**Session 5B │Space**

**Gemma Mitchell, Engineering**

**Thin Film Lubrication of Non-Conformal Geometries**

Elastohydrodynamic lubrication is a mode of lubrication typically found in mechanical components like gears, roller bearings and cam-follower mechanisms. It is desirable to effectively lubricate these surfaces and interfaces within tribological contacts. This research focuses on recommissioning existing equipment and developing new methodologies to optically measure thin film lubrication at rolling/sliding interfaces.

In many industrial applications appropriate lubrication is necessary to prevent unnecessary wear of machine elements. However, in many components they do not have smooth surfaces, leading to loads being applied over very small contact areas. Many mathematical models currently assume a smooth surface, the consideration of asperities is important to give a closer physical representation and analysis of contact. Through the recommissioning of this equipment and development of methodologies future research may be feasible to contribute to the understanding of how rough surfaces affect thin film lubrication.

The analysis of previous experimental methods has determined the functions of different parts of the equipment and realisation of parts which are missing. It has been discovered the hard drive, which controlled the equipment and analysed interferograms taken, crashed and has been removed. The project has now adapted to researching how functioning machine elements can be integrated with modern software and cameras to control moving elements and capture images of the contact area. A MATLAB code may be developed in this or future research and combined with optical colorimetry techniques to analyse the interferograms and determine film thickness, along with the effect of surface asperities.

**Eduardo Enamordao,** **Durham University Law School**

**Analysing the Development of EU Outer Space Policy**

The space sector provides over 230,000 jobs in the EU, and it is worth between â‚¬46-54 billion to the EU economy. Space has indeed become a global business yet today the European space industry faces substantial competition from America, India, China and Russia.

EU intervention in space, together with those of its Member States and the European Space Agency, needs to aim to strengthen the European space industry's competitiveness at a global level. However, in order to determine how to strengthen the European space industry, it is crucial to understand the current EU space policy and how it has developed over time.
The main academic question focuses on understanding how the EU has failed or succeeded in developing stable strategies and new technologies to promote a substantial industrial base for outer space applications and services. There is however a set of sub-questions that are raised by the research project.
Is there a coherent and stable set of provisions / a framework? When and how it developed?
How has the EU supported the global competitiveness of the European space industry?
Describe the development of different markets for space applications and services.
Has Europe become more technologically independent to access space?
Without being aware of it, European citizens rely on outer space technologies when they use their mobile phones, do financial transactions, take an aeroplane, watch the weather forecast or look for the nearest restaurant. Space has become part of modern times and could become a more substantial part of our future.

**Victor Covasan, University of Sheffield**

**Spatial Scales of Collisionless Shock Ramps Observed by the NASA MMS Mission**

The scale of the transition region in collisionless shocks is one of the core parameters defining the nature of the discontinuity since it is correlated with the relative influence of dispersive or dissipative effects in balancing the nonlinearities leading to the formation of the shock itself. It is therefore fundamental to understand the ways in which the interplay of these two entropy-generating processes evolves with changes in the propagation speed of the discontinuity to be able to verify the validity of current models describing the dynamics of shock ramps. Similar investigations have attempted to quantify these relationships based on the data provided by Cluster and THEMIS however they have been constrained by aspects such as large spacecraft separation or relatively low resolution of the fluxgate magnetometer measurements. This prompted the requirement to reconsider the problem of ramp scales in collisionless shocks. The more recent NASA MMS mission provides capabilities that rectify the two limitations by delivering a much higher sampling rate as well as a satellite separation up to ten times smaller. Over one hundred shocks were analysed, sampled randomly over the second phase of the mission and the data was processed using variance analysis methods and four-satellite timing for the construction of the boundary normal. The results showed a strong dependence of the ramp scale on Alfvenic Mach Number(MA), for low MA the ramp scale corresponding to the dispersion scale(c/Ï‰pi), while for increasing MA the scale was found to approach a few c/Ï‰pe.

**Session 5G │** **Governance & Conflict**

**Victoria Bianchi, Durham University**

**Sicily and the dÄ r al-IslÄ m: Multiculturalism in the Pre-Crusading Mediterranean**

Sicily, the largest island in the Mediterranean described by Goethe as “the soul of Italy”, has always been the gateway between Europe and North Africa. Recently, it has attracted global attention due to its struggle with Italian nationalism and the immigration crisis. Yet, the general public tends to remain unfamiliar with the island’s multicultural history. In the Middle Ages, prior to the crusades, Sicily was already a highly contested territory disputed between Byzantine, Muslim and Norman forces. My research focuses specifically on the period of Muslim rule. Through the study of contemporary Arabic accounts, I have investigated the way in which Sicily fitted into the larger picture of the dÄ r al-IslÄ m (the Islamic World). Advocating for a new approach to medieval Mediterranean studies, it is not only important to redefine the significance of Islamic history and move away from a Eurocentric vision of the Mediterranean Sea but also to consider how representations of European places contributed to the forging of Muslims’ identity. As a contentious borderland, the socio-cultural situation of Sicily raises fundamental questions about the nature of Muslim rule and the coexistence of various ethnic and religious groups. Furthermore, it was considered a prime location to engage in the Holy War. Still understudied compared to its counterpart in Spain, Sicily remains a unique example of Islamic history in Europe. My study aims to emphasise the interconnectedness of the broad dÄ r al-IslÄ m and the Mediterranean island, whose Islamic heritage affects the “soul of Italy” to this day.

**Francesca Brittain, Social Sciences**

**Islamic State Propaganda: An Investigation into the Presence and Depiction of the Themes ‘Utopianism’ and ‘Broken West’ within the Islamic State Magazine ‘Rumiyah’**

For many, Islamic State are a violent, radical terrorist group who’s aim is to inflict terror and violence upon innocent civilians across the world. However, in the propaganda they produce, its often shown what a happy world they live in, and that in fact, it is the Western world who’s aim is to harm innocents. This research’s aim is to investigate the presence and depiction of the themes of Utopianism and a Broken West within the Islamic State magazine Rumiyah. Previous research indicates that those themes are frequently emphasised in Rumiyah’s predecessor, Dabiq, but limited research has been conducted into the theme’s presence in Rumiyah. Through the methods of a content analysis and thematic analysis, I investigate the presence of these themes and contextualise their meanings through using Framing theory. I conclude with a discussion upon the themes within the text and examine if any new themes have emerged throughout the research process and propose their contextual meaning to real world events.

**Marina Tapley, Social Sciences**

**The Role of ‘Formers’ in Countering Violent Extremism**

This presentation will examine the role former extremists and former combatants have in countering violent extremism (CVE). ‘The former’ as a special category of actor in CVE activities, including in peacebuilding settings, has gained significant attention in recent years. Various organisations and governments have utilised formers in CVE activities, yet it remains unclear if and when formers can make a positive contribution to these efforts. This presentation brings together research on the subject to provide contexts in which formers do and do not play a positive role in CVE activities. The purpose of this research is to identify characteristics attributable to the role of former extremists and former combatants as categories of actors and discuss the effectiveness of these roles in contributing to CVE. Thus, the aim is to provide a conceptual tool for identifying which activities may be appropriate for formers in various CVE settings. It is highlighted that former combatants can play an active and productive role in CVE in contexts where formers have relatively more influence in communities than states, although these contexts are rare and have negative consequences, particularly for victims. Where they do not fill a gap left by the state, formers have limited capacity to support CVE beyond providing an important but short-term contribution to intelligence and counter-narratives. The presentation will be based on a policy-brief co-written with Dr Gordon Clubb for the ICCT.

**Session 5H │Masculinity**

**Laura Jane Hepworth, School of Sociology**

**‘He’s not my Husband, He’s my Father’: Exploring the Life History, Experiences and Narratives of the Successful Children of Single Fathers through Autoethnography and Qualitative Interviews**

Most single parent households in the UK are headed by women; a staggering 86% of lone parent households are run by single mothers. Increasingly, more children are growing up in households run by single fathers and the role of the single father is receiving increasing media attention. However, very little research has concentrated on the experiences of these children being raised by single fathers; additionally, even less has been conducted on the ‘successful’ children of single fathers. Successful children refer to adults who have either entered higher education or are earning a graduate salary. This study used elements of the life history approach and narrative enquiry to analyse 16 interviews with the successful children of single fathers. It also conducted an autoethnography on the experiences of a successful child of a single father. It found that uniquely many daughters of single fathers have experienced members of the public assuming that they are not in fact their father’s daughter, but their romantic partner. These findings highlight the deep, historically rooted structures and discourses that affect the role of the father in society and how they are perceived.

**Isobel Sale, Arts, Humanities and Cultures**

**Breaking the Silence of Urinary Incontinence: How Women can Find Support on Online Forums**

Due to the taboo of, and shame caused by, incontinence, exact statistics on the number of sufferers cannot be documented; when women have this condition, the embarrassment can be so overwhelming that only a small proportion of them reach out to stakeholders. So, while their General Practitioners, physiotherapists, midwives, and in some cases families and friends, are completely unaware, the humiliation grows and can sometimes lead to extremities such as isolation. Some women do, however, seem to reach out via online forums, Mumsnet being a predominant example. Thus, this study was a thematic analysis of six forum entries from Mumsnet which were related to urinary incontinence. I coded for positive and negative emotions induced by the use of advice asking and giving, consolations from others, and physical coping and management strategies. The results were surprising, showing each thread to have more positive emotions than negative. This demonstrated Mumsnet to create a virtual community and a safe environment in which the users earn immediate mutual respect for one another and where they can receive instant consolation and advice for their problem. It is necessary that researchers continue working on this topic in order to improve the physical condition of sufferers, as well as their emotional well-being.

**Jessica Ball, Durham University**

**Conflict and Constructions of Masculinities among Catholic University Students**

My research is in its second year of work under the supervision of Professor Mathew Guest and is part of ongoing research into religious identities of university students within the Higher Education system in the UK. My project is particularly interested in the negotiation of male gender identity and the perceived expectations of being a Catholic male and a male at university. I will discuss how some of the expectations of being a male, or indeed, the perceived expectations of being a male in both situations intersect and how their male gender identities are negotiated in different scenarios that could bring both identities into conflict. My interest is in the male experience of the 'masculine' at moments where both identities intersect, most importantly whether it is possible for both identities to be fully coexistent or if a compromise or distance from one or both identities is required at any point during their time at University. As a female researcher, this project is an important attempt to address the criticism that Masculinitity studies tends to involve 'men talking to men about men' and attempts to focus on the male perspective in a way that is productive to further understanding the experience of Catholic male students.

**Session 6B │ Sustainability**

**Alice Paine, Environment**

**Identification of Volcanic Ash in Great Britain: Novel Perceptions of Global Volcanism and Modern Risk Assessment**

Volcanic hazards aren’t constrained to their country of origin. In 2010, Europe’s aviation network suffered £1.1billion of losses due to an eruption of Eyjafjallajokull volcano, Iceland. Geologically, this was not an exceptionally large incident. Following this, nations needed to recognize the poignant risk of volcanism in the future - a risk set to increase alongside Europe’s reliance on global interconnections. The question remains: is modern society prepared for future eruptions?

To answer this, my study extracted and analysed sediment cores from a hitherto uninvestigated site in Northern England. Ash layers were frequently found, and high variance in particle shape/size/colour between layers implies a variety of eruption styles have the capacity to inundate this region.

Observed in conjunction with similar research conducted across Europe (Swindles et al. 2017), these findings raise poignant considerations for future hazard management. Recurrent identification of ash particles in spatially-unique sediments across Europe emphasizes how this region been previously affected by volcanism, and inevitably will be again in the future. Yet, response policies formulated post-2010 will only be effective if events of equal or lesser magnitude than Eyjafjallajokull unfold (Parker, 2015). Studying historic eruptions can indicate their extent/frequency: aiding preparations for when larger, more destructive eruptions unfold. Political and infrastructural perceptions of volcanic risk must shift from ‘prediction’ to ‘preparation’, and a key driver for this will come from searching novel sites for evidence of volcanism. If cryptotephra deposits continue to be found in the NE, political initiative to develop effective future response measures will subsequently increase.

**Mark Anis,** **University of Sheffield**

**Insights into Improving the Temperature Coefficient of Capacitance (TCC) in Multi-layer**

A further study of Barium Titanate (BaTiO3)-based MLCCs in an attempt to improve temperature coefficient of capacitance explores four different processing routes for 10% Ca-doping to achieve a composition of Ca(0.1),Ba(0.9) TiO3 and how that affects the ferro-electric Curie Temperature (Tc) of the composition.
Processing routes are as follows 1-2: Preparing from raw powders with and without a calcination step, 3-4: Adding Calcium Carbonate (CaCO3) and Titanium Oxide (TiO2) raw powders to chemically stable Barium Titanate powder with and without a calcination step. Ball-mills were done for 20 hours with isopropanol as solvent to enhance mixing and reduce segregation.
Qualitative and quantitative X-ray diffraction results of both powders and pellets show necessary element combinations and identification of chemically reacted powders, showing good powder mixing and extent of reaction. Additionally, 500 LCR scans were taken at 1000, 10000, 100000, 250000 and 1000000 Hz from room temperature till 320 degrees Celsius
Tests show positive results for an increase in Tc from ~120 to ~150 degrees Celsius for some of the processing routes. The testing conditions are discussed more thoroughly as well as the difference in processing routes for the same composition. An in-depth analysis of the implications is given, and what this means for the different processing routes and the different ceramic pellet conditions. Core-shell microstructures are discussed and how they apply to this composition of BCT (Barium Calcium Titanate) A final conclusion of some of the new potential applications is covered, leaving an open-ended basis for future work on the topic.

**Session 6G │ Applications of STEM**

**Ugonna Angel Anyamele,** **Elana Nerwich, Bharath Saravanan, Jack Godfrey, Medicine and Engineering**

**Developing Low-Cost Techniques to Improve the Use of Ilizarov Circular Frame Fixators for Tibial Fractures in Low and Middle-Income Countries**

Worldwide, approximately 90% of trauma-related deaths occur in low and middle-income countries (LMICs) - many due to severe fractures (1). Unfortunately, management of fractures is challenging in this context and many people receive little or no treatment.
Ilizarov frames are widely used in higher-income countries to manage open leg fractures. They consist of a frame constructed around the leg by surgeons using wires drilled into the bone attached to steel rings connected by stiff rods. The frame holds the bone in place while supporting load to facilitate weight-bearing, thus reducing hospital stay and improving healing.
Ilizarov frames could be highly beneficial in LMICs, however, their high cost is currently prohibitive. This project aims to explore ways of improving methods to fit these frames and reduce cost, using frugal engineering techniques.
A novel frame concept has been developed based on a low-cost alternative to the wires used in existing frames. In addition, a low-cost sensing approach is being developed to provide a robust, objective and clinically-relevant means to measure wire tension, thus reducing risk of clinical complications (2).
Work has been evaluated through lab experiments using artificial bone. The degree of frame deformation and relative bone displacement under load is measured using a motion capture system. Results are being analysed to identify the efficacy of this approach and clinical relevance. Findings will inform future research with the ultimate goal of improving leg fracture management in LMICs.

References:
1. Zirkle, 2008. doi: 10.1007/s11999-008-0387-0.
2. La Russa et al, 2010. doi: 10.1016/j.jbiomech.2010.04.029.

**Mitchell Cottam and Helcias Ribeiro, Electrical Engineering and Computing**

**MyPAM Upper Body Rehabilitation Robot - Games and Mid-Level Controller Development**

Our research focuses on the rehabilitation of stroke survivors and children with cerebral palsy, using the active-assistance robotic arm called MyPAM. Patients will play custom made computer games with the MyPAM’s assistance, with the intention of rebuilding neural connections in their brains, ultimately allowing them to perform activities of daily living that will allow them to regain their independence.

For a patient to maximise their recovery it is vital that they perform their rehabilitative exercises consistently and for a prolonged period of time. Inevitably patients often struggle to do this due to the tedious nature of the repetitive exercises in addition to the limited access to physiotherapists. The MyPAM system aims to resolve both of these issues. The use of computer games will provide a motivational component that aims to maintain the patient’s engagement for as long as is required for maximum recovery. A key goal of the research is to make the system portable and cheap enough to install in the patient’s home for the duration of their therapy, which along with the active-assistance will reduce the need for a therapist to be present. Data from gameplay will be sent to a secure database for the therapist to analyse, so that they can adjust the patient’s recovery program accordingly.

Our roles are to develop the initial MyPAM compatible games, develop a simple system for future developers to easily create compatible games, and development of a mid-level controller to manage the system hardware and games.

**Alice Tiler, Engineering**

**Artificial Arms for Medical Applications**

Worldwide, there are more than three million people who live with upper limb loss, 2.4 million of which are from developing countries. Below the elbow arm amputees account for 59%, while 28% are above the elbow. Robotic prostheses use electromyographic (EMG) signals, generated by muscle activity, to restore functionality through a limited set of movements. However, there are limited options for upper arm prosthetics, with very few affordable ones for lower arm amputees.

To address this, I designed, developed, and built a robotic prosthetic prototype for an upper-arm amputee. I used non-invasive EMG electrodes, secured to the skin surface and a custom signal conditioning electrical circuit. The conditioned signal is paired with a robotic arm that I programmed to replicate the movements detected by the electrical circuit. The prototype was tested by five people, to account for variance in muscle signals.

Test results analysis showed that body fat had more impact on the detected EMG signals than muscle size and definition. In addition, below elbow movements could be detected by monitoring below elbow muscles. Furthermore, change in magnitude of the signal was proportional to the amount of movement, while the speed of change of was proportional to the movement speed.

Through monitoring the contraction and relaxation of two muscles, flexing the upper-arm and moving the lower-arm were consistently recognised. A new signal processing technique was also introduced to remove the need for movement calibration. Future research plans include monitoring additional muscles to increase the accuracy and number of movements detected.

**Session 6H │ Policy & Reason**

**Armaan Iqbal, Medicine and Health**

**The Association of Ankle Blood Pressures and Stroke Subtype and the Influence of Glucose Regulation**

Background-Strokes are the second leading cause of global mortality. Ankle blood pressures (ABP) have been associated with strokes. However, association with stroke subtype appears uncertain- despite the need to identify more specific markers. ABP can indicate arterial stiffness- a contributor to small vessel lacunar stroke pathogenesis. Diabetes increases arterial stiffness, thus may influence ABP. This study aims to investigate associations between ABP and small vessel lacunar strokes, and ABP and diabetes.

Method-Stroke patients were recruited from LGI (October 2018- May 2019). A medical history was taken and ABP measurements using Doppler equipment. A neurologist assessed clinical features and radiological imaging to determine stroke subtype using TOAST and Bamford Stroke Classification systems. A visual rating scale using CT/MRI imaging assessed small vessel disease (SVD) severity.

Results-Recruitment totalled 105 participants. Moderate-to-severe SVD prevalence was 46%. Univariate analysis found no significant association between ABP measured at dorsalis pedis (DP) and posterior tibial (PT) pulses with moderate-to-severe SVD (p-values; left PT 0.274, left DP 0.659, right PT 0.160, right DP 0.381). Linear regression analysis indicated significant association between diabetes and ABP at three pulses (p-values; right DP 0.018, left DP 0.035 and left PT 0.017).

Conclusions-The findings indicate high ABP isn’t related specifically to SVD strokes, but low ABP may instead serve as a marker for generalised atherosclerosis in stroke as a whole, as indicated by previous studies. Association between ABP and diabetes indicates diabetic vessel pathology can be detected using ABP alone, suggesting it’s potential as a marker of disease in diabetic medicine.

**Amy Campbell, Durham University**

**Investigating how the Nation-State Law in Israel Challenges the Relationship Between Ethnicity/Religion and Citizenship in Israeli Political Culture**

The aim of this research is to investigate how the nation-state law in Israel challenges the relationship between ethnicity/ religion and citizenship in Israeli political culture. The most controversial clauses of the nation-state explicitly set forth that the exercise of the right to national self-determination in Israel is unique to the Jewish people, the official language is Hebrew, and that Jewish settlement shall be encouraged. Unstructured interviews conducted in Israel were used to collect data. Interviewees were selected across the political spectrum including Israeli/ Arab-Israeli/ Palestinian politicians, journalists, activists, directors of non-governmental organisations, and academics. The direction of the research was expanded from the initial research proposal, from examining the impact on Arab and Palestinian minorities, into a wider investigation of the agenda that brought the nation-state law to the Knesset. The preliminary findings have so far demonstrated that the law divides opinion between on the one hand furthering Zionism and on the other; increasing resistance to the symbolic consequences of defining a country with one nationality, reinforcement of the right-wing status quo and the occupation of Palestinian territory. When investigating a law so fundamental to the political structure in Israel it became apparent that there are two types of impact to the law in Israel: the parliamentary and constitutional consequences of the law in the Knesset, and the consequence of re-affirming the national and international debate of whether it is justified that one ethnic/religious group has complete power over governance of the land of Israel, including the supreme court.

**Uthpala Ramprasad, Arts, Humanities and Cultures**

**Examining Foreign Policy Platform in Republican Manifestos from 1960 Onward**

The inter state collaborative nature of foreign policies has made the world diverse, open. This created a haven for better trade and corporate expansion. Efforts have been made to collectively combat climate change, epidemics, natural disasters and attempts at ethnic cleansing. These are efforts made once a candidate (now president ) who is ideally surrounded by advisers who are not bound by party affiliations. This is not the case on the campaign trail when the goal is to use language that panders to the core base of the candidate. Promises are made, votes are obtained. It brings out the aspirational nature that captures the imagination of the voters and reflects the relationship between the american voter with the rest of the world. Today, the globalised space that we thrive within has begun to make way for the promise of protectionist foreign policy using combative language and paints trade and cultural exchange as a mutually beneficial practice, rather something that has to be won.

**Session 7D │ Health, Disease & Science**

**James Cooper, Engineering**

**Standardised Particles in Pre-filled Syringes**

Pre-filled syringes are a vital part of modern medicine and drug delivery. The safety of these products is of the upmost importance. Therefore, it is vital to ensure that the syringe is not contaminated, as syringe contaminants are a risk to the patients’ health. Detection of these contaminants is key to ensure a safe product.
We are researching into methods of creating a library of homogenous particles in the range of 50-500 microns. The machine that detects syringe contaminants does so by creating a flow field which fluidises the particles which block light, causing a detection by the machine. Currently the particles used for testing are created in an ad-hoc way, creating particles at a range of different sizes. Standardising the particles will reduce the effort in establishing optimum conditions for operation.
The research has been done by looking into a range of techniques to creating these particles resulting in thorough analysis of the viability and accuracy of the methods. During the research we have conducted a large amount microscopic imaging to validate the accuracy of the methods. The final aim of the research is to produce particles of a range of materials within 10% of the stated size, which can then be used to reduce the time and experimentation required to create a robust process.

**Sioned Williams, Biological Science**

**Inhibition of Microglial Activation Using Histone Deacetylase Inhibitors**

Alzheimer’s disease (AD) is a progressive neurodegenerative disease, culminating in reduced cognitive function and eventual death. There is currently no effective treatment. AD pathology is characterised by the accumulation and aggregation of extracellular amyloid-Î² (AÎ²), which forms insoluble AÎ² plaques, activating microglia (the immune cells of the brain). Although this activation is initially useful and leads to the phagocytosis of AÎ² plaques, it can become chronic, causing an excessive inflammatory response and consequent neuroinflammation, in turn facilitating further AÎ² accumulation and aggregation. Therefore, identifying ways to reduce microglial activation could have therapeutic effects in patients with AD. Some of our early data suggested that inhibitors of Histone deacetylase enzymes (HDACs) could reduce the microglial activation induced by lipopolysaccharide (LPS) and AÎ², but the mechanism of action remains unclear. Here we show that the non-selective HDAC inhibitor suberanilohydroxamic acid (SAHA) markedly reduces the interleukin-6 (IL-6) expression and nitric oxide (NO) production of BV-2 microglia activated with LPS and interferon (IFN). We also show that adenosine triphosphate (ATP) and acetylcholine (ACh) have little impact on the inflammatory activity of BV-2 microglia and we continue to investigate other compounds which have the potential to influence microglial phenotype. Additionally, we have used recombinant HDAC2 - green fluorescent protein (GFP) fusions to selectively express HDAC2 within the nuclei and cytoplasm of BV-2 microglia and show that HDAC2 likely enhances inflammatory activity by acting on a protein which shuttles between the cytoplasm and the nucleus of cells, work to identify the specific target protein is ongoing.

**Session 8A │ Behavioural Science & Social Systems**

**Obi Davis, Arts, Humanities and Cultures**

**Are Conventions Necessary for Linguistic Communication?**

In this paper, I argue for the non-necessity of linguistic conventions for linguistic communication. I elaborate on an argument given in a series of papers by Davidson (1984; 1986; 1994). I aim to strengthen his argument through a deeper understanding of Lewis’s (1969; 1975) account of conventions, establishing what it means for communication to be explained by conventions. Specifically, conventions explain communication when the reason for the use a specific word/meaning pair is given by interlocutors’ learned mutual expectations. When interlocutors communicate using neologisms, they cannot use their learned mutual expectations to guide their word choice. I then defend the non-necessity of linguistic conventions against two attempts to reinterpret linguistic conventions in order to accommodate linguistic innovation. I conclude that Lewis’s project of showing how conventional meaning arises out of use forces us to accept the non-necessity of linguistic conventions for linguistic communication.

**Session 8B │ Technology, Engineering & Modelling**

**Lakshya Singhal, Engineering**

**Using Machine Learning to Assess Diabetic Foot Ulcers**

Diabetic Foot Ulcers represent a major health issue around the world. The clinical treatment of DFU has drawbacks such as the difficulty of accurate diagnosis and effective treatment. Current methods for DFU assessment typically involve visual inspection of the plantar surface to determine the plantar topology, which neglect both of plantar pressure and dynamic movement. Our team are developing a load measurement system, dynamically measuring load in 3 axes, to collect plantar pressure data (normal plantar pressure shear plantar stresses). From this data we wish to determine the presence of foot ulcers. We simulated two types of foot profile (healthy and diseased) using a silicone foot model, across different walking conditions.

In this research, we propose a deep LSTM (Long Short Term Memory) network for this binary classification. LSTM network is most suitable model for this dataset as it allows sequence data as an input, and make prediction based on the individual time steps of sequence data. Investigation showed that using full (3 axis) load information as an input to the classification model provided better performance than relying on only shear or normal stress in isolation. Training the LSTM model on our dataset and performing 10-fold cross validation gave an accuracy of 0.975. This shows the potential for predicting DFU allowing patients for an early treatment and safety measures. Future work will consider training on a more extensive dataset to explore the potential to deliver a paradigm shift in diabetic foot care.

**Session 8C │ Social Change Inclusion & Engagement**

**Farida Augustine, Arts, Humanities and Cultures**

**Identifying West Africans in the French Resistance**

West African (Senegalese, Malian, Ivorian, Guinean) colonial subjects of the French Empire played a vital role in French Internal Resistance (1940-1945). However, their contributions have been largely overlooked by the prevailing historical narratives surrounding The Second World War. This research aims to identify the West African men and women who fought in the French Internal Resistance. This research forms part of a larger ongoing research project to identify members of the French Internal Resistance who were subjects of the French Empire. It examines how these men and women’s racial identity influenced their decision to join a Resistance group or movement, the roles they were given or undertook and their interactions with both their comrades and the enemy (French and German). Furthermore, the project makes an important contribution to the commemoration of Second World War in France, by diversifying the range of stories depicted.

**Session 9A │ Migrants, Refugees & Development**

**Georgia Ellis, Social Sciences**

**You Play Well for a Refugee Woman: Could Grassroots Football be a Successful Tool for Integration of Female Refugees and Asylum Seekers in Leeds and the Wider UK?**

Football at all levels has an incredibly wide appeal and following across the world (Long and Robinson, 2006; Stone, 2013; 2018), which leads many to argue that football, perhaps more so than other sports, has a significant scope as a tool for positive change (FARE, 2018). This research explores the utility of grassroots football for the integration of female refugees and asylum seekers to contribute to the current gender-blind spot in existing literature on refugees and football. It broadens the approach of existing literature from a focus on social inclusion, to looking more holistically at integration, building on a framework developed by Ager and Strang (2004). Using a combination of research from existing literature, newspaper articles, reports and qualitative interviews, it explores current levels of participation among asylum-seeking women, perceived barriers to their participation and finally suggests some recommendations to help improve the accessibility of football for these women. Overall it seeks to demonstrate that football could be a successful tool for integration on the condition that various structural adjustments are made in order to facilitate the agency of football to achieve these outcomes.

**Session 9B │ Scientific**

**Vanessa Yung, Engineering**

**Investigating and Developing a Measurement System for the Detection and Monitoring of Clostridium Difficile**

Clostridium difficile is a bacterium found in the intestines, which can cause colitis and diarrhoea, specifically antibiotic-associated diarrhoea. Patients can then become dehydrated and in more severe cases develop pseudomembranous colitis, which puts them at risk of a distended colon and subsequently bowel perforations.
Infant and elderly patients are particularly vulnerable, especially those within nursing homes. Currently there is no single test for the diagnosis of Clostridium difficile and both a clinical manifestation and a positive laboratory test, which can take at least two days, are required. The standard protocol for treatment includes quarantine and antibiotics. This carries the risk of the bacteria developing antibiotic resistance. Therefore, there is a need for rapid detection of Clostridium difficile and continuous monitoring of at-risk patients to detect the infection as soon as possible.
Within the identified at-risk populations, it is common for patients to be unable to communicate their symptoms, which is one of the reasons Clostridium difficile is not diagnosed earlier.
My research aims to implement a novel diagnostic system, embedded within a nappy or an adult incontinence pad, which will allow immediate analysis of urine and stool. This will simultaneously remove the need for the patient to communicate their symptoms and allow a clinician to continuously monitor the levels of Clostridium difficile to aid in earlier detection of infection. To achieve that, I have used low-cost electronics, combined with custom biosensors.
The outcome of my research will be used in developing a prototype for a proof-of-concept study.

**Session 9C │ Education & Student Experiences**

**Faizah Motala, Social Sciences**

**Dyslexia in Higher Education: Assessing the Experiences of Students at the University of Leeds**

Research confirms that dyslexia plays a significant role in students learning experience throughout their time in post-secondary education; suggesting that students struggle academically and adopt coping strategies to manage their difficulties. Academically, dyslexia is often categorised either medically or socially. Consequently, further research should be considered on dyslexic students’ experiences in seminar settings, because there is limited literature in this field. As such, this study examines the seminar experiences of dyslexic students at the University of Leeds (UoL), specifically, the impact this has had on them academically and in a wider context. Additionally, staff perspectives on dyslexia have been explored to assess whether there is any relationship between staff understandings and student experiences. The design involved mixed methods; a survey (49 participants) and semi-structured interviews (7 participants) to capture dyslexia students’ lived experiences. Moreover, 10 survey responses and 1 interview with staff from disability services and UoL, has provided an insight into teaching practices and awareness. From the latter, it is clear that staff receive generic inclusive teaching practice. The findings suggest that although experiences of dyslexic students are subjective, academic staff require further training on teaching dyslexic students to improve experiences. This research calls for further research on academic staff at UoL to move towards a better understanding of dyslexia and ensuring that dyslexic student’s experiences in seminars are more positive and manageable.