Clare Research Symposium

15 March 2012

Gillespie Centre, Clare College, Cambridge

Clare Research Symposium

15th March 2012

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

9.00 – Registration opens, Gillespie Centre

9.10 – Opening address by the Acting Master, Professor Paul Cartledge, Riley Auditorium

9.20-10.50 – Talks

Panel 1: 9.20-10.05 – Classics and Archeology
Chair: Professor Paul Cartledge
Dr. Gauthier Grousset, *The Negro head-vases in ancient Greece: shapes and uses*
Dr. Jamie Hampson, *Rock art and ritual from the Pleistocene to the present in the Kurnool District, India*
Nick Soderberg, *"Bronze Age Crete in Context"*

Panel 2: 10.05-10.50 – Materials and structure
Chair: Dr. Nathan Crilly
Dr. Alex Eggeman, *Diffraction Studies of Disordered Materials*
Dr. Mark Schenk, *The Art and engineering of Origami*
Daniel Weatherill, *Vibrational spectroscopy of surfaces*

10.50-11.10 Tea break

11.10-12.40 – Talks

Panel 3: 11.10-11.40 - Knowledge and learning
Chair: Dr. Patricia Fara
Katharina T. Kraus, *On the mathematisability of psychology according to Kant*
Charlie Williams, *A Digital Game-Based Model for Learning Musicality*

Panel 4: 11.40-12.40 – Health
Chair: Dr. Andrew Carter
Dr. Stephen Burgess, *"A few causal remarks about your health"*
Moos Peeters, *Semantic eye-blink conditioning: a paradigm to test abstract categorization and learning in disorders of consciousness.*
Dr. James Rowe, *Behavioural decisions in health and disease*
Dr Mark Agius & Jenny Gardner, *Studies on Depression Treatment within a Community Mental Health Team Setting*

12.40-1.40 Lunch break and poster session

1.40-3.55, Talks

Panel 5: 1.40-2.40 – Literature and Music
Chair: Dr. Fred Parker
Edward Mills, *"De mon non ne savroiz vos point": identities and roles in two medieval French romances*
Thomas Neal, *The Composer as Exegete: an Intertextual Analysis of Machaut's Motet 21*
Isabella Shaw, *'Within thyself my tunes enclose': character and musical instruments in Sir Philip Sidney's Arcadia*
Tom Taylor, *Dr Johnson's Dictionary and the making of meaning*

Panel 6: 2.40-3.55 – Bio-Chemistry/Computing
Chair: Dr. Simon Buczacki
Mark Chonofsky, *A new clustering algorithm to improve motor protein tracking*
Julia Oswald, *Investigation of neuronal circuits in human cortical neuron cultures*
Joseph Rogers, *Protein Disorder in biology*
Christopher Thompson-Walsh, *Coping with Complexity: Computer Modelling of Biochemical Networks*
Liang Wu, *Targeting 'junk' RNA*

3.55-4.15 Tea break

Panel 7: 4.15-5.15 – History *** Elton-Bowring Room ***
Chair: Dr. Michele Gemelos
Gabriel Byng, *Building the Impossible: Parish church construction during the long thirteenth century*
Dr. Elaine Leong, *Tweaking as Creating: Recipes and Knowledge Production in Early Modern England*
Katie Renaud, *Britain and Refugee Intellectuals from Nazi Europe: an International Comparison*
Dr. Hester Vaizey, *Conversations from beyond the Berlin Wall*

Panel 8: 5.30-6.15 Ethics and Law *** Latimer Room ***
Chair: Dr. Douglas Hedley
Marco Andreacchio, *'Botticelli's Critique of Theocracy'*
Teale Phelps Bondaroff, *Green Pirates? The Strategic Use of International Waters and Law Through the use of Direct Action by the Sea Shepherd Conservation Society.*
Sara Wharton, *International Criminal Law: The Doctrine of Superior Responsibility as Applied to Non-State Actors*

6.15 – Closing of the symposium by the Senior Tutor, Dr. Patricia Fara

7.00 – Dinner for speakers, Small Hall

Clare Research Symposium - Abstracts

Panel 1: Classics/Archeology

Dr. Gauthier Grousset, Classics Research Associate

The Negro head-vases in ancient Greece: shapes and uses

This paper will examine the so called "head-vases", a combination of a moulded body in the shape of human head added to a wheel-thrown neck. These special vases were produced in Athens mainly between the last quarter of the 6th century and the end of the 5th century BC. Even tough most of them were in the shape of white woman's head, a significant number of Black heads have been identified. By studying their different shapes (kantharos, oenochoe, aryballos, etc.) and uses (during banquets and as perfumes vases), it is possible to form conclusions on the motivation behind the emergence and the development of the Black-head pattern on these plastic models. The focus will be put on the cultural and social significance of these representations, as well as on the technical aspect by identifying the workshops involved in their first productions.

Dr. Jamie Hampson, Archaeology Postdoc

Rock art and ritual from the Pleistocene to the present in the Kurnool District, India

Systematic field survey and excavations in the Kurnool District of India have confirmed the existence of a remarkable archaeological record. One of the key discoveries of the ongoing project - led by Cambridge and Dharwad Universities - has been the region's rich corpus of rock art, some of which is of substantial antiquity. In this talk, I address social, economic and ideological concerns at 60 rock art sites. Rock art research in the Kurnool District has the potential to contribute important information about prehistoric and subsequent transformations in south-central India, allowing us to reassess nuances of Out-of-Africa dispersals and the peopling of the world.

Nick Soderberg, Classics Postgraduate

"Bronze Age Crete in Context"

My research relates to the architectural evidence for Crete's distinctive social trajectory in the Bronze Age. Somewhere in its early history, Crete was set upon a path that led it to become arguably the earliest European instance of a "state" society, combining a monumental canon with institutional complexity and a tantalising, though still inaccessible, use of text. I am using surviving architecture to appraise the role of exotic influence and indigenous evolution in this process, to elucidate regional distinctions with a higher spatial resolution, and to explain the characteristics that make Crete unique amongst its fêted Near Eastern contemporaries. In this presentation I shall briefly review some important elements of this debate and their implications for Crete's role in European prehistory.

Panel 2: Materials and structure

Dr. Alex Eggeman, Materials Science and Metallurgy Research Associate

Diffraction Studies of Disordered Materials

Diffraction is often considered one of the 'solved' problems of science, famously used to determine the double-helix structure of DNA and a huge number of ordered structures since. However this is not the

complete story of the technique, there is just as much information about disorder encoded into diffraction patterns, allowing us a window into the dynamics of atoms and molecules and potentially helping to explain how and why materials undergo phase changes, if we can interpret it correctly. In this talk I will explain the approach I am taking to simulate and quantify the diffraction from disordered materials. Examples of complex oxide materials and novel organic semiconductors will be shown.

Dr. Mark Schenk, Structural Engineering Research Associate

"The art of origami has found its way to many, and often quite surprising, engineering applications. In this talk I will give a brief overview of technical applications of origami, including my PhD research into Folded Shell Structures and current work on deployable structures. I will highlight some work on a novel manufacturing method for folded sheets, where the aluminium sheets were folded using gas pressure."

Daniel Weatherill, Experimental and Theoretical Physics Undergraduate

The study of the structure and dynamics at material surfaces is a highly active and relevant field, with important implications for electronic device design, material property optimisation and catalysis. Over the last few years, the Surfaces, Microstructure and Fracture (SMF) group at the Cavendish laboratory have developed a globally unique surface dynamics measurement instrument, the Helium-3 Spin echo Spectrometer. This can measure dynamic surface effects on the nanometre and picosecond scales, orders of magnitude faster than the standard technique of Helium Atom Scattering. The talk will be a very brief overview of how the instrument works, followed by a summary of my own work this year in characterising and improving parts of its electronic control systems. Some specific open problems which may now be able to be tackled due to the improved sensitivity will be mentioned.

Panel 3: Knowledge and learning

Katharina T. Kraus, History and Philosophy of Science Postgraduate

On the mathematisability of psychology according to Kant

Accounting for psychology within a Kantian philosophy of science is notoriously difficult. In various works, most notably in the *Critique of Pure Reason* and the *Metaphysical Foundations of Natural Science*, Kant criticises the conception of psychology of his contemporaries, particularly of the Wolffian tradition.

One of his arguments against this traditional conception cast doubts on the possibility of mathematizing psychological phenomena. In the *Metaphysical Foundations*, Kant argues as follows. A necessary requirement for a 'science properly so-called' is the mathematical constructability of its concepts. However, mathematics is not applicable to the phenomena of inner sense. Thus, it is doubtful whether psychology, i.e., the science based on the data provided by the inner sense, can ever achieve this status. In consequence, unlike the laws of physics, lawlike relations between psychological phenomena can never be grounded in an *a priori* lawfulness that makes a pure part of psychology possible.

In this presentation, Kant's argument against the mathematizability of psychology is explored in three steps. Firstly, I develop a reading of psychological objects as phenomena of the inner sense, which according to Kant's critical theory yields inner experience only by making reference to outer intuitions. Secondly, I examine the transcendental principles of extensive and intensive magnitude as the basis for quantification in science. Thirdly, I discuss the problem of applying mathematics to the phenomena of inner sense. I conclude by showing that for Kant mathematical methods can be applied to psychology, however, only to a limited extent, which is not sufficient to view psychology as a natural science in Kant's sense.

Charlie Williams, Music and Science Postgraduate

A Digital Game-Based Model for Learning Musicality

With the increasing prevalence of portable electronic devices and the concomitant pervasiveness of casual gaming, interest in the potential musical effects of this growth has been growing (Lantz et al. 2004, N. Collins 2007, K. Collins 2008, Mun 2009). Michiel Kamp (2010) in particular surveys the gaming field looking for such "ludic" music, ultimately calling for it more as a future goal than as an aspect of currently available games. I present a digital game-based model for music-making and musicianship-learning, grounded in embodied spontaneity and sociality rather than the extant music-theoretical, ear-training, or rote practice models. A series of mobile-device "app" games in development is described, in which live musical gestures (singing or clapping) serve as the control mechanism. For example, in one game a group of pitch classes is represented by a row of gates, which close when a pitch is sung and then open slowly over time. In that game mechanic, the goal is to break bricks by bouncing the ball off of the closed gates; to do so a user must accurately self-represent the pitch internally, and then perform the pitch required, all within a timeframe bounded by the specifics of the game's physics simulation. Other games focus variously on controlling the high-low/loud-soft distinction rather than producing specific pitch classes, and on rhythmic pattern-clapping. The rhythm-based games do not require a fixed tempo but rather include a mechanism for mutual tempo entrainment between player and device. Gameplay and demographic data are gathered in both laboratory and *in vivo* settings (the games are to be released publicly by Apple in 2012), and a preliminary analysis of this data will be presented at the conference. A hypothesis that musicality is at least partially constructed through increasingly sophisticated manipulation of a vocabulary of potential gestures will be evaluated in light of these findings.

Panel 4: Health

Dr. Stephen Burgess, Dept of Public Health and Primary Care / Medical statistics Research Associate

"A few causal remarks about your health"

Of fundamental interest in scientific enquiry in both social sciences and natural sciences is the assessment and estimation of causal associations. As opposed to observed correlations, understanding of causal associations informs the researcher about the underlying relationships between variables, and helps to predict and guide the effect of potential interventions in a system. In the context of healthcare research, the traditional approach to causal inquiry has been the randomized trial. However, assigning an exposure at random may be impractical and unethical. This talk presents a framework which uses genetic variation to estimate the causal effect of the change in a modifiable risk factor on an outcome from observational data. I will provide a general introduction to the use of genetic instrumental variables, illustrating with the example of the effect of "bad" cholesterol (LDL-C) on coronary heart disease risk.

Dr. James Rowe, Clinical Neuroscience Research Associate

Behavioural decisions in health and disease

How do you choose what to do? Sometimes, experience will have taught you the likely favourable or deleterious outcomes associated with different courses of action. However, some choices must be made between apparently equivalent options. My group has been studying this type of choice, not just because of a general interest in the experience of "free will" in behaviour, but also because of the changes in decision making and behaviour that result from neurological disease e.g. Parkinson's disease or head

injury. We have combined human functional brain imaging, pharmacology and computational models of action decisions in healthy adults, and people with acquired neurological disorders.

We have shown how the brain's activity - and network connectivity – differs between actions that are specified or freely chosen, and how computational models of decision making can distinguish the roles of these different brain regions. Focal brain injury, Parkinson's disease and the drugs used to treat Parkinson's disease exert different influences these neurocognitive processes through both the mechanisms of action selection and the mechanisms of action inhibition. These combine to influence the extent to which a current 'free' choice is determined by the decisions or actions we have recently taken.

Moos Peeters, Cognitive Neuroscience Postgraduate

Semantic eye-blink conditioning: a paradigm to test abstract categorization and learning in disorders of consciousness.

Patients with disorders of consciousness (DOC; vegetative state, minimally conscious state) show a very limited behavioural repertoire making assessment of their level of consciousness very difficult. The resulting high rate of misdiagnosis (40%) brings problems to care, rehabilitation and end of life decisions. Tests not relying on overt responses are therefore needed as more reliable tools for assessment. The current study presents such a test, capable of investigating language and learning abilities without relying on voluntary behavioural responses. It uses trace conditioning, which is known to rely on awareness (Clark & Squire, 1998). We used words as the conditioning stimuli in a differential eye-blink trace paradigm; the semantic category of the stimulus (animal/object) predicts a subsequent air-puff delivered to the eye. In order to understand the predictive value of these stimuli the individual must be able to categorize the words, requiring intact language abilities. The results show that semantic conditioning can be elicited in healthy volunteers, is modulated by attention and requires awareness. Furthermore, patient data shows that at least one patient was able to acquire the conditioning.

Dr Mark Agius and Jenny Gardner

Studies on Depression Treatment within a Community Mental Health Team Setting

Jenny Gardner 1,2
Kathy Liu 1,2
Mark Agius 3,4,2
1School of Clinical Medicine , Cambridge University, 2 Clare College Cambridge
3 Department of Psychiatry, University of Cambridge, UK
4South Essex Partnership University NHS Foundation Trust, UK

The management of depression provides a number of challenges to a community mental health team.

It is necessary to show that patients have been effectively diagnosed, and that treatment has consequently been effective. Commissioners of services wish to be able to demonstrate that patients, once treated, have been transferred back to primary care expeditiously.

Often it is difficult to be able to audit treatment of patients because no standard rating scales have been used in treatment and because there has not been any definition of outcome measures .

Here we present a series of studies in which we devised a method of assessing treatment outcome in depression by deciding that outcome measures which could be measured would be reduction in suicidality and discharge of patients to primary care.

We were able to use our Trust's Computer facilities to assess these two outcome measures.

We were then able to demonstrate that often outcome depended on accurate diagnosis and that the presence of other conditions such as PTSD, Bipolar Disorder and OCD were important determinants of outcomes.

We were also able to assess how closely the choices of antidepressants by doctors 'by experience' were mirrored by the results of a large meta-analysis of outcomes of treatments with different anti-depressants, which had recently been published.

Poster Session

Mark Agius, Rashid Zaman, and Peter Pregelj

Anxiety disorders and suicidal behaviour

Mark Agius 1,2,5 Rashid Zaman 1,2 and Peter Pregelj 3,4
1 South Essex Partnership University Foundation Trust, Weller Wing, Bedford Hospital, Bedford, UK, 2 Department of Psychiatry University of Cambridge, 3 University Psychiatric Hospital Ljubljana, Studenec 48, SI-1260 Ljubljana Polje, Slovenia, 4 Department of psychiatry, Faculty of Medicine, University of Ljubljana, Vrazov trg 2, SI-1000 Ljubljana, Slovenia, 5 Clare College Cambridge

Research relates a wide range of psychosocial characteristics and stressors to suicidal behaviour. Negative life events alone and as part of stress related disorders are associated with increased risk for suicidal behaviour. It is known that patients with PTSD are more likely to attempt suicide than subjects without PTSD. This retrospective study characterizes the suicidal behaviour in 413 consecutive patients with stress related disorders as assessed by psychiatrists in Psychiatric Emergency Clinic at University Psychiatric Hospital Ljubljana. These patients were compared with 482 consecutive patients with anxiety disorders attending the same institution. Results indicate that patients with stress related disorders expressed suicidal behaviour more often than patients with anxiety disorders. We observed that 76 patients (18,4%) with stress related disorders had suicidal thoughts at the time of their evaluation and 21 patients (5.1%) had documented suicide attempts just before the evaluation. In the group of patients with anxiety disorders we observed that 50 patients (10,4%) had suicidal thoughts at the time of their evaluation and only 4 patients (0,8%) had been referred after a suicide attempt. On the contrary we have not observed any differences in family history of suicidal behaviour between the subgroups. It is clear from our findings that the presence of a stress related disorder such as PTSD or adjustment disorder, as well as any anxiety condition must be considered an important factor which potentially increases suicide risk. It is clear that both stress related disorders and anxiety disorders, whether co-morbid with depression or existing alone are important factors which need to be taken into account when assessing suicide risk in acutely ill psychiatric patients.

Keywords: suicidal behaviour, anxiety, stress, Slovenian population.

Claire Cox, Stem Cell biology Postgraduate

Sin3A is a key factor in maintaining mammalian epidermis

The epidermis is the outer layer of mammalian skin and is maintained by numerous stem cell populations. The balance between cell loss at the outer layer and replacement of epidermal cells must be tightly controlled. Disruption to this balance can lead to disease such as skin cancer. I have found that Sin3A is a key factor in maintaining this balance and opposes the function of the oncogene c-Myc, which is an important factor in epidermal stem cell biology. In the absence of Sin3A, there is excessive epidermal proliferation leading to a massive increase in epidermal thickness. By deleting c-Myc at the same time as Sin3A, proliferation levels are returned to normal. Sin3A is required to prevent Myc overactivity and potentially acts as a tumour suppressor in the epidermis.

Laura Darby, Mark Agius, and Rashid Zaman

Co-Morbidity of bipolar affective disorder and obsessive compulsive disorder in a Bedford Community psychiatry team

Laura Darby3,4, Mark Agius1,2 & Rashid Zaman1,2
1Department of Psychiatry, University of Cambridge, UK
2South Essex Partnership University NHS Foundation Trust, UK
3School Of Clinical Medicine Cambridge University, UK
4 Clare College Cambridge

SUMMARY: This is a study of the prevalence and impact of co-existing bipolar affective disorder on patients with OCD, and the effect on their management within a community psychiatric team. We found that 16% of patients who visited psychiatric outpatients with adiagnosis of OCD had co-existing bipolar affective disorder. Of these the majority had bipolar affective disorder II (67%). Comorbidity raised a number of challenges to patient management. Compared to the control group the patients with co-morbid bipolaraffective disorder required a greater number of outpatients appointments, had a greater number of hospital admissions, were more likely to have been allocated a care coordinator and to have received psychological input.
Key words: OCD - bipolar affective disorder – co-morbidity

Jenny Gardner and Paul Wilkinson

Is Family therapy the most effective treatment for anorexia nervosa?

Jenny Gardner 1 & Paul Wilkinson 2
1 School of Clinical Medicine , Cambridge University and Clare College Cambridge 2University of Cambridge Section of Developmental Psychiatry, Douglas House, Cambridge, UK

SUMMARY

Introduction: Anorexia nervosa is a mental health disorder characterised by deliberate weight loss (through restrictive eating, excessive exercise and/or purging), disordered body image, and intrusive overvalued fears of gaining weight. The National Institute for Clinical Excellence recommends that family interventions that directly address the eating disorder should be offered to children and adolescents with anorexia nervosa.

Aims: To perform a literature review to assess whether family therapy is a more effective intervention than other treatments in the management of adolescents with anorexia nervosa.

Method: Search of PubMed, The Cochrane Library and NHS Evidence for randomised controlled trials that compared a family intervention with another treatment for anorexia nervosa in adolescence.

Results and discussion: This literature search revealed only six randomised controlled trials investigating the use of family therapy in the treatment of adolescents with anorexia nervosa, and these all had small sample sizes. Some, but not all, of these trials suggest that family therapy may be advantageous over individual psychotherapy in terms of physical improvement (weight gain and resumption of menstruation) and reduction of cognitive distortions, particularly in younger patients. Due to the small sample sizes and the significant risk of bias (particularly information bias) in some of the studies the evidence in favour of family therapy over individual therapy is weak. In the future, larger randomised controlled trials with long term follow-up are required to assess whether family therapy is the most effective treatment for anorexia nervosa in adolescence.

Key words: anorexia nervosa - family therapy - adolescence

Arjun Kingdon and Mark Agius

Schizophrenia; is it a Neurodevelopmental or a Neurodegenerative condition?

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Mark Agius 3,4,2
1School of Clinical Medicine , Cambridge University, 2 Clare College Cambridge
3 Department of Psychiatry, University of Cambridge, UK

Recently it has been proposed that Schizophrenia is a neurodegenerative disorder which is linked with a 'whole systems disease' caused by genes which cause premature aging. However , a well established view is that Schizophrenia is a neurodevelopmental condition. We carried out a literature search to evaluate the evidence for these two points of view.

Schizophrenia presents as a heterogeneous condition, in both its presentation and its outcome, or indeed as a grouping of several diseases, and therefore, it appears probable that both the neurodevelopmental and the neurodegenerative models may be true in different groups of patients, and furthermore it is possible that in a group of seriously ill patients, a neurodevelopmental illness may progress into the neurodegenerative one.

Kirsty MacLeod, Zoology Postgraduate

Where a maternal trait differentially affects the fitness of male and female offspring, mothers should produce an excess of the fitter sex. In cooperatively breeding meerkats (Suricata suricatta) maternal dominance has a greater effect on the breeding success of daughters than on sons -- dominant mothers should therefore produce more daughters. We tested the predictions that variance in sex ratios would exceed binomial expectations, and that dominant mothers would produce female-biased litters, using 15 years of data from a long term study. We show that meerkat offspring sex ratios do not significantly deviate from equality, and that litter sex ratio is not affected by maternal dominance status or mass at conception. We suggest that the benefits of preferentially investing in daughters may be offset by costs of reproductive competition, potential advantages of developing in a mixed litter, or both, resulting in adaptive maintenance of equal offspring sex ratios.

Tomaž Zupanc , Mark Agius, Alja Videtič Paska, and Peter Pregelj

National alcohol policy and blood alcohol concentration of suicide victims

Tomaž Zupanc 1, Mark Agius 2, 3,7, Alja Videtič Paska 4, and Peter Pregelj 5, 6
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Background: The World Health Organization estimates that almost one million deaths each year are attributable to suicide, and suicide attempt is close to 20 times more common than suicide completion. Beside suicide, alcohol addiction is a major social and health problem. Studies on suicide and alcohol at the individual and aggregated level have confirmed a link between alcohol and suicide.

Aims: To assess the impact of the new national alcohol policy in Slovenia on the blood alcohol concentration (BAC) in BAC positive suicide victims before, during, and after the implementation of the new national alcohol policy in 2003.
Method: Blood samples were collected by forensic pathologists during medicolegal autopsies of suicide victims in order to establish their BAC levels at the time of death. BAC was measured using two routine independent head-space gas chromatography methods (HSS-GC-FID) and expressed in grams per kilogram (g/kg).

Results: The results revealed a significant difference in the mean values of BAC of suicide victims over the investigated time periods. During the period before the implementation of the act which limited the availability of alcohol in Slovenia the blood alcohol concentrations of BAC positive suicide victims were higher than those tested in the period after the implementation of the act.

Conclusion: Despite certain limitations of the study the study demonstrates that legislation measures restricting alcohol availability may be an effective measure of suicide prevention.

Keywords: alcohol, suicide victims, blood alcohol concentration, alcohol policy, Slovenian population.

Mark Agius, Peter Pregelj, and Dr Josip Glaurdic

Major Wars and epigenetic influences on children.

Mark Agius 1,2,3 Peter Pregelj,4 and Dr Josip Glaurdic, 5
1 Clare College Cambridge, 2 Department of Psychiatry University of Cambridge, 3 South Essex Partnership University Foundation Trust 4 University of Ljubljana 5, Politics Department, and Junior Research Fellow, Clare College

Increasing evidence is reporting that there are demonstrable neuroimaging changes in the brain of persons with depressive illness , and in particular those with a deprived childhood. There is also evidence linking increased suicidality with epigenetic influences related to deprived childhood. Since war causes deprivation, it therefore comes as no surprise that recent epidemiology of Post Traumatic Stress Disorder in Bosnia-Herzegovina showed an increase in cases in the areas where the most severe deprevation and serious incidents occurred, this being most true in Shebrenica, the site of a serious massacre. As the evidence of a link between deprivation, epigenetics,and mental illness, mounts,we speculate on what the political consequences may be, including the responsibility for possible illness caused by epigenetic influences related to war conditions

Dr. Zarah Walsh, Chemistry Research Associate

Wood-polymer composites prepared from native fast-growing lumber presents a very attractive resource for the construction industry, combining the 'green' merits of this readily produced material with the increased tensile strength imparted by the polymeric component of the composite material. The British Standards states the mean required value for the modulus of elasticity of Class D30 and D40 hardwoods, which includes Oak (Quercus), a commonly used construction material, should be 9.5-10.8 GPa. The wood employed for this project was native English Willow (Salix alba), a fast-growing native hardwood, whose modulus of elasticity falls far below this value. Wood-polymer composites were designed employing methacrylate monomers to increase the elastic modulus of the of the willow and create a wood-polymer composite with properties comparable to Oak. To create the composite materials ternary monomer mixtures were used consisting of a strengthening monomer (methyl methacrylate), a cross-linker (ethylene dimethacrylate) and a monomer which would likely have a favourable interaction with the wood fibres (glycidyl methacrylate, 2-hydroxyethyl methacrylate). Polymerisation was then carried out employing either heat, light or microwaves as the initial energy source and the polymerisation time varied to maximise the % mass increase from each source. Some examples of the characterisation of these materials will be given with particular focus on microwave initiated polymerisation as this is relatively uncommon method to prepare wood-polymer composites and has great potential for the fast and cheap manufacture of joints for building materials.

Panel 5: Literature and Music

Edward Mills, MML undergraduate

"De mon non ne savroiz vos point": identities and roles in two medieval French romances

The stories of King Arthur still occupy a central role in the popular imagination. It is in the verse romances of the twelfth-century French author Chrétien de Troyes that we first see many of the features which come to typify the Arthurian universe: Lancelot and the Holy Grail appear for the first time in his poems.

In spite of these apparently familiar characters and artefacts, however, his poetry is not as straightforward as it may seem. On the contrary, it presents questions of identity that still have the power to intrigue, even over 800 years later. What roles do the characters (and, in some cases, narrators) take on in the course of the romances? How fixed, or otherwise, are these roles? This presentation will address these questions by examining the concepts of identity in two of Chrétien's romances, Erec et Enide and Le Chevalier de la Charrette.

Thomas Neal, Music Undergraduate

The Composer as Exegete: an Intertextual Analysis of Machaut's Motet 21

In recent years, musicologists have begun to view the *tenor* in thirteenth- and fourteenth-century polytextual motets not only as a means of supporting the musical structure, but also as holding the key to broader theological and literary meaning. Thus the possibility emerges of the motet serving as a scriptural gloss or commentary. This paper presents an intertextual analysis of Machaut's motet *Christe qui lux es et dies/Veni creator spiritus/*[T] *Tribulatio proxima est/*[Contratenor] (M21), arguing that the *triplum* and *motetus* texts act as tropes on the *tenor* source, Psalm 21 (22) – the 'hidden text' against which the motet is meant to be read. Moreover, an allegorical reading of this motet demonstrates how Machaut used exegesis as a means of appropriating scripture for historical and political commentary, by giving contemporary relevance to biblical events. Such a reading provides new evidence linking M21 to the *siège de Reims* (1359-

60) and, in turn, gives insight into the medieval composer's tendency to draw theological inference from historical events.

Isabella Shaw, English Undergraduate

'Within thyself my tunes enclose': character and musical instruments in Sir Philip Sidney's Arcadia

Music, voice, and identity are intrinsically linked in many of the works of Sidney. This focus is evident in the very practical, in the eclogues of the Arcadia and in Sidney's own experiments in versification and text setting, to the highly theoretical music-poetry debates with which his characters often engage. This paper aims to present several ways in which his characters articulate themselves as musical instruments, ultimately linking in to the tradition of poet as divine instrument.

Tom Taylor, English Postgraduate

Dr Johnson's Dictionary and the making of meaning

It is easy to take the factuality of dictionaries for granted, to treat them as if they were exemplars of an empirical methodology or merely works of collation. One often rifles a dictionary for the information it affords without pausing to question the sense of 'information' or the basis of authority by which that information is guaranteed. By considering Johnson's Dictionary of the English Language, I shall suggest that more careful reflection upon the construction and use of dictionaries can illuminate some of our most grammatically ingrained assumptions about language and meaning, as well as the position of Johnson's work at the intersection of empirical exposition and poetic creativity.

Panel 6: Bio-Chemistry/Computing

Julia Oswald, Developmental Biology Postgraduate

Investigation of neuronal circuits in human cortical neuron cultures

Being able to develop human cortical neurons from hiPSCs (human induced pluripotent stem cells) which have been derived from skin cells and investigate their timed differentiation process, the laboratory of Rick Livesey (Gurdon Institute) has currently initiated a new research direction concerned with the investigation of neuronal circuits.

Employing the created cell lines it is intended to investigate the electrophysiological potential of the induced cells and their connections amongst each other. Even though it is already known that the respective cells form functional synapses and display spontaneous electric activity at the end of differentiation it still remains unknown when those connections are first established and then modified during the course of development. Therefore, using calcium signaling, as well as patch clamping techniques it is not only aimed to investigate the neuronal connectivity in the system per se but to also follow it.

Mark Chonofsky, Natural Sciences Undergraduate

A new clustering algorithm to improve motor protein tracking

Cytoplasmic dynein is a dimeric motor protein which is active in cell division, transport processes (including viral transport), cilia, and other contexts. When studied by TIRF microscopy, the data present an interesting statistical problem: noisy data must be assigned to discrete steps. While reminiscent of planar k-means clustering (which is NP-hard), the strictly time-bound nature of the data presents

difficulties for standard clustering algorithms. I present a stochastic steepest-descent algorithm for this problem, outlining its utility in theory and practice. I will present some simulation results, and then demonstrate the application of the algorithm to dynein stepping data.

Christopher Thompson-Walsh, Computer Laboratory Postgraduate

Coping with Complexity: Computer Modelling of Biochemical Networks

The great complexity of the systems of interacting reaction pathways found in cells motivates using computers to model these systems. However, it emerges that biological systems exhibit combinatorial explosion --- a kind of mathematical complexity that poses difficulties to efficient computer simulation. In this talk, I will briefly describe one approach to taming this complexity, called rule-based modelling. I will focus particularly on my group's work involving the biological modelling language Kappa, which has been developed to allow the computer simulation and analysis of biochemical networks. (Joint work with Jonathan Hayman and Glynn Winskel.)

Joseph Rogers, Chemistry Postgraduate

Protein Disorder in biology

Our picture of biology in the last 50 years has been dominated by the static pictures produced by X-ray crystallography, such as those of DNA, RNA, countless proteins and the complexes they form. In the last 10 years a class of proteins have emerged that are missed by this and similar techniques, ones that have no structure at all, move with random motion, yet still have a function in the cell. I'll be talking about my research on a model system that hopes to understand why biology has evolved to include, and control, this disorder.

Liang Wu, Cancer Medicinal Chemistry Postgraduate

Targeting 'junk' RNA

Ribonucleic acid (RNA) is one of the major molecule groups found in cells, and has long been known to be an informational intermediate between DNA and the synthesis of proteins. However, only a small minority > (~3%) of RNA in the cell actually encodes for proteins, with many of the other RNA transcripts described as 'junk' by early researchers in the field. Recent research has shown that much of this 'junk' RNA may actually have important functions in the cell, the complexity of which we are only beginning to appreciate.

My project looks at targeting one of these 'junk' RNA species as an anti-cancer therapeutic strategy. I aim to give an overview of why RNA may make an interesting drug target, and some of the methods I will be using to develop potential inhibitor compounds.

Panel 7: History

Gabriel Byng, History of Art Postgraduate

Building the Impossible: Parish church construction during the long thirteenth century

Building in stone was one of the great feats of architecture, economics and ambition in the European Middle Ages. It required not just technical knowhow and lofty intentions but significant amounts of capital and a regular income. This paper is intended to restore the importance of changes in medieval

economic history to our understanding of patterns in medieval building work during the long thirteenth century. By focussing exclusively on artistic and devotional devolopments architectural historians are in danger of missing some of the most fundamental changes in the environment in which buildings were constructed.

This paper is intended to answer a very simple question, never before studied by architectural or economic historians: how did a growing population squeezed onto marginal land or into ever smaller holdings manage to construct so many magnificent churches? The answer will range over changes to demography, coinage, climate, wages and the distribution of wealth. It will have profound consequences for our understanding of changes in style and construction during this period, proposing a new way of understanding a range of trends in medieval church building.

Dr. Elaine Leong, History Research Associate

Tweaking as Creating: Recipes and Knowledge Production in Early Modern England

Recipes, whether medicinal, alchemical, culinary or technical, occupied a central place within the transmission and circulation of practical household knowledge. The large number of manuscript recipe collections still extant in the archives is suggestive of their ubiquity within the early modern domestic sphere. Modern readers often marvel at the thousands of similar yet slightly different remedies contained in these notebooks. A glance at any pre-modern recipe collection frequently yields a handful of recipes for the same ailment or several versions of well-known recipes such as 'lucatella's balsam' or 'Dr Steven's water'. Comparison of individual recipes reveals that the variants differ slightly with minute changes in methods, ingredients and use. A second puzzling feature of early modern recipes lies in the fact that many of these similar recipes are attributed to different authors creating what to modern eyes is a complex web of information.

This paper intends to address these two distinctive features of manuscript recipe collections through an investigation of the compilation process. Analysis of individual notebooks and of the marks left by readers and users demonstrate that pre-modern recipe collections were created through a simple three-step process. The process began with the gathering of recipes from practitioners, family, friends and printed books. The collected information was then tested for efficacy and suitability to the compiler's household. If deemed a success, the recipe was assimilated into the household's trusted trove of practical knowledge. During this process, compilers often customized the recipes to suit the requirements and needs of their families. This personalization may take the form of ingredient substitution, the use of a preferred production method or even an outright rejection of the suggested procedure. After these modifications, the recipe, now bearing the name of a different author, re-enters the recipe exchange circuit as a new recipe and as 'new' knowledge. I argue that this three-step process of recipe compilation is in itself a process of knowledge production. After all, these tidbits of practical hands-on knowledge were tried, tested by personal experience and altered (or rejected) accordingly. Tweaking, I suggest, is creating. The recovering of these processes allows us to further understand informal knowledge production within early modern households.

Katie Renaud, Historical Studies Postgraduate

'Britain and Refugee Intellectuals from Nazi Europe: an International Comparison'.

I will be presenting on Britain's response to persecuted scholars from Hitler's Europe. Despite tremendous homeland insecurity, intellectuals from Axis powers managed to find protection and employment in Britain. However, fewer refugee intellectuals received support in the Dominions, where there were equal opportunities for academic sponsorship and a lesser chance of invasion. Advocacy from

within the British academic community, viewed in relation to the policies of the Home Office and the activities of the Security Service (MI5), illuminate larger questions of immigration, national loyalty, and global citizenship, as well as an international approach to academia and intellectualism observable in Britain during the Nazi period.

Dr. Hester Vaizey, History Research Associate

Conversations from beyond the Berlin Wall

What happens in a country when people are faced with transformative political, social and cultural change? 29 years after the Berlin Wall first physically divided East and West Germans in August 1961, Germany was formally reunited on 3 October 1990. As East Germany was incorporated into West Germany after reunification, the context of power changed particularly dramatically for East Germans, who had to appropriate a new political system.

This talk will focus on the experiences of East Germans who were coming of age when the Wall fell. This group had been born into a divided Germany and had experienced nothing other than growing up under a socialist dictatorship. What did they make of the merging of East and West Germany after the fall of the Berlin Wall? Presenting new personal testimonies, this talk will outline a range of responses to the regime change: from relief about being free from the Stasi surveillance state to a nostalgia for a paternalistic state which guaranteed employment and a safety net for all.

Panel 8: Ethics and Law

Marco Andreacchio, Ethics/Divinity Postgraduate

"Botticelli's Critique of Theocracy"

Widespread opinion has it that, in his maturity, the Renaissance painter Sandro Botticelli forsook the philosophical impulse of his early work and embraced the apocalyptic prophecy of the Domenican theocrat Savonarola. Solid literary and artistic evidence suggests otherwise.

Teale Phelps Bondaroff, Politics and International Studies Postgraduate

Green Pirates? The Strategic Use of International Waters and Law Through the use of Direct Action by the Sea Shepherd Conservation Society.

Direct action (DA), whereby activists intervene to prevent activities they oppose, has long been employed by radical environmentalists. The theatre in which it is used has a profound impact on the form DA takes, and this paper examines the impact of the high seas on DA. The paper specifically examines the Sea Shepherd Conservation Society (SSCS), a marine-oriented conservation organization, which claims to enforce international law through the use of confrontation and DA on the high seas. Sea-based DA is differentiated from land-based DA using observational and interview data gathered on fieldwork conducted during the SSCS's 2010-2011 Antarctic anti-whaling campaign. The influence of high seas operation on the tactics, strategy and structure of the SSCS are then explored. It will be argued that the effectiveness of sea-based DA is multiplied by the SSCS's strategic use of international law. The SSCS uses international law in three ways: defensively, offensively and constructively, and this paper further argues that the use of international law in this way is unique to the marine theatre.

Sara Wharton, Law Postgraduate

International Criminal Law: The Doctrine of Superior Responsibility as Applied to Non-State Actors

In international criminal law, the doctrine of superior responsibility provides for the criminal liability of individuals in positions of authority over those who commit international crimes for failure to prevent the crimes or to punish the perpetrators. Rooted in the notion of responsible command from the laws of war, the origin of the doctrine of superior responsibility is generally traced to the trial of Japanese General Yamashita by a U.S. Military Commission for crimes perpetrated in the Philippines during World War II. Superior responsibility is now embedded in the statutes of all contemporary international criminal tribunals including the tribunals for the former Yugoslavia and for Rwanda, the Special Court of Sierra Leone, and the permanent International Criminal Court. Accused individuals before these courts include not just government officials and military leaders but also numerous non-state actors. This talk will address issues involved with the application of superior responsibility to non-state actors. It will address the question: given that the doctrine of command responsibility originally applied to traditional military hierarchies, has the law on superior responsibility evolved enough to be effective and relevant to contemporary conflicts which often involve irregular forces, militias, and newly evolving quasi-state entities?