exploration. Through research as part of the Laidlaw Scholarship at the University of Leeds, I have explored the relationship between games and militarism through organising and 5 focus groups involving videogamers, exploring the nature of the participant’s videogame consumption and their thoughts on questions of militarism in both videogames and social media spaces. Alongside my supervisor, I presented our findings at the BISA conference this year and we are currently in the process of writing an article, focusing on the attitudes of these gamers towards military recruitment advertisements and, more widely, their thoughts on military institutions and militarism. We have found that gamers are being targeted by the British military through social media advertising, yet demonstrate a reflexivity when discussing military recruitment. Despite being avid consumers of military videogames, they were often critical of military recruitment advertising, arguing that it was deceptive and manipulative. This raises ethical and moral questions about modern military recruitment; should it permeate into people’s leisure practices and what are the implications of such a practice for society when it is pursued by military institutions?

**Session 20A │ Transformations of Industry & Employment**

**Edgar Roberts, Philosophy, Politics and Economics**

**Climate Securitisation in the Israeli-Palestinian Context: Security Discourses, Climate Policy, and Conflict**

The unparalleled transnational water interdependence of the Middle East and the intense contestation for local resources between Israel and its Arab neighbours have led to a growing literature examining the implications of climate change for the security of the Middle East, in particular in the context of the ongoing Israeli-Palestinian conflict. Yet insufficient analysis is given in such research to the role of security actors’ understanding of the meaning of security and the effects this have on their response to the threat of climate change. I employ the “securitisation theory” of the “Copenhagen School” of security studies, in an analysis of the public statements and policy documents of actors within the Israeli and Palestinian Authority (PA) governments that influence national climate policy, in order to evaluate the extent to which climate change has been treated as a security issue, or “securitised”, by these states over approximately the past decade. I also analyse and contextualise just what logic or “discourse” of security is being employed by these state actors in the securitisation process. I find that neither country has securitised climate change, as Israel perceives it primarily through a “technocratic” framing and the PA affords such enormous priority to the Israeli occupation that few other issues are afforded security status. The findings of this paper highlight the urgent need to devote further attention to Israel and the PA’s interpretation of security in order to improve understanding of the significance of climate change for Israeli-Palestinian relations.

**Session 20B │ Social Change, Inclusion & Engagement**

**Anna Ferrari and Jackie Salter, School of Education**

**What is There that We can't See? The Language Classroom Explained by Children with ADHD**

This project investigated the barriers to language learning experienced in class by three young language learners with ADHD in a public secondary school in South England. In attempting to answer the research question ‘How can the language classroom influence learning in young students with ADHD?’ this study offers a new methodological approach to the issue. In particular, implementing my study exclusively on the learners’ perception provided an innovative bottom-up approach to children research where elements of exploratory practice, visual elicitation and focus group were included. This study aimed to listen and generate hypotheses on the main potential barriers for language learners with ADHD, which were found to be the poor relevance of the target language to students’ lives and language teachers’ attitudes and teaching strategies. This paper was inspired by a personal bias in socio-constructivist theories of ADHD and language learning, both found evidence in my findings, generating new questions on the future of language education for students with ADHD.

**Session 20C │ Production, Robots & Machine Learning**

**Larisa Adriana Darolti, School of chemistry**

**Use of Artificial Snow in Industry**

This talk will discuss the benefits and disadvantages of fake snow production, more specific, potential methods of improving artificial snow. This may influence present and future industry; snowflakes can have different shapes - from the well-known hexagonal to cones and strings. We’ll explore how choosing the “best” shape of a snowflake can make artificial snow more suitable to the task at hand. Since the current main use of fake snow is in the skiing industry, one vein of investigation will be the improvement of “ski-slope” snow while decreasing the environmental impact in terms of energy and carbon usage in the production process. Agricultural industry may also benefit from artificial snow. Cereal crops such as wheat benefit greatly from a snow cover during winter, which acts as both insulation and fertiliser during spring. Nitrogen and sulphur, through melting, fertilise the ground and feeds the growing seedlings. Our investigation is looking to optimise the shape of the snowflakes, based on decreasing heat conductivity, trying to tackle climate change matters as well as increasing crop production, in order to deal with world hunger issues. We will also consider how other nutrients can be incorporated into the snowflakes, to further aid crop production. To this aim, we will use diffusion-limited aggregation computer models, common when researching snowflake formation, which either simulate a lattice within a desired geometry, or use standard molecular dynamics to closely mimic the chemical and physical processes. Other approaches include using statistics to determine the best snowflake model for the situation

**Jit Hong Cheah, School of Computing, Faculty of Engineering**

**Robocup: Robots Playing Soccer, a Focus on Artificial Intelligence and Motion**

The research focuses on the improvement of Robotics and AI towards the goal of RoboCup - "By 2050, a team of fully autonomous humanoid robot soccer players shall win a soccer game, complying with the official rules of FIFA, against the winner of the most recent World Cup."

The technology used will be applicable in many other fields and help us solve difficult real-world problems. To play soccer, robots must be able to perceive their environment, classify obstacles and landmarks, make decisions based on the current game state and then execute the decision made.

My research focuses on the behavior of 2 robot roles in a team of 5 robots. This refers to the all the decisions made by any 2 robots in the team (as roles can change). My research also includes the team behavior during special cases such as kick-ins (replacement for throw-in) and goal kicks. These decisions mainly focus on determining the best position and facing direction of the robot based on the current game state and position of teammates and opponents.

Research was conducted via experimentation. First, a hypothesis is made on a possible plan based on possible game states. Then, it is programmed and tested in simulation. If the outcome is unsatisfactory, changes are made. Once the outcome is satisfactory, it is tested on the physical robot. Throughout the process, it must be kept in mind that in the real world, conditions are not always ideal and all possible errors must be taken into consideration.