



Clare Research Symposium

17th March 2011

www.clareresearch.com - symposium@clare.cac.uk

Finalised Schedule 12/3/11

8:30

Registration Opens

9:00 – Opening address by Master

9:10 - 11:25

Panel 1: Medical Science 9:10-9:55.

Chair – Dr. Rob Semple

Dr. Marina Minic,

Investigation of a Syndrome of Severe Insulin-Independent Hypoglycaemia and Overgrowth

Rhian Holvey,

Using Fragments to TPX Out Cancer: Designing TPX2-Importin- α Inhibitors To Interfere With Cell Division.

Dr. Lucy Yang,

Thrombin Generation predicts post-operative bleeding

Panel 2: Literature 9:55-10:40

Chair – Prof. Philip Ford

Keating McKeon,

Power to the Poet: An Apollonian Reading of Callimachus' "Hymn to Zeus"

Dr. Emma Gatland,

The Representation of Women in Medieval Spanish Literature

David Porter,

Meaning and Obscenity in Neo-Latin Satire

Panel 3: Perception Knowledge and Philosophy 10:40-11:25.

Chair – Dr. Patricia Fara

Michael Philo,

Talking Origins: A Study of People's Understanding of Human Evolution

Dave Neale,

The Narrative Thinker: Stories and Cognitive Development

Jonathan Birch,

Is the Concept of Life Response-Dependent?

11:25-11:40

Tea Break

Panel 4: Biological Sciences 11:40 – 12:25

Chair – Prof. Nicky Clayton

Tom Flower,

Deceptive Strategies of the fork-tailed drongo

Eleanor Raffan,

Longer, Faster, Quicker: new DNA sequencing techniques reach the clinic

Mark Chonofsky,

The SOWH test: simulation assessment and a new alternative

Panel 5: Music 12:25 – 13:10

Chair – Dr. Gregory Seach

Thomas Neal,

Palestrina in the 'twilight of the renaissance': exploring the evolution of his polychoral motets

Scott Whittaker,

Concatenative synthesis: a new technique for computer music

Jeremy Coleman,

The Transmission and Reception of Boethius' 'de institutione musica' in Medieval England

13:10-14:00

Lunch and Posters

14:00 – 14:50

Keynote Address – Professor Roel Sterckx, introduced by Patricia Fara,

A marketplace of ideas: perceptions of wealth and poverty in traditional Chinese thought.

3:00 – 4:30

Panel 6: Ancient History/Archeology

Chair – Prof. Paul Cartledge

Jared J. Eddy,

Osteoarcheological and Biomedical Evidence of Tuberculosis in the Roman Empire

Nick Soderberg,

Building a Minoan tale

Jamie Hampson,

Images of Power: rock art and indigenous archeology in southern Africa and beyond

Panel 7: Neuroscience

Chair – Dr. Richard Dyball

Alex Clarke,

The Evolution of Meaning: Time Slices through visual object recognition

Dr Li Su,

Brain Control: Science Fiction or Reality?

John Griffiths,

Studying the ageing Brain with multimodal neuroimaging

4:30-4:50

Tea Break

4:50-6:20

Panel 8: Modern History

Chair – Prof. Tony Badger

Dr. Hester Vaizey,

Surviving Hitler's War: Exploring the emotional impact of the Second World War

Andrew Pinnington,

Why do likely losers win 'unwinnable' elections: the cases of Harry S. Truman and Paul Keating

Thomas Keane,

The Institute for the Harmonious Development of Man: the English and American Pupils of Gurdjieff at Fontainebleau, France, 1922-1926.

Panel 9: Physical Sciences

Chair – Dr. Meera Parish

John Tarasewicz,

Using micro-earthquakes to track magma movement under Eyjafjallajökull volcano, Iceland

Andrew Haines,

Fantastic Plastic: Polymer Opals

Ben Deadman,

Flow Chemistry and its Place in the Modern Chemists' Tool Box

6:20

Closing of Symposium by the Senior Tutor, Dr. Patricia Fara

Clare Research Symposium – Abstract Booklet

Session 1 – Medical Sciences

Dr. Marina Minic – PhD Clinical Biochemistry

Investigation of a Syndrome of Severe Insulin-independent Blood Glucose Suppression and Overgrowth

Hormones are our body's chemical messengers, transporting signals from one cell to another. They act by binding to receptors on the surface of a target cell and triggering an intracellular cascade of reactions that ultimately leads to a specific response. Insulin, for example, is secreted by the pancreas and plays a key role in lowering blood glucose levels, by regulating its absorption, production and metabolism.

I have been studying four patients with severely low blood glucose levels in the fasting state, leading to seizures and sometimes unconsciousness. Their symptoms suggest that they have high levels of insulin activity; surprisingly, however, insulin levels in the blood were undetectable. In other words, each patient had evidence that the insulin signal in their tissues was stuck in an “on” position. By simultaneously sequencing all of their genes, we have discovered a previously unknown mutation in three of the patients, in a gene coding for a critical component of insulin's signaling cascade, AKT2.

Studies to date have shown that the mutant AKT2 molecule is indeed inappropriately located within cells, and permanently “on” despite the lack of insulin. These abnormalities can be corrected by a drug that inhibits AKT2 activity (currently under development for cancer treatment), offering potential treatment for these patients. In summary, my studies have uncovered the cause of an entirely novel form of severe human blood glucose suppression, and suggest an avenue for rational development of potential treatments.

Rhian Holvey – PhD Cancer Medicinal Chemistry

Using Fragments to TPX Out Cancer: Designing TPX2-Importin- α Inhibitors To Interfere With Cell Division.

The machinery of cell division, mitosis, is the mitotic spindle, a series of ordered protein filaments that pull the chromosomes apart. TPX2 is a crucial protein in the formation of this network. Its activity is inhibited by another protein, importin- α , until it is in the vicinity of the chromosomes where it is released, resulting in regulated assembly of the spindle and successful mitosis. It is our hypothesis that inhibition of this interaction would release TPX2 in other regions, prompting uncontrolled spindle assembly and disrupting mitosis. Due to the high amounts of TPX2 in many cancers (including non-small lung, prostate and pancreatic cancers) this target has the potential to be more selective than the current anti-mitotic method of targeting the spindle directly.

I am using the fragment-based approach to develop an inhibitor for the TPX2-binding region of importin- α . This relies on screening a collection of small organic molecules with a suite of biophysical techniques (such as NMR and X-ray crystallography) to identify initial binders and develop them into more potent and selective inhibitors. Such a process has several advantages, including the potential to avoid disrupting the other key functions of importin- α .

Dr. Lucy Yang - MPhil Translational Medicine and Therapeutics

Thrombin generation predicts post-operative bleeding

Introduction

Bleeding following cardiopulmonary bypass (CPB) surgery is a major cause of morbidity and mortality. Bleeding places a major drain on blood components. Transfusion of blood components carries risks of adverse events. A test that predicts excessive bleeding post surgery would allow more prompt planning of appropriate usage of blood components.

Current concepts of haemostasis highlight the importance of thrombin generation (TG). The rate and total amount of thrombin generated can be measured using the calibrated automated thrombography (CAT). Standard haemostatic tests like prothrombin time (PT) and activated partial thromboplastin time (aPTT) are poor predictors of bleeding during invasive procedures. Our hypothesis was that TG is a better predictor of post operative bleeding as it better reflects the physiological haemostatic pathway.

Method

With ethical approval, 77 patients were recruited. Standard tests (PT, aPTT, coagulation factor levels) and CAT were measured pre and post CPB surgery. Post operative blood loss were measured as drain losses.

Results

The 22 patients who bled more than 1L were compared to the 55 who bled less than 1L. Post operative rate and amount of TG were both reduced in patients who bled more than 1L. Post operative aPTT was prolonged in patients who bled more than 1L. Pre-operative rate and amount of TG were both reduced in patients who bled more than 1L. ROC analysis showed that pre operative and post operative thrombin generation were potentially useful predictors of bleeding within 24 hours post CPB.

Session 2 – Literature

Keating McKeon – BA Classics

Power to the Poet: An Apollonian Reading of Callimachus' "Hymn to Zeus"

With his "Hymn to Apollo," Callimachus acts as more than just the author: he becomes both cult leader and choral director, presiding over the god's worship while establishing himself as the direct recipient of Apollo's patronage. Callimachus cloaks their relationship in religious trappings, but uses the hymn as a means of extolling his own brand of aesthetics, employing the language of ritual to attack and exclude his literary critics. So close is the identification between Apollo and Callimachus that the god appears at the hymn's end to personally defend Callimachean poetics. The authority of Apollo and Callimachus is unassailable. It is surprising, then, to read Callimachus' "Hymn to Zeus" only to find the poet and his patron subservient to kingly authority and its sponsor, Zeus. Callimachus seems to have relegated himself and Apollo to a decidedly lesser rank.

This paper proposes that such deference on the part of Callimachus is highly unlikely. In light of the elitism evinced elsewhere by the poet, this paper suggests an alternative, "Apollonian" reading of the "Hymn to Zeus": when viewed through the lens of the "Hymn to Apollo," it becomes clear that the "Hymn to Zeus" is not the submissive work that it first appears to be. Callimachus has, in fact, presented a subtle challenge to the authority of Zeus and his kings, showing it to be reliant upon Apollo and, by analogy, himself.

Dr. Emma Gatland – CRA

The Representation of Women in Medieval Spanish Literature

My PhD and first postdoctoral project focused on the representation of female saints in late-medieval Spanish versions of Jacobus de Voragine's Golden Legend. Female saints are often categorized according to type (virgin martyr, penitent prostitute, or transvestite saint), yet it became apparent throughout the course of these projects that it is in the passage (mediation, transition, conversion) between contradictions that women's identity and her position in the social order become most effectively dramatized. In this talk, I shall outline some of the key points of these projects, and show how their findings have led me to ask a series of broad ideological questions that form the basis of my current Leverhulme project: Women and Transition in Medieval Spanish Literature.

David Porter - PhD Neo-Latin

Meaning and Obscenity in Neo-Latin Satire

My research centres on sixteenth-century satire written in Latin, with nods to literature in European vernacular languages. Although sixteenth-century satirists found their inspiration in the Roman poets, their ancient models set an ambiguous example of what truly is meant by 'satire'. This critical ambiguity allowed Renaissance satirists to reshape the genre for their own purposes. I will discuss how Renaissance poets recreated satire within their own literary and political context and answer how this affects a broader understanding of what satire, in any age, is. In addition, I will address how the choice of Latin over vernacular languages affected the intellectual critique of politics, religion and social order in the Renaissance, and then opening this to a broader context, explain why the study of Latin matters for understanding intellectual currents and the commerce of ideas in the early modern period.

Session 3 – Perception, Knowledge and Philosophy

Michael Philo - BA Archaeology and Anthropology

Talking Origins: A study of the public understanding of human evolution

This project aims to discern how much the public understand about human evolution, delineate what factors influence their understanding most significantly and whether this knowledge differs in different countries. The two populations studied are inhabitants of Lodwar, a town in North-West Kenya and Cambridge. The study focuses in on two potential sources of human evolution knowledge; museums and primary school education. Using questionnaire testimonies from a cohort of adults and a cohort of children within each area of study, Talking Origins explores whether the English population exposed to multiple museums, a stringent but limited curriculum and a wide ranging popular media results in a better understanding of issues in human evolution than those in Kenya, limited in formal education institutions highlighted above, but exposed to Human evolution through their everyday surroundings and national heritage. The project intends to show that human evolution is an underrepresented subject worldwide and more concrete attempts to integrate it into the understanding of the public could easily, and should be made.

Dave Neale – MEd Psychology & Education

The Narrative Thinker: Stories and Cognitive Development

Sociocultural theory claims that the voluntary control of cognition in humans depends on the internalisation of symbolic systems, such as gesture, iconography and language. From this perspective the way an individual thinks about an activity reflects the way that the activity has been constructed and described socially, so even apparently solo tasks have a significant 'social' element. My research consists of an investigation into how a mother and child co-narrate the experience of a cognitive planning task, and specifically into whether the form this co-narration takes relates to the way the child performed on the task. In my presentation I will contextualise my research with a discussion of sociocultural theory and cognitive development, and conclude with some broader considerations of how sociocultural research can contribute to our understanding of what it is to be human.

Jonathan Birch – PhD Philosophy of Science

Is the concept of life response-dependent?

Six decades after Schrödinger, we still have no general account of the nature of life. For most biologists, this is not a pressing problem. Yet, for the growing number of researchers exploring the possibilities of artificial life, alien life and the origins of life, it could hardly be more urgent. I suggest a novel approach which, as a by-product, explains why the problem has been so intractable for so long. It is uncontroversial that many basic concepts implicate human responses. We call something red because it looks red; we call something sour because it tastes sour. Do we call something living because it looks animate? Drawing on recent work in perceptual and cognitive psychology, I argue that (a) animacy is directly perceived, (b) we grasp the concept of life by learning to discount perceptions of animacy in certain misleading situations, and (c) we thereby come to conceive of life as that property possessed by all and only those objects which look animate in favourable conditions. Because any number of underlying properties may underwrite a disposition to look animate, we can expect no unified account of the nature of life. I close by considering the deflationary (but largely benign) implications of such a view for artificial life, astrobiology and origins of life studies.

Session 4 – Biological Sciences

Tom Flower – PhD Behavioural Ecology

Deceptive strategies of the fork-tailed drongo

Animals commonly deceive each other, but just as in Aesop's fable 'The boy who cried wolf', they cease responding to deceptive signals that are made too frequently. This acts as a constraint on deceptive behaviour, but where species can strategically change their deceptive signal, deception rackets could be maintained. I show that a small bird, the fork-tailed drongo, uses deceptive alarm calls, including the mimicked alarm calls of other species, to scare other animals and steal their food. Furthermore, I demonstrate that the target species are more likely to be deceived by mimicked alarm calls than drongo-specific alarm calls, and that by employing vocal mimicry to vary their false alarm calls, drongos could maintain deception when targets cease responding to the drongo's own alarm calls. This work illustrates the sophisticated strategies employed by animals in deceptive communication and provides evidence of function for vocal mimicry, a common but little understood behaviour.

Eleanor Raffan – PhD Clinical Biochemistry

Longer, faster, quicker – new DNA sequencing techniques reach the clinic

DNA contains the information for building and maintaining our bodies, stored as a 3 billion letter long code. 99.9% of our DNA is identical to other humans'; the remaining 0.1% results in much of the difference between us. Many diseases are caused by a single mutation in a single gene. Until now, finding those mutations relied upon making informed guesses about the genes involved and sequencing them, taking on average a week per gene. New next-generation sequencing methods allow all 25,000 genes in the body to be sequence in a matter of days. We used next-generation sequencing to sequence all the genes of a patient with a unique form of diabetes. It revealed she had an unusual manifestation of Werner's syndrome. The diagnosis is important to the patient clinically, and is an example of the future diagnostic potential of this technology.

Mark Chonofsky - BA Natural Sciences

The SOWH test: simulation assessment and a new alternative

Finding the best evolutionary history (or "phylogenetic tree") of a set of organisms is a complex task due to the combinatorial structure of the problem. Small changes in branch pattern can substantially alter how well the tree fits the data. Hence, it is computationally prohibitive to fully describe the distribution of support for trees. Phylogenetic trees are used in taxonomy, epidemiology, and many other fields, so it is important to be able to find the best possible phylogenies.

My work uses computer simulation to assess confidence in phylogenetic trees. Given some data and a single "best" phylogenetic tree, how likely is it that another tree explains the data just as well? I will present new simulation results about model sensitivity in a particular parametric bootstrap test of phylogeny, including an improved method for estimating tree confidence.

Session 5 – Music

Thomas Neal – BA Music

Palestrina in the ‘twilight of the renaissance’: exploring the evolution of his polychoral motets

Palestrina’s motets for eight or twelve voices comprise a significant portion of his output and occupied the last twenty-five years of his life. Yet he is still widely perceived as both monostylistic and an essentially conservative composer, who clung to the dictates of the *prima prattica*. Building on the work of Noel O’Regan and Anthony Carver, in this paper I aim to explore the stylistic origins of Palestrina’s polychoral motets, charting the development from the homophonic and antiphonal writing in his earlier works to the first signs of polychoral writing in the *Motetorum Liber Secundus* (Venice, 1572) and the six ‘mature’ polychoral motets contained in his *Motetorum Liber Tertius* (Venice, 1575). In so doing, I will explore stylistic connections and possible influences within Palestrina’s predecessors and contemporaries, and argue that Palestrina experienced a gradual but fundamental change in his conception of musical expression.

Scott Whittaker – BA Computer Sciences

Concatenative synthesis: a new technique for computer music

The increasing role of electronics in music has led to novel aesthetic possibilities. One of the most interesting of these is the ability to sample, meaning to use previously-recorded audio in new compositions.

Concatenative synthesis is an exciting and powerful technique for automating the process of composing using samples; it creates new sound by joining together numerous small pieces of sound, in a fashion analogous to a photo mosaic. While its use has become common in the area of speech synthesis, its musical possibilities have been less explored, and are ripe for investigation.

This talk will describe my final-year project, an system to perform musical concatenative synthesis, and discuss some of the musical history and technical theory behind its implementation.

Jeremy Coleman – MPhil Musicology

The Transmission and Reception of Boethius' "de institutione musica" in Medieval England

Boethius' "de institutione musica" was the most widely and numerously disseminated music-theoretical treatise in Medieval Europe. Anicius Manlius Severinus Boethius (ca.480-ca.524) was, besides Martianus Capella, the most comprehensive auctoritas on ancient Greek music theory in the late Roman Empire, and his translation into Latin of various ancient Greek texts would provide the basis for the liberal arts education 300-400 years later. While the revival of Boethian music theory as part of the 9th-century Carolingian renaissance has been relatively well researched, the earliest reception of the text in England (10th-12th centuries) has until now been neglected in scholarship. I shall consider patterns of textual transmission, focusing in particular on monastic centres such as Christ Church, Canterbury. By examining the evidence of the manuscript sources, moreover, I hope to suggest how Boethius' treatise was copied, read, and understood by Medieval English monks and others.

Keynote Address

Professor Roel Sterckx – Joseph Needham Professor of Chinese History, Science and Civilisation

A marketplace of ideas: perceptions of wealth and poverty in traditional Chinese thought.

A great deal of public discourse in today's China is focused on the impact of modernisation and economic growth on social structures such as the family, the education system and, generally, the moral values that underpin civil society. China's move from a command economy to a market based economy and from a predominantly agricultural society to an increasingly urban, industrial one, has, according to some, resulted in a shift from shared poverty to uneven wealth. Such debates on justified wealth creation, the balance between agriculture and trade, and the role of the market as a social institution, however, are not new. In fact they were a central topic for discussion among Chinese thinkers as early as Confucius (551-479 BCE). This talk will trace the contours of the main debates on wealth and poverty in pre-modern China and offer some thoughts on why they are revived in China today.

Session 6 – Ancient History/Archaeology

Jared Eddy – PhD Classics

Osteoarchaeological and Biomolecular Evidence for Tuberculosis in the Roman Empire

In the past few decades scholars began highlighting the role played by infectious diseases in shaping ancient history. But this took the form of speculation on particular large-scale epidemics whose causative microorganisms remained unknown. Recently, the allying of archaeology and molecular biology has begun a revolution in the study of ancient infectious diseases. This has provided material evidence for endemic diseases like tuberculosis, suggesting that it may have indeed been as great a problem in the Roman Empire as it is in the modern one. But these methods have inherent limitations, leaving us to wonder how far the new evidence can be trusted.

Nick Soderberg - PhD Classics

Building a Minoan tale

My PhD research is rather broad, using architectural evidence to add to our understanding of the multiple processes which led to the emergence of a unique culture on Middle Bronze Age Crete (Minoan palatial society is typically said to have existed from ca 1900 BC to 1400 BC). In order to make the most of the opportunity to address a multidisciplinary audience, I shall rehearse neither the various elements of human decision-making that may be crystallised in the architectural environment nor the unfolding spatial and chronological patterns in those decisions, although it is this data I am primarily gathering at present. Rather I shall take a single example from the very end of my period of interest in order to show how, through contextual analysis, archaeologists may be able to piece together an account of the past which extends not only to the functions of a given built space but even, in very fortunate circumstances, to the lives (and deaths) of a small group of individuals some 4000 years ago.

Jamie Hampson – PhD Archaeology

Images of Power: Rock art and indigenous archaeology in southern Africa and beyond

Recent anthropological and archaeological approaches to rock art have taught us much about the meaning of the images; we need no longer 'gaze and guess'. In many countries, cultural identity is shaped, manipulated, and presented to the public through rock art. In this talk, I present results from fieldwork in southern Africa, northern Australia, and west Texas. I focus on innovative new visitor centres concerned with conservation, promoting 'community archaeology', and – above all – challenging visitors' preconceptions of rock art and of the indigenous peoples who made it.

Session 7 – Neuroscience

Alex Clarke - PhD Experimental Psychology

The evolution of meaning: Time slices through visual object recognition

Humans can recognize tens of thousands of objects with incredible speed and accuracy. Although this feat is subjectively instantaneous, a series of dynamic interactions between multiple brain regions are thought to underpin our ability to recognise objects in the world. Critical for such recognition processes is that meaningful information can be rapidly extracted from our visual perceptions. The neural activity from different brain regions, specifically those in the occipital and temporal lobes, are known to reflect different perceptual and semantic attributes of objects. However, little is known about how meaning emerges from perceptual inputs. I will present a series of experiments using time-sensitive neuroimaging that show initial perceptual inputs are processed in occipital regions before coarse semantic knowledge is activated within 200 ms. Subsequently, after 200 ms specific semantic information about objects is processed, while this transition from general to specific semantic information is underpinned by dynamic interactions between anterior and posterior temporal regions. These experiments converge to support a theory where meaning emerges from a coarse to fine-grained state over time and is underpinned by cortical interactions within 500 ms.

Dr. Li Su – CRA

Brain Control: Reality or Science Fiction?

The brain is one of most complex systems in the world. It is made up of about 100 billion nerve cells or neurons. For centuries, humans are fascinated by how the brain works. Also, being able to control the mind at will has been seen in many science fiction films and books. Interestingly, there are far more horror films than comedies that contain some forms of mind or brain control. Despite of the worry, terror and controversies over brain control, science and technology have developed rapidly. For example, in the last few decades, scientists are able to see how the brain works in real time by measuring either the electrical impulse the neurons emit or the blood flow in the brain. In particular, recent developments in functional magnetic resonance imaging (fMRI) and computational methods allow very rapid data transfer and analysis within a few seconds of data collection. I am going to introduce a novel brain machine interface based on such real time fMRI technology and show how it can be used for neurofeedback. This nonpharmacological therapy has already been shown to have clinical promise. Studies from healthy controls suggest the right anterior insula (a part of human brain that is implicated in affective processing, and is hypoactive in some psychiatric conditions) is amenable to regulation. Hence, this new technology may potentially turn brain control from science fiction into reality.

John Griffiths - PhD Cognitive Neuroscience

Studying the ageing brain with multimodal neuroimaging

The scientific study of the ageing process has been placed high on the agenda in this and many other developed countries – a response to the significant economic challenges presented by a rapidly ageing population. The brain is a key battleground in this endeavour, since it is here that the cellular and physiological effects of senescence translate into the cognitive infirmity that typically accompanies advanced age. Cognitive faculties such as language and memory are dependent on dynamic patterns of information flow within multiple distributed brain networks, and the primary target of age-related tissue degeneration is the 'wiring' of these networks. The task for the scientist studying ageing is therefore to measure, and elucidate the relationships between, tissue structure, tissue function (network dynamics), and cognitive abilities. In this talk I will illustrate how modern imaging methods, supplemented with appropriate biophysical models, make this a tractable (if challenging) research agenda.

Session 8 – Modern History

Dr. Hester Vaizey - CRA

Surviving Hitler's War: Exploring the emotional impact of the Second World War.

This talk will examine the impact of World War Two on marriages in Germany. It will ask if wartime circumstances could reaffirm and strengthen emotional bonds within the context of the threat of losing one's loved ones. Historical analysis to date suggests that separations often led to estrangement and a difficult period of re-adjustment post-reunion. However, quoting from numerous letters sent between husbands and wives in wartime, this talk will show that the chaotic and often life-threatening reality reinforced the desirability of the private sphere.

Andrew Pinnington - BA PPS

Why do likely losers win "unwinnable" elections: the cases of Harry S. Truman and Paul Keating

Some of the most dramatic and resonating political images of the past century have been created by likely losers winning "unwinnable" elections. The Australian Labor Party's triumphant victory in 1993 in which its leader, Paul Keating, praised its "true believers" can perhaps only be overshadowed by Harry Truman's unbridled delight whilst holding aloft the erroneous Chicago Tribune headline which had claimed "Dewey Defeats Truman" in 1948. Remarkably, there has been little academic focus on this particular electoral phenomenon.

This presentation will identify the decisive factors behind the victories of Truman and Keating and show how this compound of personality, rhetoric and policies can illuminate our understanding of why likely losers can win "unwinnable" elections. Whilst clear steps need to be taken by underdog candidates to give themselves any hope of triumph, this presentation will also demonstrate the importance of factors beyond their control to their electoral fate.

Thomas Keane – BA History

The Institute for the Harmonious Development of Man: the English and American Pupils of Gurdjieff at Fontainebleau, France, 1922-1926.

The guru-mystic G.I. Gurdjieff and his 1920s Institute for the Harmonious Development of Man has long been the subject of controversy. While Gurdjieff's appeal was, and is, popularly dismissed as a sinister feat of personal magnetism or even of hypnosis, his pupils – many of them notable members of the Modernist avant-garde, or of the political and scientific communities of their era – proclaimed him to be 'a messiah in the true sense of the word', a custodian of the esoteric knowledge of the East. This study asks what was at the root of Gurdjieff's appeal for his English and American pupils by identifying and examining a climate of advanced disillusionment in the post-war West. This, it seems, was not a teaching for the weak-willed but the provider of answers to those desirous of a holistic explanation yet determinedly unwilling to have the wool pulled over their eyes.

Session 9 – Physical Sciences

John Tarasewicz – PhD Earth Sciences

Using micro-earthquakes to track magma movement under Eyjafjallajökull volcano, Iceland

The eruption of the Eyjafjallajökull volcano in Iceland in April 2010 disrupted European airspace for weeks and received widespread media coverage. This study uses the micro-earthquakes generated as magma moved through the Earth's crust before and during this eruption to elucidate the magma plumbing system beneath the volcano. The main explosive eruption started on April 14th and was preceded by a fissure eruption on the eastern flank of the volcano from March 20th to April 12th. Our results show a complex intrusion pattern at relatively shallow depths (3-6km) prior to the first eruption as well as rare seismic evidence for injections of fresh magma into the system from much greater depth (>20km) during the main explosive eruption phase.

Andrew Haines - PhD Physics

Fantastic plastic: polymer opals

Photonic crystals are engineered on the nanometre scale to interact with light in interesting ways. Such materials have applications in telecommunications, display technologies and many other areas, as well as being commonly found in nature, where they create iridescent colouring (in butterfly wings, bird feathers, and flower petals, for example).

Polymer opals are a novel type of stretchable photonic crystal, formed by a regular array of plastic spheres mimicking that of the natural gemstone. Their colour is generated by scattering of light, which may be intensified by doping the material with carbon nanoparticles. Stretching distorts the crystal and changes the colour, depending on the direction of stretch.

As well as the angularly-dependent stretch response, light is scattered more strongly in certain directions. Both effects are caused by the arrangement of the spheres, but anisotropic scattering has not been previously observed in similar materials.

Ben Deadman – PhD Chemistry

Flow Chemistry and its Place in the Modern Chemists' Tool Box

Synthetic chemistry, the science of making molecules, has traditionally been carried out in batch fashion. The synthetic chemists in the laboratory have discovered a great host of chemical transformations to create almost any molecule they desire, albeit on a small scale. Turning these molecules into useful drugs, materials, fragrances or other products requires the original process to be scaled up to an industrial process level. This is where batch chemistry often falls down. As reactor volumes get larger it becomes more difficult to efficiently mix chemicals, distribute heat and control the reaction. Many chemical transformations which are considered routine on a laboratory scale are avoided in industry due to the toxic, explosive or generally hazardous conditions, reagents or intermediates. This often requires the total redesign of synthetic routes to make them amenable to process scales.

Continuous flow processing offers an alternative approach to the synthesis of useful molecules. By continuously combining reagents in small tubular reactors, efficient mixing and heat distribution can be maintained during the scale up of a reaction. Carefully designed flow processes can also be used to form hazardous intermediates and then immediately use them without requiring their isolation. In this way the hazardous component is only ever present at small levels, even in a process scale reaction. It is these benefits and more which are making continuous flow processing an increasingly important part of the synthetic chemists' toolkit.