WOLFSON COLLEGE CAMBRIDGE

WOLFSON RESEARCH EVENT 2015

Friday 1 May and Saturday 2 May

Schedule
and
Abstracts

WOLF50N

Day	Time		Activity
Friday 1 May	1:00pm	1:15pm	Introduction - Richard Evans
	1:15pm	1:30pm	Keynote - Lynn Gladden
	1:30pm	1:45pm	
	1:45pm	2:00pm	Talk 1 - Tara Cookson
	2:00pm	2:15pm	Talk 2 - Abhijit Sarkar
	2:15pm	2:30pm	Break
	2:30pm	2:45pm	Talk 3 - Mirela Domijan
	2:45pm	3:00pm	Talk 4 - Miah Khaitova
	3:00pm	3:15pm	Talk 5 - Barbara de Smith
	3:15pm	3:30pm	Talk 6 - Armando Maestro
	3:30pm	3:45pm	Posters, demonstrations & tea
	3:45pm	4:00pm	
	4:00pm	4:15pm	Talk 7 - Anne Martine Solstad & Yi Ren Thng
	4:15pm	4:30pm	Talk 8 - Laura Rimell
	4:30pm	4:45pm	Talk 9 - Sheridan Gunderson
	4:45pm	5:00pm	Break
	5:00pm	5:15pm	Talk 10 - Debbie Pullinger
	5:15pm	5:30pm	Talk 11 - Giorgia Giardina
	5:30pm	5:45pm	Talk 12 - Zainab Kabba
	5:45pm	7:15pm	Break
	7:15pm	10:00pm	Formal Hall
Saturday 2 May	8.30am	9:15am	Posters, demonstrations & breakfast
	9:15am	9:30am	
	9:30am	9:45am	Introduction - John Naughton
	9:45am	10:00am	Keynote - Ian Rhodes
	10:00am	10:15am	
	10:15am	10:30am	Talk 13 - Gary Chi-hung Luk
	10:30am	10:45am	Talk 14 - Antonio Rodrigues
	10:45am	11:00am	Break
	11:00am	11:15am	Talk 15 - Zaha Kheir
	11:15am	11:30am	Talk 16 - Claudio Köser
	11:30am	11:45am	Talk 17 - Jeremiah Garsha
	11:45am	12:00pm	Break
	12:00pm	12:15pm	Talk 18 - Lakshmee Sharma
	12:15pm	12:30pm	Talk 19 - Davide Pigol
	12:30pm	12:45pm	Talk 20 - Anabela Pinto-Poulton

Keynote 1: Professor Lynn Gladden – Pro-Vice-Chancellor for Research, Department of Chemical Engineering and Biotechnology

The Changing Landscape of Funding for Research

Over the past 10 years, the funding landscape for research, and indeed the way many academics undertake research, has changed significantly. This presentation will give an overview of these changes and how the University is responding. At the heart of the University's strategy is the recognition that the individual has the right to pursue their own ideas - this is what makes Cambridge such a stimulating place in which to do research. At the same time, we also need to make sure that the University provides academics with the state-of-the-art infrastructure and support to deliver world-leading research, to be able to engage effectively in national and international research consortia, and to find the most effective ways of working with both small companies and large corporates.

Keynote 2: Ian Rhodes – CEO McLaren Applied Technologies

Introduction to McLaren Applied Technologies and how we interact with the Research and Development communities

Ian will introduce his background and the background to McLaren Group and specifically McLaren Applied Technologies before going on to talk about the drivers and priorities for a continuous portfolio of research and technology development activities at McLaren. Ian will also share a few personal views on the differences between research and development activities in industry versus an academic environment and highlight the opportunities for collaboration, illustrated by the recent Partnership announced between McLaren and Oxford University Medical School.

Talk 1: Tara Cookson – PhD student, Wolfson College, Department of Geography

Cash, conditions and 'inclusion': A case study of women and social policy in Peru

The Economist has called conditional cash transfers (CCTs) 'the world's favourite new anti-poverty device'. CCTs give monetarily poor women small sums of money conditioned upon pre-natal exams, children's health check-ups and school attendance. Their supporters argue that CCTs are a tool for promoting the social inclusion of traditionally marginalized groups at a very low cost to funders. But what does social inclusion – a development "buzzword"- actually mean? Drawing on multi-scalar ethnographic fieldwork in the government offices and program headquarters of Lima, and in households, schools and clinics of the northern Andean highlands, I attempt to unpack and make sense of social inclusion in Peru, focusing in particular on the national CCT program, *Juntos*, as a tool for its achievement. In bringing the experiences of women program beneficiaries to bear on a discourse of social inclusion, I hope to open up space for a productively critical confrontation with both a development buzzword and a wildly popular social policy tool, asking how these might be wielded more substantively – and justly.

Talk 2: Abhijit Sarkar – DPhil student, St Antony's College, Faculty of Oriental Studies

'A Famine that Fed Communalism: The Great Bengal Famine and Communalism'

This paper deals with how providing food to the victims of the Great Bengal Famine of 1943 in India became a tool for publicizing the communal ideology of Hindu parties, particularly of the Hindu Mahasabha. In that period of overall starvation, issues around food actually fed politics. Realising that the famine had thrown open a scope for religious conversion from Hinduism through distribution of food-relief, Mahasabha rushed to provide food-relief to the Hindu vulnerable to 'save' them from converting to another religion. Mahasabha condemned the despatch of starving Hindus from Bengal to other provinces by the Muslim Khaksar volunteers on the ground that such action was actually a disguised attempt to convert the Hindu destitutes to Islam. Mahasabha demanded that Hindu orphans should remain in the custody of Hindu organisations. Thus, Mahasabha advocated relief work along communal lines. This paper argues that there was a correlation between relief works and the Mahasabha's increased membership; and in the Noakhali district (which was the site of a Hindu-Muslim riot in 1946), through 'special food relief', the Mahasabha increased its influence among the Hindu professional groups with a larger objective to counter the power of the Muslims in the district.

Talk 3: Dr Mirela Domijan – Research Associate, Wolfson College, Sainsbury Laboratory

Mathematical modeling of the plant circadian clock

The plant circadian clock is an endogenous 24h timer driving numerous metabolic, physiological and developmental processes in plants. The clock can run under constant conditions in the absence of environmental cues, but it can also be entrained by these cues, adapting to daily cycles in both light and temperature. Another key striking feature of the clock is that it can maintain nearly constant period of oscillation over a broad range of physiological temperatures, a feature commonly known as temperature

compensation. All these properties enable the clock to do a variety of functions: it helps the plant predict transitions at dusk and dawn, it allows it to measure day length and it also prepares the plant to respond accurately to seasonal rhythms. Due to these important roles, it is of great interest to understand the design principles of the clock mechanism. I will show how mathematical modelling in tandem with experiments has helped us gain a greater understanding of the plant clock and its function.

Talk 4: Miah Khaitova – MPhil student, St Antony's College, Institute of Social and Cultural Anthropology

'Mother – Potter and Child – Clay: Woman as Agency in Gender Construction?'

The dominant ideology of patriarchal relations among Muslim communities of Margilan, Uzbekistan is supposed to lie behind privileging the male over female. In my presentation, I will argue that the patriarchal representation is rather limiting in portraying the reality of Uzbek women. The social and cultural reality beyond such an ideology takes us to an important domain of women's experience where this seemingly dominated status of a woman is actually overturned. This is the domain of the practices of motherhood. In particular, my presentation focuses on the practice of using *beshik* (wooden crib) in nurturing a child. This study examines Uzbek's mother's self-image as well as the status that the wider society confers upon her. In the present segment of the narrative, I am focusing on the mother's newborn baby and the harmonising relationships between the two. This involves a continuous interaction between symbols and practices: how rhymes of lullabies translate into mother's body rhythms and the rocking movements of the Crib.

As an anthropologist, I would like to treat mother-child relationship as a site where broader cosmologies and changes in collective living inscribe their print, allowing the observer to examine the extended context, its continuities and changes on a time scale. For the present paper, *beshik* is one such window to begin to unravel this complex society.

Talk 5: Barbara de Smith – Senior Member, Wolfson College

'Diego Garcia: issues in International and Constitutional Law and politics'

Diego Garcia is a US base in the Indian Ocean. It is also part of the British Colony, the British Indian Ocean Territory, (BIOT). The island is claimed by Mauritius, a former British Colony. The independence negotiations were held at a time when there was a fear of Russian naval intervention in the Indian Ocean. There have been domestic and international law cases involving a review of the legal, political, historical and constitutional issues involved. Where do these facts come from? Is something necessarily true because it is said before a Senate investigatory Committee? Do we necessarily believe Wikileaks? Can conclusions about Government policy be drawn from civil servants' opinions written at a time when the Cold War was the overriding consideration in decision making and international law was in its relative infancy?

The author had a humble and junior role in the Mauritius Independence negotiations but has maintained a close relationship with the Island ever since.

Talk 6: Dr Armando Maestro – Junior Research Fellow, Wolfson College, Cavendish Laboratory

Hydrodynamic synchronization of colloidal rotors – a simple model to explain the coordinated beating of cilia

The coordinated cyclic beating of eukaryotic cilia and flagella is responsible for vital functions such as motility of microorganisms and fluid transport close to various epithelial tissues. Synchronization induced by hydrodynamic interactions is a possible and potentially general mechanism behind this coordinated beating of cilia. To understand hydrodynamic synchronization, rather than a realistic beating filament description, we use here a simple model with a minimal number of degrees of freedom, based on optically driven colloidal particles that can act as micron-scale phase oscillators. For the first time I show that modest tuning of the cilia beat properties, as could be achieved biologically by modulating the molecular motor activity or binding affinity, or the cilia length and orientation, can lead to dramatic changes in the collective motion.

Talk 7: Anne Martine Solstad & Yi Ren Thng – Undergraduate students, Wolfson College, Faculty of Human, Social and Political Sciences

Information and communication technologies and Human Rights: Risks and Opportunities

As student researchers in a research team at the Centre of Governance and Human Rights (POLIS) we have been looking into different information communications technologies that have been used in the service of human rights. Technology in existence and under development aim to prevent human rights abuses, or document them, and use the evidence for accountability in courts or for advocacy. Our research informed a report that was used in an expert meeting this February with the UN Special Rapporteur on extrajudicial, summary or arbitrary executions, and which will result in his recommendations the UN's Human Rights Council on this topic. As part of the project, the research team have created an online live resource. On the website (http://ictandhr.tumblr.com/) we have collected an overview of a number of technologies and tactics, as well as more in-depth case studies, where we have spelled out some of risks and opportunities of the uses of these

technologies, and aspects of inclusion and exclusion. We hope that this can be a reference point and a resource for researchers and activists.

Talk 8: Dr Laura Rimell – Research Associate, Wolfson College, Computer Laboratory

Learning from Text Whether a Lion is an Animal

In Artificial Intelligence, detecting entailment relations between natural language sentences is a crucial task for reasoning, learning, and communication. A prerequisite is the ability to automatically identify entailment relations between words: for example, being a lion entails being an animal, and kicking something entails touching it. We will discuss how entailment relations between words can be learned by a machine, with minimal human intervention, from large amounts of text. We make use of Distributional Semantics, the idea that a word's contexts of use characterise its meaning: for example, "lion" and "tiger" occur in similar contexts in natural text (they may co-occur frequently with the words "tail" and "hunt"), but different contexts from "sun" and "moon" (which may co-occur frequently with the words "shine" and "light"). This observation underpins much important work in Natural Language Processing today, but distinguishing similar words ("lion" and "tiger") from entailed ones ("lion" and "animal") is challenging. We will give an introduction to Distributional Semantics and describe how the contexts of words like "lion" and "animal" relate to each other in surprising ways.

Talk 9: Sheridan Gunderson – MSc student, St Antony's College, African Studies Centre

Chewing Over Change: New Dynamics in the Global Khat Trade

In 2014, the United Kingdom instituted a ban on khat, a leafy stimulant widely consumed by the Somali diaspora community. In the wake of this ban, I research how a law passed in the United Kingdom can have major adverse affects upon the economic livelihoods of communities thousands of miles away in Kenya. Therefore, khat becomes a lens with which to explore the idea of global markets and the linking of distant localities.

My research explores how the United Kingdom's ban on khat is impacting livelihoods in Kenya, in particular those in the main khat cultivation region of Meru, and how these communities are adapting to this new situation. Are farmers re-appropriating land to grow different crops? Are traders and exporters attempting to sell khat in other markets? Are they re-branding khat through converting it into other products? Has the economic tension resurrected former stressed relations between the different ethnic groups in the region (Tigania, Igembe, and Somalis)? My research considers the outcomes of a rupture in Meru's global commodity since khat's disconnect from its licit global journey, as well as how the affected communities now imagine the future of such a commodity.

Talk 10: Dr Debbie Pullinger – Junior Research Fellow, Wolfson College, Faculty of Education

In Living Memory

The Poetry and Memory Project is an interdisciplinary investigation into experiences of learning and memorising poetry, with, as its central research question: how does learning poetry affect our experience and understanding of it, and what is distinctive about this form of relationship with a poem? I will share some of the initial findings from the first phase, which included a UK-wide survey of memorised poems. As the population that learned poetry in school has dwindled over the past fifty years, the poems within cultural memory are likely to be increasingly diverse and fragmented. But what poems or types of poems do remain, and why? Through this qualitative survey, in which we invited members of the public to tell us about one poem they knew by heart, we gathered data that indicates what poems remain in the national consciousness, and is allowing us to explore their individual, social and cultural uses. Additionally, we are interested in how a memorised poem becomes active and alters its meaning for an individual over the course of life, and in what contexts it might crystallise different kinds of understanding.

Talk 11: Dr Giorgia Giardina – Junior Research Fellow, Wolfson College, Department of Engineering

Modelling of Settlement Induced Building Damage

The assessment of potential damage of surface buildings has become an essential stage in the excavation projects in urban areas. Object of this study is the development of an improved damage classification system, which takes into account the parameters influencing the structural response to settlement, like the non-linear behaviour of masonry and the soil-structure interaction.

The methodology used in this research is based on experimental and numerical modelling. The design and execution of an experimental benchmark test representative of the problem allows identifying the principal factors and mechanisms involved. The numerical simulations enable to generalize the results to a broader range of physical scenarios.

The results from the numerical simulations are used to set the framework of an overall damage model which

correlates the analysed structural features with the risk for the building of being damaged by a certain settlement. This research therefore provides an increased experimental and numerical understanding of the building response to excavation-induced settlements, and sets the basis for an operational tool for the risk assessment of structural damage.

Talk 12: Zainab Kabba – DPhil candidate, St Antony's College, Department of Education

The Education of Young American Muslims: Knowledge and Authority in Intensive Islamic Learning Environments

This study examines the ways in which religious teachers reproduce and transmit religious knowledge to American students within intensive Islamic learning environments. The descriptive 'intensive' signals out educational programs that are short-term, often residential in nature and constructed and collapsed around religious teachers. Whilst fostering a more nuanced understanding of Islam, these teachers facilitate the personal development of Muslim students, their local communities, and their engagement with a wider society. As part of their learning, students and teachers navigate their multiple identities and their relationship with each other. The focus on the negotiation of knowledge and authority highlights student aims to gain knowledge and "recharge" their practice in light of program aims, which encourage students to embody prophetic exemplars in order to become a "witness" for society. The study is innovative in its use of narrative ethnography to highlight the ways tradition is invoked as well as reworked within a Western context. The thesis also explores the role of interpretative authority within the American Muslim milieu. It reveals Muslim intellectuals straddling two regional domains and traversing various associated normative practices in their efforts to develop and maintain their religious influence.

Talk 13: Gary Chi-hung Luk – DPhil candidate, St Antony's College, Institute for Chinese Studies

Westerners and the Waterborne Chinese in Late Imperial China

This paper traces the Western usage of such terms as "boat people", "Tanka" and "fishers" to refer to the vast Chinese population who worked and/or lived afloat in late imperial China (1368–1912). Although historical anthropological studies have demonstrated how Chinese settlers on land imposed the ethnic marker of "Dan" (lit. "egg") upon those who lived on the "water margins" of late imperial China, they have yet to pay attention to the roles of Westerners in China in shaping the ethnicity of boat people, Tanka and also fishers. This paper analyses the Western perception of the Chinese who lived and/or on water from the late eighteenth century to the time of the Opium War (1839-1842). It argues that the Westerners contributed to construct the ethnicity of boat people, Tanka and fishers in China during the hostilities between China's Qing government and the British in 1839-42, and in the late imperial period at large. During the 1839-42 Sino-British hostilities, the Westerners regarded many of the Chinese who helped the British as the boat people, Tanka or fishers. The Western contemporaries also regarded, if not stereotyped, most of the early Chinese settlers in Hong Kong as the boat people or fishers out of their prejudice towards Hong Kong and its Chinese population.

Talk 14: Dr Antonio Rodrigues – Junior Research Fellow, Wolfson College, Department of Zoology

The evolutionary theory of social behaviour

Charles Darwin theory of evolution by natural selection suggests that selfishness should be rampant in the natural world. According to this view, those organisms that spend energy and resources in helping others will leave fewer babies in the next generation, and therefore their altruistic genes are condemn to disappear from the gene pool of the population. William D. Hamilton changed this view of natural selection, when he suggested that altruism could spread in a population if altruists give their gifts to close relatives. Kinship is thus crucial for the evolution social behaviour. Based on my research, I will talk about how in practice these ideas about natural selection help us to understand the movement of organisms, when mothers should have daughters rather than sons, and the wealth inequality among the members of a society.

Talk 15: Zaha Kheir – DPhil student, St Antony's College, Department of Politics and International Relations

The effect of national sentiment on democratic stability in ethno-religiously divided countries. A comparative study of Israel and Lebanon

Both theoretically and empirically, democracy and the nation-state have generally come hand in hand. The very notion of popular sovereignty that is at the heart of liberal democracy is also at the heart of nationalism. Thus, these political ideologies and the realities they created are closely intertwined. Nonetheless, in the past twenty years, nationalism has been associated with autocracy, ethnic cleansing and partition, both theoretically and empirically. Much of the scholarship on democracy and nationalism has focused on the content (civic versus ethnic) of national discourse, and its impact on politics. But very little has been done to empirically inquire into the effects that the existence or absence of a shared national discourse has on democracy when the sovereign demos is divided. Taking ethno-religiously divided countries as an especially problematic situation due to

overlapping, entrenched identities, this project intends to test the hypothesis that a shared national sentiment is a necessary condition for democratic stability in these countries. Process tracing in both Israel and Lebanon at different times of their democratic history is to shed light on the process through which national sentiment affects democratic stability.

Talk 16: Dr Claudio Köser – Junior Research Fellow, Wolfson College, Department of Medicine

Who infected whom, that is the question

According to UK chief medical officer, "the soaring number of antibiotic-resistant infections poses such a great threat to society that in 20 years' time we could be taken back to a 19th century environment where everyday infections kill us as a result of routine operations." It is therefore crucial to strengthen infection control and prevention. In the context of a hospital, this means that doctors have to determine whether bacteria are introduced into the clinic independently or, alternatively, transmit within the hospital, which would trigger an outbreak investigation. Unfortunately, traditional techniques do not offer the necessary resolution for many pathogens (i.e. most stains of pathogens are indistinguishable). By contrast, I have demonstrated that using the same sequencing technology that has brought the cost of a human genome to below $1,000 (and, incidentally, was invented in Cambridge) provides the ultimate molecular resolution to reconstruct transmission events. In some cases it is even possible to determine who infected whom on a single ward in near real-time, thereby providing unprecedented opportunities to intervene in the spread of pathogens. I will illustrate this approach using an outbreak of MRSA that occurred on the neonatal intensive care unit at Addenbrooke's, our local hospital.

Talk 17: Jeremiah Garsha – MPhil student, Wolfson College, Centre of African Studies

'The Time Must Come For Us To Make Our Own Monuments': Genocide Narratives in Namibia

This essay traces the various strategies of both preserving and decentring markers of German colonial domination while constructing new memorials to commemorate the genocide of the Ovaherero and Nama people in Namibia. The paper argues that these strategies have created a hierarchy of narration. The SWAPO ruling party, German-Namibians, and the indigenous communities have each sought to rework historical events in the postcolonial milieu under new, and conflicting, narratives. This paper seeks to contextualise the contemporary sites of historical memory—in public memorials and monuments—by tracing their current presentation back through the historic transformations these sites have undergone. In preserving the inherited German monuments while establishing a nationalistic narrative of colonial resistance, Namibian public space has created genocide amnesia and state-sponsored co-option that mirrors colonial practices. Drawing off a month of field research, this paper explores political and nationalistic practices of both remembering and forgetting history in postcolonial Namibian society.

Talk 18: Lakshmee Sharma – MSc student, St Antony's College, Institute of Social and Cultural Anthropology

Iyengar's Gorur: An anthropological reading of Ramaswamy Iyengar's '*Namma Oorina Rasikaru*'

Anthropology as a discipline has been lauded for its interdisciplinary nature. Social anthropology, particularly, calls on various resources from different intellectual and academic spheres to augment the understanding of society and mankind.

The study I conducted in 2013 builds on this interdisciplinary spirit of anthropology and has resulted in the subject of this abstract. In this study, I have attempted to reread an Indian vernacular (Kannada) novel 'Namma Oorina Rasikaru' in an anthropological light. Why I chose this particular novel is because of its anecdotal nature and a body of work that encapsulates a native and lived experience of an individual in the village of Gorur, Karnataka in south India. Although it is a literary work, the content and description of village life it holds likens to certain famous ethnographic studies.

What this study aims to achieve is to explore further the bounty of vernacular texts in India and the knowledge they present to social scientists. It is also an attempt to understand societies from the point of view of people who have lived in it and those that have produced a now temporally and textually bounded understanding of the same.

Talk 19: Davide Pigol – Research Associate, Wolfson College, Department of Pure Mathematics and Mathematical Statistics

Bayesian estimation of time since colonization in forensic entomology

An important piece of information in homicide investigation is the post-mortem interval, i.e. the time since death. A portion of this interval is given by "time since colonization" (TSC), the time passed since the first insect eggs have been laid on the body. External factors determine how close this is to the post-mortem interval but in any case an accurate estimate of TSC is very useful in the investigations. Many different techniques, both qualitative and quantitative, are currently used to estimate TSC. This work is part of a project with the aim to

help in assessing the uncertainty in these estimation procedures. In particular, here a Bayesian framework is proposed to include in the analysis prior information coming from qualitative methods and from criminal investigations. A model is considered for the larval lengths where the average larval length depends both on TSC and on the time series of temperature at the crime scene. Prior information about TSC needs to be elicited from the forensic entomologists' expert knowledge. Finally, a Metropolis-Hastings algorithm is used to obtain an estimate for TSC, informed both by the expert knowledge and by the larval lengths observed on the crime scene.

Talk 20: Dr Anabela Pinto-Poulton – Research Associate, Wolfson College, Department of Veterinary Medicine
The Biology of Scepticism
Scepticism has traditionally been dealt with in the domains of philosophy or psychology. In biological terms scepticism is no more than a fancy word to refer to deception detection mechanisms. This talk will present the biological roots of such mechanisms and how they have evolved through the different animal groups through primates to humans. It discusses an arms race between the evolution of dishonest signals and the need to optimise systems that protect the individual against misleading information. The talk also introduces the biological basis of belief formation and its relation to philosophical approaches to truth and falsehood. This is a talk that bridges out between evolutionary mechanisms, ethology, psychology and philosophical concepts.

Demonstration 1: Dr Pradipta Biswas – Junior Research Fellow, Wolfson College, Engineering Design Centre
Inclusive Intelligent Human Machine Interfaces
This exhibit will demonstrate research on inclusive user modelling for disabled and elderly population in EU and India as well as how the principle of inclusive design can widen the scope of electronic interfaces for very specialized domain like intelligent cockpit and automobile control. Our exhibit will include demonstrations of:

- Cloud-based user interface personalization that can automatically adjusts font size, colour contrast and line spacing of electronic interfaces irrespective of devices and applications.
- An agricultural advisory system, weather monitoring system and an Augmentative and Alternative Communication aid for spastic children that exploits the user modelling framework.
- An intelligent eye-gaze and head-movement tracking system that can predict intended targets in an electronic display.
- An electronic shopping system and a multi-function display (part of a flight simulator) that exploits the intelligent eye-gaze and head-movement tracking systems.

The exhibition will inspire public and students to think about people with different range of abilities and also convince them that inclusive design does not work only for 'disabled' people but has applications for everyone.

Demonstration 2: Dr Henry Tribe – Emeritus Fellow, Wolfson College
Demonstrating aspects of metabolism to the interested public by models: Life at Two Million Magnification
The exhibit summarizes my research into ways of representing life pictorially at the level of metabolism. We magnify a cell two million times so that we can 'see' the molecules of which it is composed. We model them and arrange them into meaningful patterns which represent aspects of metabolism.
Model 1 shows conversion of nutrients into cell substance and energy. We have millions of copies inside us. Metabolic pathways appear as alternating proteins and small molecules with input from coenzymes. All the particles taking part in metabolism: proteins, nucleic acids, coenzymes, lipids, other molecules, ions, protons, are modelled less or more symbolically and are represented together. The model, of necessity complex!, is supplemented with a location model at x 100,000.
Most cells are far too large to build at x 2 million. But the bacterial cell is manageable: at 5 x 2 x 2 metres in size it is possible to show many aspects of its metabolism. I have a model of this at the University of Aston in Birmingham.

Demonstration 3 (on Saturday only): Ian Rhodes – CEO McLaren Applied Technologies
McLaren Venge bike

Poster 1: Hui Ben – PhD student, Wolfson College, Department of Architecture
Domestic comfort and energy efficiency: a socio-technical approach
This study examines occupant comfort and domestic energy efficiency in the UK. More specifically, it presents a Socio-Technical System (STS) approach to compare occupant heating behaviour and thermal comfort at home. The domestic sector accounts for nearly one third of total UK energy use, and building energy demand per household in this sector remains flat despite large increases in energy efficiency. The main reason may lie in

occupants' increased level of comfort. The research utilises a user-centred approach based on practice theory within the sociotechnical system to analyse empirical evidence from fourteen households living in Cambridge, UK. Adopting a socio-technical approach, the paper uses both qualitative and quantitative methods to collect household data on comfort and energy consumption patterns, utilising a series of observations, photo records, diary records, data logger monitoring, questionnaire surveys and interviews. The results show significant gap between heating behaviour and thermal comfort, and that the provision of heating does not necessarily lead to thermal comfort. An analysis using STS identifies the gap with the elements of technology, occupant, activity, composition, in the understanding of thermal comfort with respect to home performance. It identifies the parameters for the development of energy efficient technologies and policy to increase both occupant comfort and energy saving at home.

Poster 2: Johanna Lukate – PhD student, Wolfson College, Department of Psychology

Exploring social representations of natural hair using Instagram hashtags

"*I am overdetermined from the outside. I am a slave not to the "idea" others have of me, but to my appearance.*" Fanon

Skin and hair are bodily signifiers of race. However, hair unlike skin is an easily alterable signifier. As a result, black and mixed-race women invest a lot of time and money in their hair. I use a recent trend towards natural hair to investigate identity construction in black and mixed-race women in the United Kingdom and Germany. Moreover, I am interested in how hair styling practices influence social representations of hair, beauty and femininity. Triangulation of methods, including interviews, participant observation and a social media analysis is used to provide a comprehensive understanding of the phenomenon investigated. In this poster, I will present results from an analysis of Instagram hashtags that illustrates how we can use social media data to investigate social representations. The analysis treats hashtags such as #naturalhair, #naturalhairjourney and #naturalhairsistas as a vector for social representations of natural hair. By using information on the date (DD/MM/YEAR) and geo location of each positing I show how the frequency and spread of particular hashtags change over time and space. The relevance of such an analysis, for the study of social representations in general and social representations of natural hair in particular, is discussed.

Poster 3: Joachim Dias – PhD student, Wolfson College, Department of Materials

Novel hydrogen-resistant bainitic steel for oil and gas applications

This project aims at designing a new hydrogen-resistant bainitic steel for application in the oil and gas industries. Steels for this purpose have historically been martensitic, using quenching and tempering heat treatments. The limits of the mechanical properties of such alloys are almost attained and because of the maturity of the field, small improvements tend to require a lot of effort. The corrosion resistance of such alloys has also limited the exploitation of wells with extreme corrosive environments. This has led to a desire of either changing the nature of the steel or changing material for this application.

Poster 4: Dr Gisela Redondo-Sama – Research Associate, Wolfson College, Faculty of Education

Teachers as agents of change: contributions from educational leadership

The impact of leadership in school improvement is emerging as a key issue in the field of educational leadership. In the light of this, the European Commission has funded the TEACH-IN project. The main objective of the research is to increase our understanding of teacher leadership and how it can be developed in secondary schools and communities in ways that support school improvement and social transformation. The analysis of teacher leadership and strategies that involve families and the wider community are at the core of this initiative. The research draws on the experience of the HertsCam Network which supports teachers as agents of change and the INCLUD-ED project which identified 'successful educational actions' that contributed to school improvement and social inclusion. An approach to teacher leadership that enables the creation of spaces of dialogue for teachers to interact with the community is presented.

Poster 5: Dr Helen Chappell – Research Associate, Wolfson College, MRC Human Nutrition Research Unit

Computational Modelling of the Structure and Stability of Endogenous Intestinal Nanomineral

Amorphous magnesium-substituted calcium phosphate (AMCP) nanoparticles have been shown to form in the human intestinal lumen, trapping organic molecules within their structure for subsequent delivery to antigen presenting cells of the mucosa. To understand the atomic-level structure of these nanoparticles, computational modelling, using first principles methods, was undertaken. An idealised AMCP precursor cluster, commonly considered to be the basic building block of crystalline calcium phosphates, was simulated followed by more complex models incorporating the experimentally measured chemical composition of laboratory-produced intestinal nanomineral mimetic. Magnesium was shown to play a key role in the stabilisation of the cluster as an amorphous entity, preventing crystallisation. The most energetically favourable geometry has magnesium

ions at the centre of calcium phosphate cages. These results show the first stages of particle formation and provide an explanation of how amorphous calcium phosphate can remain sufficiently stable under intestinal conditions, prior to intracellular lysosomal dissolution. In future work, the structure of precursor aggregates will be modelled to explore particle nucleation around organic moieties and thus, the phenomenon of 'cargo incorporation'.

Poster 6: Nele Dieckmann – PhD student, Wolfson College, Cambridge Institute for Medical Research

On Target: How Killer T-cells use sophisticated protein machinery to protect us from infection

Cytotoxic T-lymphocytes (CTLs) are white blood cells in the human immune system that eliminate virally infected and tumour cells. CTLs kill by delivering a cocktail of toxic substances that rapidly triggers a self-destruction programme (apoptosis) in the target cell. The toxic substances are contained in lysosomes, membrane-coated vesicles that fuse with the plasma membrane of the T-cell to release their contents onto the target. Cargo release must be tightly controlled and only occurs once a tightly sealed interface known as the 'Immune Synapse' is established between a T-cell and its target.

Precise delivery of toxic cargo to this interface requires complex machinery. The study of the immunodeficiency condition Familial Haemophagocytic Lymphohistiocytosis (FHL) identified several proteins that are essential for CTL killing. Mutations in the Sec/Munc protein Munc18-2 and its binding partner the SNARE protein Syntaxin11 (Stx11), have been shown to cause FHL type 5 and 4 respectively. A key question that remains to be answered is how Munc18-2 and Stx11 function in secretion. Knowledge of where the two proteins localise in CTLs can give important clues to answer this question. I have used newly available antibody probes to investigate the localisation of Munc18-2 and Syntaxin11 in human CTLs.

Poster 7: Dr Luca Lotta – Junior Research Fellow, Wolfson College, MRC Epidemiology Unit

Definitions of metabolic health and prediction of future type 2 diabetes: a systematic review and meta-analysis

Background: Various definitions of the level of metabolic health have been proposed for the identification of individuals at high risk for type 2 diabetes, a common metabolic disease and major cardiovascular risk factor. However, the relevance of these definitions to the prediction of future type 2 diabetes has not been assessed.

Methods: We sought to assess the predictive relevance of metabolic health definitions by systematically reviewing existing literature and pooling evidence from different studies with the use of quantitative meta-analysis methods.

Results: We reviewed 3122 MEDLINE records and pooled evidence from 14 cohort studies. In a meta-analysis of 140,845 participants, being classified as metabolically unhealthy was associated with increased relative risk of type 2 diabetes in lean, overweight and obese individuals (relative risk compared with healthy individuals [95% confidence interval, CI]: lean individuals, 4.0 [3.0 – 5.1]; overweight individuals, 3.4 [2.8 – 4.3]; obese individuals, 2.5 [2.1 – 3.0]). However, definitions of metabolic health had a predictive performance opposite to the desirable, with high specificity but low sensitivity in lean individuals and satisfactory sensitivity but low specificity in obese individuals.

Conclusions: Current binary definitions of metabolic health have limited relevance to the prediction of future type 2 diabetes.

Poster 8: Laura Tan – Wolfson alumna, Disability Support, University of Cambridge & Associate Lecturer, Open University

'Working on Work Skills: A documentary analysis of teaching resources on a Level 1 course in Psychology – evaluating how to improve how embedded employability skills might be taught'

It is often reported that gaining employment is the primary motivation for committing to study at higher education rather than subject knowledge. However, the way in which employability skills should be delivered within the university curriculum, either as embedded or as 'bolt-on' and by higher education staff or external organisations/future employers is a contentious issue which continues to fuel debate. The issue surrounding embedded employability skills has attracted debate due to problems with accurately being able to separate skills (which can be taught and learnt) with an individual's own attributes (which are seen as fixed). Traditionally, stakeholders such as employers or graduates who are already in the workforce have been surveyed about the 'contested curriculum', however, far fewer have carried out action research with undergraduates themselves. To find out more about how an Associate Lecturer could facilitate embedded employability skills in online and distance education, a documentary analysis of teaching resources from a Level 1 course in Psychology was undertaken to assess how these could be improved in the future. The implications of this Practitioner Inquiry may serve to assist others in similar roles in supporting adults develop transferrable skills for the workforce.

Poster 9 (on Saturday only): Dr Richard Bramwell – Research Associate, Wolfson College, Institute of Criminology

UK Hip-Hop, Grime and the City: The Aesthetics and Ethics of London's Rap Scenes

Young people in London have contributed to the production of a distinctively British rap culture. This poster moves beyond accounts of Hip-Hop's marginality and highlights, how this cultural form plays an important role in the everyday lives of young Londoners and the formation of identities. Based on in-depth interviews with a range of leading and emerging rap artists, close analysis of rap music tracks, and over two years of ethnographic research of London's UK Hip-Hop and Grime scenes, the poster examines how black and white, working-class, youths to come together to produce these politically significant subcultures, through which they resist unfair and illegitimate policing practices and attempt to develop their economic autonomy in a city marred by immense social and economic inequalities.

Poster 10: Amanda O'Shea – PhD student, Wolfson College, Faculty of Education

Assessment for learning in mathematics and the development of autonomy for 9-10 Year old pupils

This research is an exploratory study of teachers' conceptions and classroom practices in assessment for learning. In this inquiry, assessment for learning is taken as necessarily involving pupils in order to understand and reflect upon their own achievements. This study further explores the development of learner autonomy.

The research design employs an interpretivist methodology with multiple case studies focused on mathematics lessons in four case classrooms of pupils aged 9-10. Semi-structured interviews, questionnaires and observations of the participants, give a rich understanding of how assessment for learning is conceptualised, practised and developed in terms of autonomy for each case.

Indications are that conceptions of assessment for learning espoused by the teachers were reflected in their understanding of their roles, responsibilities and their classroom practices. The use of dialogue and inquiry were important indicators of control in learning for the children. Such experiences of talk and control were also crucial to the learners' perceptions of their own roles, responsibilities and personal autonomy. A typology of assessment for learning classrooms is suggested. There are important implications for policy in the need to focus assessment for learning on the analysis of achievement rather than the provision of evidence for measurement of learning.

Poster 11: Dr Rocío García-Carrión – Junior Research Fellow, Wolfson College, Faculty of Education

Exploring inclusive epistemic climates in primary classrooms through Interactive Groups and Dialogic Literary Gatherings

Pedagogical practices used by teachers in the classroom play a crucial role in nurturing or neglecting cognitive, emotional, social and epistemological development. Despite the 'recitation' mode is still predominant in classroom talk, increasing empirical evidence reveal the potential of dialogic teaching and learning to develop students' higher order thinking when asking questions, exploring ideas or expressing understanding. This poster presents the impact of two particular interventions, which are referred to as Interactive Groups and Dialogic Literary Gatherings, in culturally and linguistically diverse primary classrooms in Spain and in rural schools in England. Our question referred to whether these interventions can create affordances for children to acquire and justify knowledge, to share their beliefs and funds of knowledge, thus unveiling new knowledge and advancing their epistemological development. Data show changes over time (pre-post covering a six month period). Participants are children aged 10-11 years (n=109). Children and teachers were interviewed about their epistemic beliefs, teaching and learning practices in each school. This research is part of the EU-funded research project Children's Personal Epistemologies: capitalizing on children's and families' knowledge in schools towards effective teaching and learning (ChiPE) (European Commission, Marie Curie Actions, FP7).

Poster 12 (on Saturday only): Andy Walker – McLaren Applied Technologies