Off the Lip

Transdisciplinary Approaches to Cognitive Innovation

Workshops 7 - 8 September
Conference 9 -11 September
2015

University of Plymouth, Plymouth, UK

Welcome to Off the Lip.

The promise of cognitive innovation as a collaborative project in the sciences, arts and humanities is that we can approach creativity as a bootstrapping cognitive process in which the energies that shape the poem are necessarily indistinguishable from those that shape the poet. For the purposes of this conference the exploration of the idea of cognitive innovation concerns an understanding of creativity that is not exclusively concerned with conscious human thought and action but also as intrinsic to our cognitive development. As a consequence, we see the possibility for cognitive innovation to provide a theoretical and practical platform from which to address disciplinary differences in ways that offer new topics and concerns for research in the sciences and the humanities.

#OTLIP15

Off the Lip is a collaboration between CogNovo and Transtechnology Research, at the Cognition Institute, University of Plymouth.

CogNovo is an Innovative Doctoral Programme, funded by the EU Marie Skłodowska-Curie Actions initiative and Plymouth University, to foster research training in the emerging field of Cognitive Innovation. CogNovo offers transdisciplinary training that combines scientific studies of the neural correlates and mechanisms of creativity, with investigations into the role of creativity in human cognition, and their application in sustainable technological and social innovation. 25 international PhD candidates work within a network of over 50 partners in research and industry all over the globe.

Transtechnology Research is a transdisciplinary research group situated in the Faculty of Arts and Humanities. Its constituency is drawn from historians, philosophers, anthropologists, artists and designers and is led from a historical and theoretical perspective with the objective of understanding science and technology as a manifestation of a range of human desires and cultural imperatives. Its aim is to provide a doctoral and post-doctoral environment for researchers who need to undertake academic research informed by their own and others creative practice. Its overarching research project concerns the historical and philosophical aspects of science and technology and the popular arts.
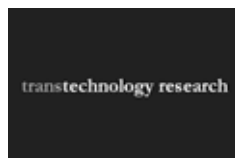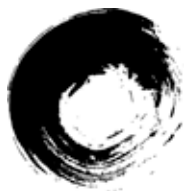
Workshop Schedule

Monday 7 September - Cognovo Project Space (Link Building, 3rd Floor)

10:30	Tea and Coffee	
10:45	Workshop Introduction	
	Workshop Topic	Instructor
11:00	Gender, Archives and Memory in Early Modern England	James Daybell
13:00	Lunch	
14:00	The Art of Consumption: Picturing tuberculosis in alpine sanatoria around 1900	Gemma Blackshaw
16:00 – 17:00	Tea and cake	

Tuesday 8 September - Cognovo Project Space (Link Building, 3rd Floor)

10:00	Tea and Coffee	
	Workshop Topic	Instructor
10:30	Light Image Imagination: Transdisciplinarity and Publishing in the Arts and Humanities	Martha Blassnigg
12:30	Lunch	
13:30	Visual Mediators: Exploring the transactional capabilities of diagrams, maps and schematic notations	Mathew Emmett
15:30	Break	
15:45 – 17:45	Hanging in Dreams on the Back of a Tiger: Lies, Science and the Philosophy of Metaphor	Min Wild
19:30	Conference Dinner at River Cottage, Royal William Yard (pre-registration required)	

Conference Schedule

8:00	Registration, tea, coffee and pastries	
9:00	Welcome	Sue Denham
9:15	Event Spaces of Infinite Perspective	Mathew Emmett, Adam Benjamin, Frank Broz
	Cognitive Innovation and Framing in Documentary Film Practice	Catalin Brylla
	From Conceptual Blending to Procedural Blending: Applying a model of cognition to process in sound art practice	Iris Garrelfs
10:45	Coffeee Break	
11:15	Art in Action: Does recreating motion performed during art production help increase appreciation at the time of viewing?	Ben Dyson
	The Contact Sheet in Close Up	Jacqui Knight
	Creativity as Correspondence in Humanitarian Engagement	Pamela Cajilig and Diego S. Maranan
	Electrophysiology of Cinema Spectatorship	Guy Edmonds
	Perception of Intended Emotion in Drawings by Non-artists	Diane Humphrey
12:45	Lunch	
13:45	Plenary: New Forms of Art-Science Collaboration: Case Studies	Roger Malina

14:45	The Formational Imaginaries of Space Technology as an Issue of Cognitive Innovation	Joanna Griffin
	The Affective Embodiment of Testing Tools and Their Influence on Experimental Outcomes	Agi Haines, Kathryn Francis and Raluca Briazu
	Catastrophe, Sense of Crisis, Cultural Expressions	Yutaka Nakamura
	(How) Does Play Matter?	Chun-Wei Hsu, Pinar Oztop, Michael Straeubig, Mihaela Taranu
16:45	Break	
17:00	Round table discussion: Manipulating the Human Mind: When experiments get dirty	Kathryn Francis, Ilaria Torre, Chun-Wei Hsu, Raluca Briazu, Chair: Sue Denham
17:30 - 18:30	Poster + session with drinks and nibbles	

Thursday 10 September - Jill Craigie Cinema and Roland Levinsky Crossroads (Roland Levinsky Building)

8:30	Tea, coffee and pastres	
9:00	Transcending Academic and Epistemic Boundaries: Psychoactive tryptamines and the frontiers of human exploration	Christopher Germann
	Creative Mind and Evolution in Bergson's Philosophy: The self as technology	Martha Blassnigg
	Cognition, Materiality and Salvation: The relationship between objects, people and God in counter-reformation France	Elizabeth Tingle
10:30	Coffee break	
11:00	Musical Imagery: Towards the liberation of imagination	Freya Bailes
	Engagement and Optimal Experiences in Music Education Clases: A case study based on the Orff-Schulwerk approach and Flow Theory	João C. R. Cunha
	A Multidisciplinary Approach to L2 Learning by Illiterate Adults: Multimedia, situational comedy and dyslexia exercises	Abeer Nasser Eddine
	Exploring Creativity Through Creative Artifacts and Group Performances: Analysis of the students' accounts of a Masters programme in innovation, creativity and leadership	Mary Ann Kernan

Thursday 10 September continued - Jill Craigie Cinema and Roland Levinsky Crossroads (Roland Levinsky Building)

13:00	Lunch	
14:00	Plenary: Cognitive Innovation in Mathematics	Sundar Sarukkai
15:00	Evaluating the Affective Potential of a Computer-aided Composition System in 2D	Duncan Williams, Alexis Kirke, Eduardo Miranda
	Towards Modelling Humpback Whale Song Evolution using Multi-agent Systems	Alexis Kirke, Eduardo Miranda, Luke Rendell, Simon Ingram
16:00	Break	
19:00	CogJam with music, performance, and films from Off the Lip presenters and associates at Exile (across the street at 8 Drake Circus)	

Friday 11 September - Jill Craigie Cinema and Roland Levinsky Crossroads (Roland Levinsky Building)

8:30	Coffee and pastries	
9:00	The Pretty Hard Problem of Creativity	Jack McKay Fletcher
	Memory and the New Unconscious	Sowon Park
	Hypnosis, Telepathy and the Modern subject	Eugenia Stamboliev
	Quantum Creativity: Robert Creeley and self-reflective wholeness	Gi Taek Ryoo
11:00	Coffee Break	
11:30	Plenary: Art and the Brain: Plasticity, Embodiment, and the Unclosed Circle	Amy Ione

12:30	Lunch	
14:00	Panel discussion: Cognitive Innovation: Roadblocks, challenges and opportunities	Sue Denham, Martha Blassnigg, Hannah Drayson, Sowon Park, Chair: Roger Malina
15:30 - 15:45	Closing Remarks	Michael Punt

Workshops

James Daybell
Professor of Early Modern British History, Plymouth University

Gender, Memory and the Politics of the Early Modern Archive
Monday 7 September 11:00

In his now classic mediation on the nature of archives and memory, Archive Fever: A Freudian Impression, Jacques Derrida posits a very male-dominated model of the archive in which women play an ambivalent role, at once central but also marginalised and excluded from the 'economic' work of the archive. He introduces, however, the term 'matriarchive', a term that is not actually explained. In his recent study of marginalia, William H. Sherman responds to this suggestive neologism by conceptualising such an archive, by looking at 'the role of women in organizing goods, information and history in the early modern household', the role they played in early modern 'archival practices', as well as 'the place they have traditionally occupied in the archives we now use to access their lives and works'.

What this workshop is interested in is more broadly the ways in which women's manuscripts survive to us today; not only in women's direct involvement with early modern archives as sites of memory, but also in what might be described as the gendered politics of archival survival, the ways in which women

might be marginalised and excluded from memory systems. In particular the workshop examines the survival of women's letters outside of formal institutional archives, through a series of case studies which examine the status, treatment and archival of afterlife of four distinct groupings of letters within family archives.

Gemma Blackshaw
Associate Professor in Art History & Visual Studies, Plymouth University

The Art of Consumption: Picturing tuberculosis in alpine sanatoria around 1900
Monday 7 September 14:00

Art historian Dr Gemma Blackshaw works on the many vital connections that existed between modern medicine and modern art in Europe at the turn of the 19th century. Her workshop will begin with a paper on the Austrian artist Oskar Kokoschka's time at the MontBlanc Sanatorium for Lung Disease, Leysin, in 1910, which coincided with his 'breakthrough' to an expressionist style of portrait painting. Reconstructing his experience of new medical technologies, such as X-ray imaging, and therapeutic regimes, such as the rest cure, Gemma will highlight the formative relationship that existed between the curative environment of the sanatorium and Kokoschka's newly visceral form of portraiture. This will lead to a discussion of the entangled histories of medicine and modernism, and the role of the 'medical humanities' in unravelling them.

Martha Blassnigg
Associate Professor in the Anthropology of Media, Plymouth University
Michael Punt
Professor of Digital Art and Technology, Plymouth University

Light Image Imagination: Transdisciplinarity and publishing in the arts and humanities
Tuesday 8 September 10:30

This workshop will provide insights into a transdisciplinary publishing project in the Humanities and Arts that brought together 22 artistic practitioners

and media theorists, philosophers and scientists from a range of disciplines including film and media theory, media archaeology, cinema history and theory, philosophy, history of science and technology, astronomy, computer music, literature studies, neuroscience, psychology, art history and art and media practice (painting, photography, film, video and digital arts; music composition). They were invited to explore the explicit, and more particularly the implicit, interrelationship between light and the creation of (re)mediated, (im)material, mental images, through image or text essays which were treated with the same significance on an equal basis.

The workshop will use this project as a case-study in order to trace the processes of the conception and production of this anthology starting from the book proposal, through the negotiations with publishers to the intricacies of the editorial process to the final product. In doing so it will pose questions around multi-modal publishing, discipline-related styles and approaches to publishing, media specificity and cross-disciplinary dialogue that come to bear in a transdisciplinary publishing project of this kind.
The workshop aims to open up a platform to share publishing and editorial experiences among the participants and to foster the understanding of transdisciplinarity in practice in the context of current trends in the international academic publishing business.

Michael Punt will be co-leading this workshop on behalf of Leonardo (MIT Press), his long-standing expertise as international editor of art, science, technology collaboration and Editor-in-Chief of Leonardo Reviews.

Mathew Emmett
Associate Professor in Three Dimensional Design, Plymouth University

Visual Mediators: Exploring the transactional capabilities of diagrams, maps and schematic notations
Tuesday 8 September 13:30

Diagrams, maps and schematic notations represent information in a visual manner. By interpreting these visual mediators as a creative theoretical framework for conceptual synthesis, an extended repertoire of reasoning can be negotiated visually to elucidate contingencies, reveal reciprocal actions and broker relational contracts.

Visual mediators have become the foundation for various visual languages and reasoning activities from both academia and industry. This workshop will explore visual mediators as a creative practice for improvisation and creativity, offering the possibility to evolve and reinterpret your research within a conceptual nexus of visual mediation. Further, the workshop will explore these visual mediators as inherently spatial devices that articulate both structure and program, whereby movement through, in and around the constituent parts reveals a multidimensional quality comprised of intersections, overlaps, disjointed cut-ins and interplay. Visual mediators will therefore explore these complex images as visualisation tools encoded with sophisticated information. The workshop will cover both the contextual understanding and practical exploration of diagramming, maps and notation. The workshop aims to bring together researchers from diverse backgrounds to explore and experiment with visual mediators, offering the opportunity to extend your repertoire of research practice both as a tool for discovery, communication and reflection.

Min Wild
Lecturer in English, Plymouth University

Hanging in Dreams on the Back of a Tiger: Lies, science and the philosophy of metaphor
Tuesday 8 September 15:45

In this workshop we'll be considering some heresies about the possibilities and impossibilities of science as we normally understand it. We'll focus together on a short, but inflammatory piece written by the irreligious philosopher Friedrich Nietzsche: 'On Truth and Lying in a Extra-moral Sense' (1873). We'll use ideas from philosophy, psychology and literary criticism – most especially about the role of metaphor in cognition – to ask questions of the scientism that marks Western culture. Together in a seminar environment, we'll be trying to make sense of what Nietzsche says and if it has anything to say to us today. Except for Min, who has an unfair advantage, everyone starts from the same place, and so we can direct the workshop ourselves – it's an exercise in collective reading and judgement we hope everyone will immensely enjoy. Practically, it will be of help when considering the value of rhetoric in the public dissemination of science.

Plenary Talks

Roger Malina
Distinguished Professor of Arts and Technology, Professor of Physics, University of Texas at Dallas, USA

New Forms of Art-Science Collaboration: Case studies
Wednesday 9 September 13:45

In recent years art-science collaboration has been identified as an emerging frontier of science. The upcoming US conference "Art and Science, Engineering and Medicine Frontier Collaborations: Ideation, Translation and Realisation" is notably sponsored by the US National Academies of Science, of Engineering and of Medicine. Two recent studies, the European Commission ICT-Art Connect Sutdy and the US National Science Foundation SEAD Study provide abundant examples of projects which have led to new discoveries and compelling forms of art. In this talk I will give an overview of the various rationales, and demonstrated methodologies in art-science collaboration as well as a number of case studies. I will also present the work in our ArtSciLab at the University of Texas at Dallas; in this case we are developing data exploration tools, which we call 'data stethoscopes', which are being applied in neurobiology to resting state fMRI data of age cohorts of individuals, as well as performing the data in public settings.

Sundar Sarukkai
Professor and Director of the Manipal Centre for Philosophy and Humanities, Manipal, India

Cognitive Innovation in Mathematics
Thursday 10 September 14:00

What is the nature of cognitive innovation in mathematics? To answer this, it is important to understand the nature of mathematics, its domain and scope, and the structure of its discourse. Mathematics, right from early times, has been one of the most important disciplines and has served as a model for other subjects like philosophy and the sciences. At the same time, it is also perhaps most closely related to certain themes in art. In this talk, I will argue that this ambiguous position of mathematics as a discipline influences not only the

cognition of mathematical entities and structure, but also its performative modes of creativity. In particular, I will focus on the role of pictorial cognition and visual metaphors in the creative processes of mathematical thinking since it also allows us to understand what is special to the creative processes of manipulating and playing with symbols.

Amy Ione
Director of the Diatrope Institute, Berkeley, California, USA

Art and the Brain: Plasticity, Embodiment, and the Unclosed Circle
Friday 11 September 11:30

Listening to a train in 1854 Thoreau wrote: "I hear the iron horse make the hills echo with his snort like thunder, shaking the earth with his feet, and breathing fire and smoke with his nostrils. (What kind of winged horse or fiery dragon they will put into the new Mythology I do not know.)" (Thoreau 2004: 113). As rail power was married to industry and to society more broadly, artifacts started to build the new mythology. By 1874 Charles Dickens described Coketown (in Hard Times) as:

> "[A] town of red brick, or of brick that would have been red if the smoke and ashes had allowed it; but as matters stood, it was a town of unnatural red and black like the painted face of a savage. It was a town of machinery and tall chimneys, out of which interminable serpents of smoke trailed themselves for ever and ever, and never got uncoiled. It had a black canal and a river that ran purple with ill-smelling dye . . ." (Dickens 1854: 22).

Yet, in 1877 Claude Monet (1840–1926) thought the smoke and the steam presented an artistic challenge. He wanted to reveal that even a black machine and a mass of black panes could be depicted with blue paint, that the dirty gray of the ground could be seen as green, and that the smoke itself could become light. He explained his project to his colleague Renoir, telling his friend that he would have the rail people increase train emissions to aid him in achieving the desired effect: "I'll show [the Gare Saint-Lazare] just as the trains are starting, with the smoke from the engines so thick you can hardly see a thing. It's a fascinating sight, a regular dream world." Monet's tantalizing results led the French writer Émile Zola (1840–1902) to praise the resulting state-of-the-art plein-air paintings, and in a way that no doubt gives a new meaning how we think of the term "plein-air": "You can hear the trains rumbling in, see the

smoke billow up under the huge roofs . . . That is where painting is today . . . Our artists have to find the poetry in train stations, the way their fathers found the poetry in forests and rivers" (in Wilson-Bareau 1998: 105-106).

Brain research has similarly yielded prescient and incongruent examples. After Luigi Galvani's pioneering work in the late 18th century led to an understanding of the electrical basis of nerve impulses some scientists tried to animate corpses, which led to a scientific debate that is critiqued in Mary Shelley's Frankenstein. By the 19th century a range of ideas about localized function, human psychology, human physiology, and environmental impacts are similarly evident in both art and the neurosciences. William James introduced the word plasticity in 1890 to speak about hypothetical changes in nervous activity that underlies the formation of habits, a more limited concept than how use the term today. Over the course of the 20th century, plasticity and hardwiring were discussed, with the computer revolution beginning to add texture to the ideas by the end of the century. The current understanding is that brain development itself begins before birth and continues over the course of our lives. Starting out as a tiny strip of cells, complex biological processes form the brain. Then, as we grow over time, connections within the brain are constantly being removed or recreated, largely dependent upon how they are used.

Using an array of examples that encourage thinking about art, the brain, plasticity, embodiment, and the environment relationally, this talk will emphasize four themes that integrate commonalities and incongruities within the art and brain discussions: First, I will explain that many elements related to art and our brains are difficult to precisely characterize and exist within a larger context. Thus, the "unclosed" circle phrase in the title. Second, I will argue that rather than creating a defining model for art and cognition, we should approach the topic developmentally. Third, insofar as we know, creativity is not located in a discrete region of the brain; it is a complex, dispersed, and flexible function that includes the brain and the nervous system. For this reason, I will urge we think about art and the brain in terms that encompass our changing biological nature, natural environmental factors and culture. Finally, I will consider how all of the above frames our individuality. Gerald Edelman (1929–2014), the American biologist who shared a 1972 Nobel Prize and trained as a concert violinist before turning to science, put it well when he said that if we are going to see human psychology on a biological basis "we must account for how embodiment occurs in each individual" (Edelman 1992: 33).

References:

Dickens, Charles. 1854. Hard Times. For These Times. London: Bradbury & Evans.

Edelman, Gerald M. 1992. Bright Air, Brilliant Fire: On the Matter of the Mind. New York, N.Y.: BasicBooks.

James, William. 1890. The Principles of Psychology. 2 vols. New York,: H. Holt and company.

Thoreau, Henry David. 2004. Walden: A Fully Annotated Edition: Yale University Press.

Wilson-Bareau, Juliet. 1998. Manet, Monet, and the Gare Saint-Lazare. Washington DC: National Gallery of Art.

Papers

Wednesday 9 September 9:15

Event Spaces of Infinite Perspective

Mathew Emmett, *Associate Professor in Three Dimensional Design*; Adam Benjamin, *Lecturer in Theatre & Performance*; and Frank Broz, *Research Fellow in the Centre for Robotics and Neural Systems, Plymouth University*

"It is the vital impulse that drives us to generate new forms and new experiences, to grasp reality in a broader, more real way".
(Montxo Algora, 2008. Director ArtFutura)

For the past year, choreographer Adam Benjamin and architect Mathew Emmett have been exploring performative space within contemporary dance. The impetus for this research has been focused on the formation of compositional potentials achieved through the hybridisation of integrative dance with experimental architecture. Whilst this paper will focus on new choreographic devices for transdisciplinary practice, Benjamin and Emmett will also explore the capacity of 'event-spaces' (Tschumi, 1981) to advance a heightened understanding of environment-agent relationality. This paper

proposes a hypothetical theory called "enactive niche construction" (Emmett, 2015) that tries to unify these choreographic theories with an ecological understanding of architectural space, perception and kinesphere agency. Further, this paper will examine novel improvisation methodologies together with architecturally designed soundscapes that recognise and anticipate the ganzfeld experience.Together with experimental practice and interpretation, these relational dialogues are amplified by the mediation of transdisciplinary methodologies, where each domain is concerned with the primacy of reflexivity in the overlapping terrains of dance, architecture and sound.

Benjamin and Emmett will present a series of case studies to demonstrate these theories including a trans-Asiatic dance project "Open State" (Benjamin, Emmett & ljichi, 2015), where a deeper, more investigative analysis will illustrate the iterative design processes that underpin the practice-led research project. Documentary films, sound, photographs and diagrams will compliment the presentation of the paper to help validate the experiential domain. Documentation of dance and critique will be analysed using computational tools that capture patterns of sound and movement within this dialogue.

Cognitive Innovation and Framing in Documentary Film Practice

Catalin Brylla, *Senior Lecturer in Film, University of West London*

In terms of film practice cognitive theory has mostly been concerned with audience reception, not with the creative conceptualisation of moving images. Whilst documentary filmmaking decisions are often made with an audience in mind (Eitzen 1995), filmmakers and film scholars have not yet explored how a socio-cultural framing shapes affective and cognitive spectatorship experiences, and how this framing can inform the creative process of film production.

Adopting Wayne's idea of documentary as creative and critical practice, this paper argues that, especially when it comes to the representation of under/mis-represented social groups, the filmmaker's encounter with the "other" indebts him/her into a responsible media portrayal (Levinas, 1989) – a portrayal that takes into account cognitive schemata. As Macrae and Bodenhausen explain, our perceptions of the social world are guided by categorical (i.e. stereotypical) thinking based on pre-existing schematic knowledge, not the novelty of

individual case studies (2001, p. 240). Media are complicit in the construction of this schematic knowledge, which has been detrimental to social groups, such as disability. Disabled people have been dominated by being squeezed into socially constructed dichotomies (e.g. abled-disabled, normal-abnormal), which have been perpetually reinforced through narrative and stylistic tropes in media portrayals (Riley 2005).

The methodology of my documentary practice aims to demonstrate the value of cognitive theory in relation to two stages of filming blind people: (1) gauging the current media framing of blindness and conceptualising alternative portrayals that go beyond common stereotypes, thus aiming to initiate a shift to a cognitive "plurality" when it comes to perceiving disability on screen, and (2) using cognitive theory to enable the filmic mediation of first-person embodied experience through particular artefacts (e.g. biographical objects) and spaces. From this perspective, my methodology considers "experience" to have cognitive and phenomenological aspects (Bayne and Montague 2011) that can be mapped and captured through the affective interaction with materiality.

From Conceptual Blending to Procedural Blending: Applying a model of cognition to process in sound art practice

Iris Garrelfs, *Lecturer, Sound Arts & Design, London College of Communication*

This paper is based on a practice led PhD research project conducted between 2010 and 2014 at CRiSAP, University of the Arts London (Garrelfs, 2015). In this research, a theory of cognition, conceptual blending (Fauconnier and Turner, 2002), was applied to the investigation of process in sound art practice. Conceptual blending posits that everyday, subconscious activities such as crossdomain mapping are involved in combining elements from a range of inputs into new concepts. Sound art is 'explicitly intermedia' (Barthelmes, 2006) and artists employ avariety of genres, media, formats and technologies. In order to illuminate this inherently multi-modal practice, I have borrowed from and extended the model of conceptual blending to create the model of 'procedural blending'; it can serve as a framework for artists and researchers to understand and communicate the complexity of sound art practice.

Through the notion of inputs, which are blended through an iterative process of making into outputs, procedural blending illustrates how new work is created. Inputs can be drawn from diverse, even dissimilar categories,

including media, genres, technologies, approaches, and even personal aspects such as emotions or personality traits can be considered as an input. As a consequence, this research also extends the notion of process to include all that artists might encounter in their lives; what shapes the artist, also shapes the work. Additionally, the development of procedural blending has resulted in a method which aids the creation of new works of art; this method is suggested as useful in interdisciplinary collaborations outside sound art, where languages and viewpoints may differ.

This paper summarises the original theory of conceptual blending, sets out my adapted model of procedural blending, and illustrates this model by applying it to the discussing of two of my own art projects. Potential additional applications of the model such as the tracking of process are also outlined.

Wednesday 9 September 11:15

Art in Action: Does recreating motion performed during art production help increase appreciation at the time of viewing?

Ben Dyson, *Lecturer in Psychology, University of Sussex;* Christine McLean, *Ontario College of Art and Design;* Stephen C. Want, *Ryerson University*

There are often large historic, cultural and ability distances between an artist and the viewer of the art. One hypothesized way to increase art appreciation is to create congruency between the actions performed by the artist and the actions performed by the viewer (Leder, Bar & Topolinski, 2012). Across 4 experiments using university undergraduates, we explored the conditions under which providing a motoric link between the artist and viewer promotes the aesthetic experience. In Experiment 1 we asked participants to make either stroking or stippling motions while viewing stroke-style and pointillist-style paintings (op cit) but failed to show an effect of image-action congruency. In Experiment 2, the relationship between image and action was made more transparent by re-using some of the materials produced in Experiment 1 as closer examples of the kind of work produced when stroking or stippling, and the desired cross-over interaction was observed. Experiment 3 demonstrated that the effect cannot be reproduced by simply hearing the sounds associated with drawing production, highlighting the need for a motor component. Experiment 4 investigated whether measures of awareness of the image-action match modulated the liking ratings, in addition to artwork familiarity and

participants' own hypotheses regarding the direction of the image-action effect. Participants who predicted that congruent relationships between what they saw and what they did would increase liking showed enhanced congruency effects. Establishing links between historical production and contemporary exposure to art may then rely on overt rather than covert processes.

The Contact Sheet in Close Up

Jacqui Knight, *CogNovo Research Fellow, Plymouth University*

Possibly the most established post modernism truism is that what you see depends on where you stand, but perhaps less discussed is the notion of selectivity in one's visual encounter with the world. In this paper I will discuss the photographic contact sheet as an archaeological trace of vision and attention. It will show how a forensic study of the sequencing, intervals and photographer's inscriptions of this 'first sight' of all the pictures taken on one film roll has much in common with the attentive processes of high speed and time-lapse photography. The contact sheet in this paper will be discussed as an artefact of close and slow looking in two registers, the first as a record of the photographer's selective attention and the second as the reflective engagement after the event. Using examples from Magnum photographers Cartier Bresson and Jonas Bendiksen and through the writing of Vilem Flusser, this paper will try to show how the photographic contact sheet, perhaps once the most natural and ubiquitous outcome of the analogue photographic process, can be seen as a world view that is exclusively available through the photographic artefact as 'apparatus' (dispositif), and its subsequent interpretation through a post hoc narrative. The exceptions to this perhaps are those photographic practices in which the 'photographic process is intentionally made apparent in the image in order to highlight the conscious awareness of visual comprehension within the viewer.

Creativity as Correspondence in Humanitarian Engagement

Pamela Cajilig, *Curiosity Design Research,* and Diego S. Maranan, *CogNovo Research Fellow, Plymouth University*

If there is any phenomenon that demands a creative and efficient response, it is the onslaught of disaster. Conventional approaches to mitigating the effects

of disaster hinge on policy and planning, where pre-determined courses of action are expected to give form to an idealised configuration of social and technological formations that provides a best "fit". The search for "fit" tends to be messy and improvisatory rather than straightforward and predictable. It requires more than alignment of institutional agenda or finding the right technology for the right relational patterns, especially as post-disaster settings are imbued with uncertainty, anxiety, and distrust. This paper reflects on our experiences doing design research for shelter assistance intended for coastal communities in the Philippines affected by Typhoon Haiyan. Our broad aim is to suggest alternatives to planning-oriented approaches in addressing the challenges of humanitarian engagement, and in doing so support assertions Caroline Gatt and Tim Ingold's formulations of design as "correspondence". We maintain that humanitarian engagement is an example of improvisatory, group creativity in which variedly positioned actors subjectively evaluate their consonance (or lack thereof) with the givens of the moment, devising aims and actions as they carry on. This paper is located within intersections between creativity, design, and the social sciences by illuminating the everyday workings of power and agency as actors improvise their way through the politically inflected field of humanitarian engagement.

Electrophysiology of Cinema Spectatorship

Guy Edmonds, *CogNovo Research Fellow, Plymouth University*

As a loose movement, Media Archaeology has employed a multiplicity of approaches and, unlike more formal media studies, its exponents have often productively engaged with the artifacts and practices that it investigates. This is admirable but can be extended even further in combination with techniques in use in the cognitive sciences to create an archaeology of historical audiovisual perception.

This paper will outline a novel method for analyzing human perception and cognition as it relates to the viewing of motion pictures. It will apply knowledge gained from electrophysiological studies to scholarship on the reception and technology of Early Cinema and propose experiments in which I aim to compare brain response to projections of analogue and digital versions of the same film stimulus. The intention is to combine experimental media archaeology – media archaeology in which use of historic technology is central to the investigation - with electrophysiological techniques. It takes dormant,

obsolete technology, which is nevertheless loaded with the potential for action and bristling with suggestive affordances, and reanimates it for the purpose of shedding light on the question of historical perception.

Perception of Intended Emotion in Drawings by Non-artists

Diane Humphrey, *Associate Professor, Department of Psychology, King's University College at The University of Western Ontario;* Bryanna Lucyk, Christie Purchase, Rachel Sansone and Emily Baxter, *Department of Psychology, King's University College at Western University*

A corpus of 442 coloured drawings made by 28 young adults, 22 older adults and 22 children depicting six different emotions were rated for emotional content by eight judges untrained in art. The colours used in the drawings were also analysed. As in a previous study, emotional descriptors of happiness and sadness were more frequently given by judges than were other descriptors for all emotional scenes. Happiness was more frequently seen in depictions of happiness and sadness more frequently seen in depictions of sadness than were other emotions. Other emotional scenarios, however, were more frequently described with emotional words unrelated to the intended emotion in the drawing. The use of colour was not clearly related to specific emotional scenarios. In previous studies it has been shown that there is a spectrum of colours typically related to a range of emotions in drawing, painting, pointing and naming tasks. The direction of association, however, appears to be expressive. While emotion names can evoke specific colours, colours per se do not evoke emotional categories as reliably. This relationship resembles the inducer-concurrent roles in synaesthesia and may be related to synesthetic phenomena.

Wednesday 9 September 14:45

The Formational Imaginaries of Space Technology as an Issue of Cognitive Innovation

Joanna Griffin, *Associate Researcher, Transtechnology Research, Plymouth University*

The paper presents concerns that relate to the cognitive shaping of space

technology. It addresses tendencies and framings that reveal limitations in the imaginative scope formational to the actual production of space technology and which pervade the operational frame of reference of space agencies.

From the evidence of anecdotal reports and visual documentation there are a number of formational imaginaries that space technologists refer to when describing their visions. Among these are 'towers to the sky' that inspired the geostationary orbit and the (in process) space elevator. These cartoon--like imaginaries spill into diagrams of disproportionately large satellites in space sending signal over vast 'footprint' areas of Earth with a seemingly invincible capability to connect and survey. In addition the imagery of spaceflight is dominated by the graphic allure of starkly lit objects set against the black background of space and often depicted from a 'God's--eye view' (Haraway, 1982) or Archimedean point (Arendt, 1963).

The visual characteristics of such imaginaries raise questions as to what is framed and what is left out of the frame by such ways of thinking. Furthermore, if there is an inherent bias in what is seen and not seen in the mind's eye of the space technologist, are there detrimental consequences to this? And, if so, then should the development of technology concern itself with techniques of cognitive innovation to counter the potential normalisation of cultural myths and other hidden assumptions into the fabric of space technology via under--critiqued visual imaginaries?

The intervention of the artistic, aesthetic and creative into the operational frames of reference of space agencies indicate a claim for inclusion in the frame and foregrounds the authorial construction of space technology and mechanisms for cognitive innovation. In addition, the painterly struggles by artists through history, offer techniques for addressing visual bias – and visual naivety – in the formational imaginaries of space faring. The paper presents speculative proposals for an underdeveloped correspondence between aesthetic interventions and determinants of technological development.

The Affective Embodiment of Testing Tools and Their Influence on Experimental Outcomes

Agi Haines, Kathryn Francis and Raluca Briazu
CogNovo Research Fellows, Plymouth University

This paper intends to question the potential implications of production quality in simulations of the flesh within psychological experimentation. In experimental design, behaviours are often tested through a simulacrum of the human body, one whose subtlety within the tool's fictitious nature is rarely considered as potentially impactful on data collection and research outcomes.

Simulations of the human body will be questioned through an interrogative study of one specific experimental scenario titled the 'footbridge dilemma.' This dilemma is an influential inquiry in the field of moral cognition; a field endeavouring to observe and interpret moral choices as driven by primitive or instinctive characteristics. Within this dilemma, participants are faced with the prospect of pushing a 'fat man' off a footbridge in order to obstruct a train's imminent progress towards several construction workers on the tracks ahead. This scenario is designed to elicit a speculative action questioning the morality of dynamic participation, an action that is primarily based on material judgement of a person's structure and substance. Despite the emotional and ambiguous richness of 'morality', experimental science has largely employed hypothetical or pen-and-paper methods to formulate the scenario and inspect responses. The embodied nature of moral action has been neglected and the physicality of speculation unfathomed within experimental science.

The consideration of aspects such as aesthetic appeal, haptic response and tactile quality may produce simulations in the form of sculptural entities that can question verism within material treatment of experimental tools. And in turn the potential to highlight the importance of subtlety in production of simulations within experimental designs could offer new insights concerning the generalizability of outcomes when compared to real-life circumstances. Perhaps experimentation with the concept of hyper-reality may trigger an embodied response, potentially evincing a corporeal experience rather than a dissembled ethical choice.

Catastrophe, Sense of Crisis, Cultural Expressions

Yutaka Nakamura, *Associate Professor, Tama Art University*

This paper, at most manifest level, examines the selective cultural responses toward the recent major earthquake and Fukushima nuclear disaster in Japan. Since March 11, 2011, Japan has suffered from the earthquake and its aftermath. Most physical damage was caused by the tsunami and although so many houses, schools, businesses and other constructions were shattered by its brutal wave, the severest impact was brought by the meltdown at the Fukushima nuclear power plant. This unprecedented and ongoing accident invoked a set of urgent yet lasting problems that otherwise would not have been fully addressed. There has been a lot of strong emotion among people; frustration, anger, a sense of hopelessness, of betrayal and of mistrust toward the politics, the involved corporations, and the information disclosure. But most of all, there has been a strong sense of lasting crisis, some manifest while others more subtle.

It is, then, this paper's second task, somewhat theoretical one, to explore the relationship between this sense of crisis and some of the cultural responses that are produced under it. Crisis, of course, if we follow Walter Benjamin, is the moment at which one's epistemic framework ceases to sustain his "ordinary" everyday life. His understanding is challenged, belief system questioned and cognitive limit shaken and pushed. It could be an opportunity to sense the ruptures within the current totalizing and normalizing system, recapture a different history and reimagine an alternative future. Yet, crisis is also a moment at which one stubbornly seek to recover his once familiar system, restore his shattered belief and hold on to the precedent remedies.
The paper focuses on selective cultural responses toward what could be called a serious catastrophe. In that, it is a speculative approach toward the relationship between crisis and expression, and catastrophe and creativity.

(How) Does Play Matter?

Chun-Wei Hsu, Pinar Oztop, Michael Straeubig, Mihaela Taranu, *CogNovo Research Fellows, Plymouth University*

Play is a common, yet elusive phenomenon in humans and animals. Despite many attempts to define, explain and justify play, sciences, humanities and

the arts have yet to achieve a truly transdisciplinary understanding of the issues involving playful thinking and playful behaviour. In this paper we explore three different phenomena in their relations to play: neurobiological development, deception and creativity. We then reflect on these observations from our individual perspectives and address the resulting questions in form of a multidisciplinary discussion.

Wednesday 9 September 17:00

Round table discussion
Manipulating the Human Mind: When experiments get dirty

Kathryn Francis, Ilaria Torre, Chun-Wei Hsu, Raluca Briazu, *CogNovo Research Fellows, Plymouth University;* Chair: Sue Denham, *Professor in Cognitive and Computational Neuroscience, Plymouth University*

This session aims to discuss the current ethical and experimental considerations in the field of psychology with a particular focus on investigating personality traits. The main focus lies in those cases in which experimenters manipulate participants' personalities through moral or morally-related paradigms. These experimental designs have considerable ethical considerations with participants often encouraged to make moral judgements, take part in deceptive tasks or trusting/ untrusting games.

Thursday 10 September 9:00

Transcending Academic and Epistemic Boundaries: Psychoactive tryptamines and the frontiers of human exploration

Chris Germann, *CogNovo Research Fellow, Plymouth University*

Contemporary materialistic reductionist neuroscience emanates from the working hypothesis that the underpinnings of human perception and cognition are based on electrochemical transduction. That is, electrical action potentials and chemical neurotransmission are postulated to undergird all mental processes. Interestingly, especially from a neurochemistry/biology point of view, several secondary (possibly semiotic) plant compounds have close structural relationships with various human neurotransmitters and

consequently can reliably change a variety of cognitive processes (both quantitatively and qualitatively). N,N-Dimethyltryptamine (often acronymised as DMT) is a paradigmatic exemplar. Its molecular structural geometry (see Appendix) is very closely related to 5-hydroxytryptamin (Serotonin) and it is a phylogenetically ancient molecule which is ubiquitous in the plant and animal kingdom (Smith, 1977). In its pure synthesized form, DMT is a white, pungent-smelling, crystalline solid. Accumulating converging evidence suggests that DMT is an endogenous neurotransmitter in the human brain (e.g., Cozzi, et al., 2009; Fontanilla, et al., 2009).

A defining criterion of DMTs psychological activity is that it affects visual perception in the most spectacular ways possibly imaginable. Its profound experiential/phenomenological effects are described as consciousness expanding, transformative, and essentially ineffable.
DMT has been used in shamanistic rituals for millennia by several cultural traditions. For example, it constitutes the active chemical principle in Ayahuasca, a plant based, drinkable concoction, which is utilized by indigenous tribes in the Amazonian rainforest for divinatory and healing purposes (Metzner, 2014). Typically, the main ingredients of the Ayahuasca brew are two plants, Psychotria Viridis (which contains the DMT) and Banisteriopsis Caapi (which contains the harmala alkaloid harmine, a monoamine oxidase inhibitor that prevents the breakdown of DMT in the gastro-intestinal tract). Western science has just recently learned about DMT and its psychoactive effects from ethnobotanists who were able to conserve this ancient knowledge literally in the last minute because old shamanic traditions are being extinguished at a fast pace by the modern industrial world.

Creative Mind and Evolution in Bergson's Philosophy: The self as technology

Martha Blassnigg, *Associate Professor in the Anthropology of Media, Plymouth University*

This paper will discuss the way the mathematician and philosopher Henri Bergson referred to the processes of the mind and to the evolution of consciousness as "creative". It will problematize this term in the sense of Bergson's reference to a particular tendency of the mind in its durational quality, as something that is "productive of effects in which it expands and transcends its own being" (Bergson, Creative Evolution p. 52). This will be situated in relation to Bergson's understanding of cognition as embodied and

enactive, which anticipated the recent return to a similar understanding of perception particularly in the discourses of the philosophy of mind. This paper will discuss this understanding of the mind's creative processes, connected with agency, choice and action, within the contemporary historic context in view of its current relevance. It will raise the question how this model of mind has been influencing thinking about media, processes of mediation, perception and affective engagement through the cognitively pro-active role of the beholder (viewer and researcher alike); as 'observing participant' of one's internal cognitive processes.

The presentation will revisit some key examples of self–reflective uses of audio-visual media within scientific contexts including documentary film, visual anthropology and scientific visualisation and discuss them as participatory platforms that provoke and afford cognitive engagement as creative, constructive process. It will discuss this form of active engagement with reference to Michel Foucault's 'technologies of the self' and in doing so uncover an undercurrent strand in the history of cinema and its wider, especially philosophical, dispositif that addresses the intrinsic area of mental health and well-being and processes of mediation as vehicles to train perception. As such it will situate the discussion of media, philosophy and cognitive science in a larger spectrum concerned with the anthropology of the creative human evolution.

Cognition, Materiality and Salvation: The relationship between objects, people and God in counter-reformation France

Elizabeth Tingle, *Head of School & Associate Dean, Humanities and Performing Arts, Plymouth University*

The ways in which Europeans understood the nature of God and how he worked in the physical world – immanence - are amongst the most important questions asked by historians about the Reformation period. With the growth of Protestantism in Europe after c.1520, the relationship between divinity, people and material objects was hotly contested, as Christians disputed the best way to achieve eternal salvation. Protestants largely rejected sacred materiality and in its Reformed version tended towards iconoclasm. Catholics, however, retained the belief that God could work in special locations and through physical objects: he could be encountered and understood through material things. In the Counter Reformation, therefore, relics and shrines were restored,

images defended and objects revived.

In this paper, I will draw upon the methodologies of history, archaeology and anthropology to investigate some of the changing ways in which Europeans encountered and comprehended divinity in this period, through a case study of the creation and use of a particular category of 'thing', indulgenced artefacts. Sites and objects could be inextricably linked to heavenly power, for they can refer to, provide signs of, or gesture toward the divine. Of interest here is how religion was implemented in concrete, material domains, such as the body and senses, objects and exchange relations, things and spaces. Across the Counter Reformation period, 'things', medals, beads, rosaries and crosses, could act as physical, portable vectors of salvation for their owners through their bestowal with indulgences. Indulgence-bearing objects were particularly potent for their owners for they permitted direct access to personalized grace through touch, sight and speech. Material 'things' therefore allowed for the expression of faith and the acquisition of salvation in different ways in the Counter Reformation. Their paper therefore presents an historical understanding of cognition of divinity.

Thursday 10 September 11:00

Musical Imagery: Towards the liberation of imagination

Freya Bailes, *Academic Fellow in Music Psychology at the University of Leeds*

"Be ready to play what you know and play above what you know." (Miles Davis)

How do musicians reach beyond their existing re-presentations of sound to imagine the unknown? Music is the perfect example of a conscious imagined experience so common that it is known to regularly encroach on daily life in the form of 'earworms', while at the same time serving the creative needs of musicians who are able to mentally recall music and imagine new musical patterns in their mind's ear. Such conscious representations of music, known as musical imagery, have not been critically studied with respect to musical creation. Understanding their relationship can inform the effective teaching of creative practice, which in music includes composition and improvisation. Mental imagery is also used in mental rehearsal: by studying its imaginative potential, performers ranging from artists to athletes might benefit by acquiring the strategies they need to enrich and attain their performance goals.

This paper will draw on existing and planned experimental research to consider musical imagery: 1) as a phenomenon limited by our experience and cognitive mechanisms, 2) as an involuntary occurrence in everyday life triggered as much by our physiological state as our mental processes, and 3) as a creative tool, in which re-presentations are manipulated to new ends.

Engagement and Optimal Experiences in Music Education Clases: A case study based on the Orff-Schulwerk approach and Flow Theory

João Cristiano R. Cunha, *Researcher, INET-MD, University of Aveiro*

Based on a longitudinal study conducted in the context of Music Education - 2nd Cycle of Basic Education in Portugal - for two academic year periods, this work presents results, involving students (n = 50) in classes of Music Education, based on the Orff-Schulwerk approach. This pedagogical approach, applied in more than forty countries in the five continents, comprises a multiplicity of artistic and expressive aspects sustained in practice (and integrated) experience of creative music, language, dance and movement. This pedagogical approach search for a holistic development of the human being. The collection and data analysis has a methodological support based on Flow Theory (Csikszentmihalyi, 1975, 1988, 1990, 1997, 2002), particularly their adaptation to the Music Education context (Custodero, 1998, 1999, 2000, 2002, 2005), through two instruments: FIMA - Flow Indicators in Musical Activities, and AFIMA - Adapted Flow Indicators in Musical Activities. AFIMA contains, in the "affective" dimension, the "involvement" as an indicator parameter of optimal experiences / flow states occurrence. The results obtained indicate that students lived high degrees of "involvement" in Music Education classes based on the Orff-Schulwerk approach.

A Multidisciplinary Approach to L2 Learning by Illiterate Adults: Multimedia, situational comedy and dyslexia exercises

Abeer Nasser Eddine, *PhD in Language Sciences, University of Grenoble*

As cognition "refers to the ability of the brain to process, store, retrieve and retain information", we presume that illiterate adults learning a second language (L2) are less likely to develop cognitive abilities and executive functions, especially if we take it for granted that early bilingualism – unlike

monolingualism – favors an increase in metalinguistic awareness. Besides cognition, emotional and contextual factors and other influences like age, gender, socio-economic status, time and the amount of exposure are at play. Digital illiteracy can be an additional hindrance in the context of Information and Communication Technologies (ICT) based language teaching and learning. That said, illiterate adult immigrants or underprivileged groups are left with little to no hope of learning a second language.

We hypothesize that the individual's need for survival as proposed by the Darwinian theory of struggle for existence together with the use of adaptive digital language learning environments can help motivate illiterate adult immigrants to learn to communicate orally in L2 at a basic level (A1/A2 – Common European Framework of Reference for Languages).

We propose a thematic prototype, an interactive multimedia language learning tool in French, that takes into account two major aspects: (i) a socio-cultural approach to language based on Vygotsky's theory (1987) through mediation and meaning while using situational comedy and farce and (ii) language learning exercises for dyslexics to train working memory. This aims at enabling the target groups to meet their basic societal needs: career development, social integration and/or lifelong learning. A lexical corpus of at least 50 French words and phrases is recurrent throughout the themes suggested. This user interface – designed to encourage autonomous learning, preferably with a tutor's assistance – highlights language processing skills (listening and speaking), visual and semantic memory skills, attention and concentration, and visuospatial and constructional skills.

Exploring Creativity Through Creative Artifacts and Group Performances: Analysis of the students' accounts of a Masters programme in innovation, creativity and leadership

Mary Ann Kernan, *Senior Lecturer, Department of Culture and Creative Industries, City University London*

This paper outlines the learning outcomes of 'Creativity and the Creative Industries', the final module of an interdisciplinary Masters programme for post-experience management students. Its experiential workshops, led by expert practitioners, introduce artistic practices (drama, classical music, improvisation and art) and explore the nature of embodied experience (Watkins, 2014). The assessed elements include a group performance, a

showcase of individual artefacts, a reflective journal and a summative reflective report (Bolton, 2014; Entwistle, 2009; McDrury & Alterio, 2003).

These theoretical propositions underpin the PhD study outlined here (Yin, 2008, p.18):

1) That the module's learning processes explore creativity through artistic, unfamiliar, disruptive, embodied experiences (Dewey, 1934; Fleming, 2012; Holtham et al., 2013; Marshall, 2008; Sawyer, 2012; Senge et al., 2005; Standal & Engelsrud, 2011; Todes, 2001; Varela et al., 2001)

2) That the students create an applied understanding of their learning through reflection and personal narrative (Bruner, 2002; Boyd, 2009; Damasio, 2012; Downey & Clandinin, 2010; Dreyfus, 1996; Gottschall, 2012; Herman, 2013; McGilchrist, 2009)

3) That critical incidents in the students' personal narratives will be expressed through metaphors of personal and professional identity (Fuster, 2013; Gauntlett, 2007; Lakoff and Johnson, 2010; Ricoeur, 2007; Shiu, 2014; Sullivan & Rees, 2008)

4) That both narrative (Goodson, 2013; James and Brookfield, 2014, p.106, citing Kűbler-Ross's (1997) Change Curve) and personal change models (eg Heron, 1992, p.122) will usefully inform the analysis.

The approach is consistent with arts-based and creativity research (eg Amabile, 1983; Bateson & Martin, 2015; Gregerson et al., 2013; Shiu, 2014; Sayer, 2012), and work on threshold concepts (Meyer & Land, 2003, 2005).

The paper concludes by inviting discussion on the potential for collaborative research on experiential, creative pedagogy and distributed cognition in higher education (Hollan et al., 2010; Hutchins, 2000).

Thursday 10 September 15:00

Evaluating the Affective Potential of a Computer-aided Composition System in 2D

Duncan Williams, Alexis Kirke and Eduardo Miranda, *Interdisciplinary Centre for Computer Music Research, Plymouth University*

Affectively-driven algorithmic composition (AAC) is an emerging field combining computer music research and psychological approaches to music cognition [1], [2]. AAC systems attempt to communicate or induce specific emotions in the listener by creating novel music. In this poster we report on a listener evaluation of a pilot system under development at the Interdisciplinary Centre for Computer Music Research, Plymouth University, as part of the 4.5 year BCMI-MIdAS (Brain Computer Musical Interface for Monitoring and Inducing Affective States) project, funded by the EPSRC.

A musical feature / affective response matrix was drawn from literature and implemented in an artificial intelligence driven composition system. This response matrix corresponds to a time series of musical features with varying ratios, intended to evoke discrete affective states that can be broadly represented on the 2-Dimensional circumplex model of affect (wherein valence describes the horizontal axis, corresponding to positivity of emotional response, and arousal describes the vertical axis, corresponding to intensity of emotional response) [3]. The system uses this feature matrix to inform the generation of new music with specific affective targets, as a polyphonic piano score.

A tri-stage listener evaluation was then used to inform two levels of subsequent calibration of the affective response matrix. The size and spread of affective responses was gradually increased by deliberate manipulation of the ratio of musical features in the affective mappings, until a complete spectrum of emotional responses in each quadrant of the 2-Dimensional space was achieved in the listener responses.

Towards Modelling Humpback Whale Song Evolution using Multi-agent Systems

Alexis Kirke, Eduardo Miranda, *Interdisciplinary Centre for Computer Music Research, Plymouth University;* Luke Rendell, *School of Biology, University of St. Andrews;* Simon Ingram, *Marine Institute, Plymouth University*

The vocal behavior of cetaceans is a fast expanding current research area worldwide. This interest is largely explained by the highly complex vocal beihavior of cetaceans, including vocal learning, vocal signatures and vocal dialects. This paper focuses on the singing behavior of Humpback whales. Humpacks exhibit one of the most complex forms of mamal communication

outside human beings. Thus learning about humpback song may help us learn about hpw our own language evolved. The work in this paper came about as a result of a musical commission which involved a very simple Humpback Whale model. Unusually this performance led to a multi-centre science project with marine mammal experts, of which this paper is a part. This mutli-agent model incorporates mobile whale agents that communicate using a simple song-grammar made up of a small vocabulary. Agents are attracted to swim towards other agents who are singing a similar grammar. Agents also adapt their grammars based on the singing of other nearby agents. The closer the nearby agents are, the greater the influence. These features are consistent with a number of the proposed hypothoses for the singing behaviors of the Humpback whales and other marine mammals. As a result of these features we show how over time the agents song grammars become more correlated, and agents which are closer geographically have more closely correlated grammars. Furthermore the agents group into clusters, or "schools," which exhibit highly correlated grammars, and hence similar songs, and will continue moving in these "schools."

Friday 11 September 9:00

The Pretty Hard Problem of Creativity

Jack McKay Fletcher, *CogNovo Research Fellow, Plymouth University*

David Chalmers in his essay "Facing up to the problem of Consciousness" makes the distinction between the "easy problems" of consciousness and "the hard problem" of consciousness. The easy problems are a broad category of cognitive phenomena which can be systematically studied by the cognitive sciences. The hard problem of consciousness is the phenomenon of subjective experience. Chalmers argues that easy problems are tractable using the current methods of cognitive science, whereas the hard problem is intractable. In the present work I introduce a third category of "pretty hard problems", problems which I believe to be too hard to fit in the category of easy problems but not quite as difficult as the hard problem. To motivate the existence of this category I use the problem of human creativity as a case study. I argue that creativity does not naturally belong to the set of easy problems, nor the set of hard problems, thus a third intermediate category of pretty problems is a useful concept. Afterwards, I describe two characteristics which make a problem pretty hard, namely non-modulariseability and subjectivity. In addition, I

identify additional cognitive phenomena which belong to this category. To conclude, I argue that the pretty hard problems cannot be systematically studied in the same way as the easy problems, and as such, care needs to be taken by cognitive scientists when studying a pretty hard problem.

Memory and the New Unconscious

Sowon Park, *Lecturer in English at Oxford University*

The unconscious, in so far as it refers to the processes of the mind that are not conscious, has always been a central concept in the arts. In science, however, the unconscious only found brief legitimacy in models of the unconscious/subconscious developed by Freud and William James before being relegated to the margins by the ascendency of positivist models of knowledge. Behaviorism dismissed ideas about the unconscious because they could not be empirically verified; logical positivist orthodoxy rendered what is not testable and falsifiable as 'meaningless'. In this vein, Karl Popper famously claimed that psychoanalysis was a pseudo-science. However, new and ongoing discoveries in cognitive neuroscience during the last twenty years demonstrate that very little of what goes on in the brain is actually conscious, making it possible not only to re-examine earlier models of the unconscious but to witness the role of the unconscious in the human mind as the new frontier of knowledge. This paper will chart the relations between the unconscious and memory as they have been configured in psychoanalytic criticism and cognitive neuroscience to consider the innovations that might emerge from the correlation.

Hypnosis, Telepathy and the Modern Subject

Eugenia Stambolev, *CogNovo Research Fellow, Plymouth University*

Like telepathy as a "product of ambivalent modernity" (Luckhurst. 2002:276), the practice of hypnosis was similarly bringing up questions and ambivalent relationships, for example, between the concept of the immediate, intersubjective and inexpressible. A short overview on the connection between memory, mind and moving images (Väliaho: 2010) in the late 19th century will not only question the mentioned ambivalent terms but link a medical discourse intimately to the history of hypnosis, which at that time was led by prominent figures such as Martin Charcot, William James and Georges

Gurdjieff who were also familiar with F. Myer's work and well aware of the ideas and issues around telepathy. In this context the line between disciplines blurred— the term telepathy was as much at home in Freud's writings as it was in theosophers such as H. Blavatsky's or P. Ouspesky's work, which consequently influenced modern painters like W. Kandinsky who reports in his writings and paintings on these sources of inspiration (Luckhurst. 2002: 278).

The aim of this paper is to trace the visual myth of hypnosis rather than proving the "medical" accuracy of the changing practices. In the field of medical representations, medics like Charcot, Bernheim and Londe played an important part in illustrating hypnosis and also manifesting what was considered to look like part of the practice. Another move in this paper is to lay open why telepathy was being understood as a 'hybrid object' (Luckhurst. 2002), floating between not only disciplines but also artefacts and practices and redefining "the boundaries of the singularly bounded and distinctly human subject." (Blackman. 2010: 172) The challenge presented throughout this paper is to reflect on the problematic aspects of these techniques of "affective transfer" and to situate them in the bigger context of how modern technologies were used to displace the subject. What did these developments mean for the selfunderstanding of the modern subject - and its representation?

Quantum Creativity: Robert Creeley and self-reflective wholeness

Gi Taek Ryoo, *Professor of English, Chungbuk National University*

How can we represent reality if reality is 'all that is', a totality that includes things, thoughts, and words? How can language, thought and reality be made to coincide in mirroring each other's dynamics? Robert Creeley (1926-2005) addresses these issues by embodying, in his poems, the part-whole dilemma of quantum physics in the paradox of self-referentiality: his poetry attempts to describe the objective reality only by being itself inherent part of it. His poetry tends to place the poet himself within rather than outside the frame of reality, so that when he speaks about it, he is speaking from within the picture that basically contains himself. Much of David Bohm's ideas of 'wholeness' and his notion of 'rheomode' as well take place at this level, a level at which mind and matter are indivisible. It is not so much the brain that is thinking, that is stringing along words, but the entire body through subtle muscular movement which then unfolds into thoughts. Just as particles partake of each other, intellect, emotion, and the whole state of the body flow into and out of each

other, and which, in certain sense, enfold each other. Similarly, Robert Creeley firmly locates his poetry in the bodily act of language, identifying breath, heart beats, and the muscular-nervous system as the rhythmic measure of poetry. The act of writing then makes the poet realize the full force of words as they are continuously incorporated into the breathing rhythm of the body. In Creeley's poetry neither thinking nor feeling are recognized as such until their associative patterns are materialized into words and syntactic structures. I will argue that, creative thinking may be experienced as a quantum-like thought process, in which reality from within is indistinguishable in its dynamics from reality from without.

Friday 11 September 14:00

Panel discussion
Cognitive Innovation: Roadblocks, challenges and opportunities

Sue Denham, *Professor in Cognitive and Computational Neuroscience, Plymouth University*; Martha Blassnigg, *Associate Professor in the Anthropology of Media, Plymouth University;* Hannah Drayson, *Lecturer in Digital Art & Technology/ Immersive Media Design, Plymouth University*; Sowon Park, *Lecturer in English at Oxford University*; Chair: Roger Malina, *Distinguished Professor of Arts and Technology, Professor of Physics, University of Texas at Dallas*