YSLR

WINTER WORKSHOP
FRIDAY JANUARY 27 2017

MANCHESTER, UK

The study of social learning and cultural evolution has many aspects, and is studied with both humans and non-human animals, as well as with computers. It is a diverse field spanning across archaeology, biology, psychology, physics, philosophy, and many others. Whilst this field has seen an explosive growth over the past decade, we are only just beginning to understand what culture actually is and how culture in humans is similar or dissimilar from animal culture. And yet, there are still so many things we do not understand. These are exciting times for our research field. Wouldn't it be great to take this journey together?

The workshop is built around three themes:
(1) getting to know each other, (2) exchanging ideas and visions about our research field, and (3) exploring ways for public outreach.

The Company of Biologists

MANCHESTER 1824
The University of Manchester

PROGRAMME

0815		Registration - Put up Posters
0915		Welcome Address
0930		Keynote Speaker
1030		Coffee Break
1045		Activity
1145		Lunch and Posters
1245		Activity
1345		Coffee and Posters
1415		Activity
1515		Coffee and Posters
1615		Keynote Speaker
1715		Open Discussion about YSLR
1730		Closing Remarks and Drinking

Keynote Speakers

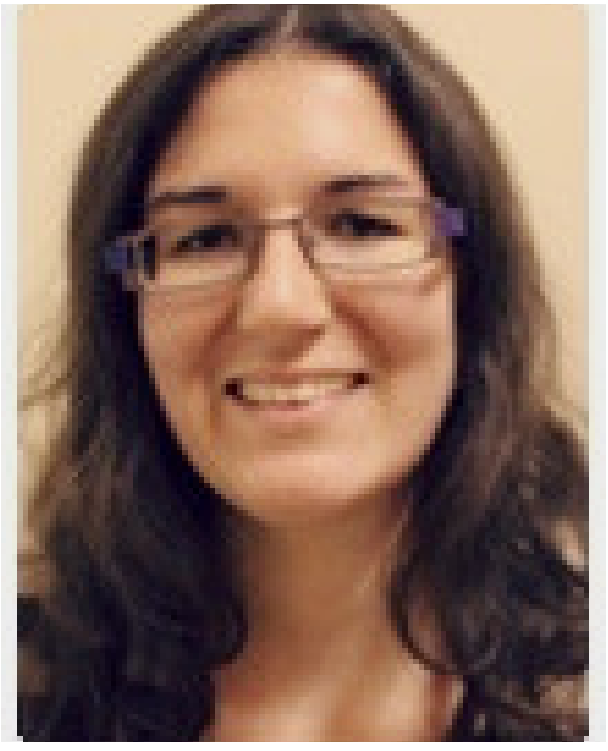
OLLI LOUKOLA

(Queen Mary University, London)

Olli is broadly interested in animal behaviours and cognition, especially social learning. His research focuses on information use within and among species as well as its ecological and evolutionary implications. In his latest projects, he and his colleagues show that the fundamental mechanisms for culture can be found in bumblebees and that even small brained insects can display goal-oriented behaviour for which evolution has not provided them with rigid adaptations.

EVA REINDL

(University of Birmingham)



Eva investigates young children's ability to spontaneously use and make tools to solve novel problems. She is also interested in cumulative culture, especially its ontogenetic origins and cognitive pre-requisites.

ABSTRACTS

The cultural evolution of vaccine-related narratives and its influence in vaccine decisions

Angel v. Jimenez University of Exeter

Although vaccines have been enormously successful in controlling infectious diseases, vaccination has often been subjected to controversy. Two of the most well-known controversies are the Pertussis (1974-1986) and MMR (1998 -2005) vaccine controversies. The origin of both controversies was the claims of some parents and some medical experts who were convinced that these vaccines caused dreadful outcomes such as neurological disorders and autism. These controversies were widely covered by the media and had an immediate effect on the rates of vaccination coverage, which, in turn, led to outbreaks of infectious diseases. The present study simulates the cultural evolution of a vaccine controversy using a transmission chain experimental design. Participants were exposed to opposed views regarding the dipherpox vaccine (a made-up vaccine against a made-up disease), which were held by either a father or a doctor. The experience-based view held by the father was better transmitted than the medical-based view held by the doctor. Importantly, the transmissibility advantage for the information attributed to the father did not interact with his stand on one side of the controversy (pro-vaccine vs anti-vaccine). Moreover, the exposure to two sides of the vaccine controversy caused a considerable number of participants (41%) with neutral or positive attitudes towards vaccination to decide not to vaccinate. The findings might have consequences for vaccination campaigns. The results suggest that vaccination campaigns may be more effective by including information about personal experiences with the diseases vaccines prevent.

Teaching behaviour in birds and primates

Camille Troisi Lincoln University

There is very good evidence that chickens socially learn, yet there is not yet any evidence that information is transferred from mothers to chicks. A previous study found that hens modify their maternal display when observing chicks feeding on seemingly unpalatable food, potentially to teach (Caro and Hauser, 1992) young chicks which food to forage on and which food to avoid (Nicol and Pope, 1996). In this study, I attempted to replicate Nicol and Pope's (1996) findings and further analysed the chicks' behavioural response over a period of 10 days, particularly looking at their foraging decisions and how they might be affected by the hens' demonstration. Although I found that hens did not modify their foraging display based on the chicks' foraging errors, the 95% C.I. showed little evidence that the pattern of results obtained was inconsistent with Nicol and Pope's (1996) findings. I found a weak correlation between the chicks and hens' foraging choices which was not in the expected direction: hens seem to adjust their dietary choices based on the chicks' choices. Finally, I found that chicks are consistent in their foraging decisions up to 10 days after the demonstration.

The study of interactions between cultural mechanisms and economic dynamics through an evolutionary perspective

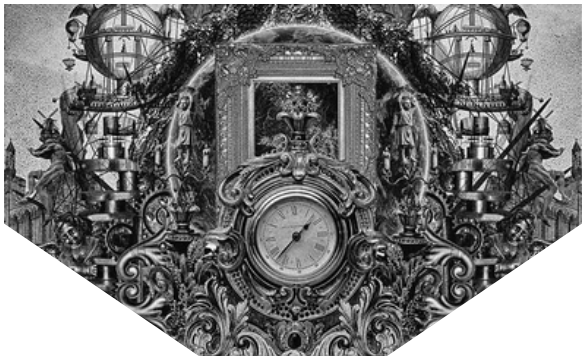
Simon Carrignon
Barcelona Supercomputing Center (BSC)
& Univ. Pompeu Fabra (UPF)

In this poster we explore a model previously build to study the interaction between cultural mechanisms and economy. In this first model groups of agents produce, consume and exchange goods. They learn and change the strategies they use to exchange goods by simply copying the more successful agents in the population. We use for this study a variation of Approximate Bayesian Computation to explore the parameter space of the original model and to compare it to an ideal case where all exchange of goods are made under a well know economic equilibrium: the general equilibrium (also called Walrasian equilibrium). Our method allow us to compute how likely different social learning process are able to produce a system where the emergence of a walrasian equilibrum is possible. At the same time it gives us the possibility to quantify the likelihood of the emergence of such situations under different set of fixed and limited constraints derived from historical cases studies.

Cultural changes of baetican olive oil amphorae from an evolutionary perspective

Maria Coto-Sarmiento
Barcelona Supercomputing Center (BSC)

The goal of this study is to analyze the cultural dynamics among amphora workshops in the Roman Empire. Specifically, we focus on the evolution of the production of olive oil amphorae found in Baetica (currently Andalusia) from 1st to 3rd century AD. // In particular, we analyze a set of measures among different kinds of amphorae shapes from different workshops to quantify the dynamic of changes. To achieve this goal, multivariate methods was used to classify each amphorae workshops. These methods allow to know if there were differences on the pattern productions among workshops. Specifically we want to identify the origin of these changes and if these changes were produced by cultural reasons depending on the spatial distance and other cultural constraints. As hypothesis, we propose that spatial distribution of pottery workshops is the main influence of the making techniques processes. // Therefore we propose to create a simple Agent Based Model using concepts borrowed from Cultural Evolution Studies. This method allow to compare different processes of transmission (vertical vs horizontal) and cultural accumulation in different context and content. We implement a mechanism to quantify which one of those process explain better the distribution and pattern revealed in the data analysis. // This study aims to better understand the cultural processes acting among the workshop of Baetica during the Roman Empire and explain the nature of the patterns and differences observed in the archaeological evidence.



Zone of Latent Solutions hypothesis – which behaviours great apes are able to reinvent, without social learning

Damien Neadle University of Birmingham

It is generally accepted that, of the great apes, gorillas (Gorilla Gorilla), together with bonobos, use tools the least; in fact wild gorillas do not seem to use tools to acquire food, rather they rely on their physical strength. Chimpanzees are credited as the most tool proficient great ape, however it is important to understand physical cognition in all genera of great apes to fully understand the extents of primate cognition. To investigate this the present study replicated the methods of a related study testing “scooping behaviour” in captive chimpanzees (“scooping” is defined as a swivelling of the wrist in order to wrap an, out of reach, floating object around a stick), chimpanzees were able to perform wild-type behaviour spontaneously. In this study captive western lowland gorillas were provided with ecologically relevant materials for “scooping” floating bread (used in this instance as a proxy for floating algae). Even though naïve to the task a gorilla was able to spontaneously scoop in the same way as chimpanzees, given the right ecological, social and motivational conditions. We tentatively conclude from this data that “scooping” is within the Zone of Latent Solutions (Tennie, Call, & Tomasello, 2009) of gorillas; that is, individuals are principally able to reinvent the behaviour without the need for social learning. This suggests that the reason for gorilla’s lack of wild tool use is unlikely due to lack of ability; rather it is a lack of motivation, difference in ecology or unsuitable social situations.

Tool Use in Domestic Dogs (Canis familiaris)

Hannah Kate Worsley University of Salford

Domestic dog (Canis familiaris) research has recently revealed an impressive cognitive skillset within the species. Their abilities as tool users, however, are far from impressive. Dogs are unable to grip, hold and manipulate objects in their environment, resulting in an inability to use objects as tools. In our study we explore how dogs circumvent this anatomical shortcoming by observing the extent to which they employ human group-mates as ‘intermediary tools’ to assist them in achieving their goals. To obtain detailed observations of natural, undisturbed tool use in domestic dogs, we needed to determine a clear and concise definition of tool use. We put forth a new definition that considers both the physical and behavioural manipulation of tools, and identified nine modes of manipulation frequently performed by dogs. Furthermore, to increase the scope and ecological validity of the research we adopted a canine citizen science methodology. The citizen science approach here means that the owners were in charge of the data collection phase and performed naturalistic observations of their dogs in their home. Our results demonstrate that domestic dogs are competent and capable tool users. We revealed that to achieve their desired goals dogs utilise a variety of gestures and behaviours to manipulate and fashion humans into “tools”. To our knowledge, these results provide the first evidence of tool use by domestic dogs in its full ecological context.

Why individuals learn socially, when and from whom

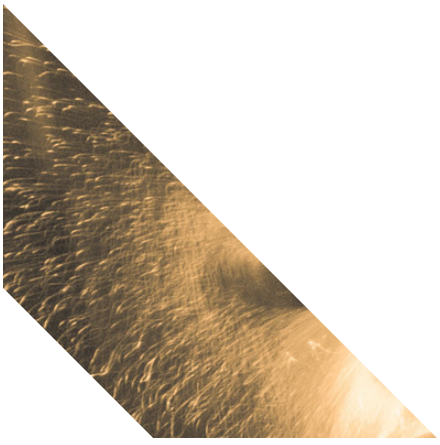
Marco Smolla University of Manchester

Social learning – acquiring information by observing others – is widespread in the animal kingdom. While copying opportunities might be restricted to certain individuals (e.g. proximity), most theoretical models assume well-mixed populations. To study the effect of population structure on information acquisition and individual interactions, we developed an agent-based model that uses both fixed and dynamic networks. For the dynamic model, network density is highest where resources are unevenly distributed and frequently changing, and degree-centrality correlates with social learning propensity. Also, being central is beneficial where information is competition-free (e.g. food handling), but disadvantageous where competition requires resource sharing (e.g. food patch choice). Dominance is one mechanism allowing central individuals to hold resources and benefit from social information. Together, this provides an explanation why dominant individuals appear to be information hubs in social species: it may be due to their centrality rather than their dominance.

The evolution and development of reflective imagination, and its role in behavioural adaptation

Alejandra Wah University of Groningen

For centuries, philosophers, and more recently, scientists have been concerned with understanding the artistic experience focusing on the emotional responses to the perception of objects and events. By contrast, since a couple of decades, evolutionary biology has been concerned with explaining how and why the artistic experience is universal to human beings and characterizes human culture. Up until now, the cognitive mechanisms that allow for objects and events to be experienced as art remain largely unexplored and there is still no conventional use of terms for referring to this process. Nonetheless, a cognitive process underlying the artistic experience has been pointed out as ‘kinematic imagination’ (Donald 1991), ‘aesthetic imagination’ (Dissanayake 2001), ‘creative imagination’ (Damasio 2003), ‘imaginative experience’ (Dutton 2009), ‘self-imagination’ (Van Heusden 2010), or ‘reflective imagination’ (Wah 2014). In this poster, I will first question whether it is productive to understand the artistic experience in terms of perception and emotion, and briefly mention the presence of degrees of this experience in non-human animals. From the perspective of evolutionary biology, I will subsequently propose a possible alternative explanation to understand this experience, and its function in the human species, drawing upon the work of Merlin Donald (1991, 2006, 2013), Ellen Dissanayake (1992, 2015), Antonio Damasio (1994, 2000, 2003, 2010), Michael Tomasello (1999; 2014), Barend van Heusden (2004, 2009, 2010), Dennis Dutton (2009), Frans de Waal (2012; 2015), and Alejandra Wah (2014).



History of Globalization and big data from the free port of Trieste (1850-1914)

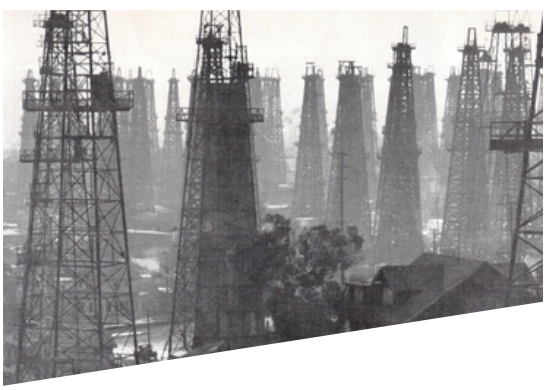
Gaetano Dato University of Trieste

Presenting with Simon Carrignon - a project born at the Complex System Summer School 2016 - Santa Fe Institute. // Globalization is a phenomenon lasting centuries. Contributing factors, including the import and export dynamics of major nations, are many in number and complex in their interactions. This study considers the behavior of one of the worlds 10 largest ports - Trieste - within the Austria-Hungarian empire from the mid 19th century through to the start of World War I (WWI), a time of profound globalization. // Trade in the mid 19th century largely followed the British World System; a free world market centered in London and its financial web. However this system was unstable, experiencing a long depression (1873-96), state defaults, and regular financial panics. Challenges from competitors, especially Germany, soon followed, and by the end of the 19th century the trade landscape had shifted, and a new nationalist era ushered in. New boarders appeared, trade restrictions were imposed, and strong cartels limited competition, within the multinational Austro-Hungarian Empire as well. The European powers competed for African resources and parted the continent. // This age culminated into a denser cluster of wars and deeper crisis, from WWI to the close of WWII in 1945. // This study present a first series of quantitatives analysis made on new dataset to understand how trade dynamics might evidence and interact with these various processes. Those new datasets include the distribution of imported and exported tonnages by nation over time and the balance sheets of the Generali insurance company, the largest Austro-Hungarian insurer, from 1851 to 1910.

Do instructions squash creativity?

Zarja Mursic Durham University

Creativity and innovation are seen as important human capabilities. However, it is very hard to pinpoint the origins and emergence of creativity among humans. Children at a very young age express creative behaviours, but when tested for their problem solving abilities and innovation, they may not necessarily be successful. Recently, it has been shown that the context in which they are tested influences their innovation abilities. To gain a deeper understanding of how context influences innovation in children, we place them in a playful context of a science museum. // We tested creativity in children in the science museum, the Centre for Life in Newcastle. We recruited children aged between 4 and 12 and tested their creative abilities with a building blocks task in three different conditions; instructions, scaffolding (open questions) and no instructions. Children were asked to build whatever they wanted with seven shapeshifting blocks. We coded for their exploratory behaviours while interacting with blocks. We developed two measurements of creativity. Firstly, we assigned a creativity score for each build by comparing them to another randomly assigned build. Secondly, we measured the appropriateness of each build. This was done by asking children what they built and then adult participants rated their sculptures. // From preliminary analysis of the behavioural data we saw that instructions increased the rate of their actions and exploration performed while interacting with the task, compared to other conditions. In the context of the science museum, demonstrating the affordances of the blocks to children promotes more exploratory behaviour. In the future we plan to compare the appropriateness of the builds and their originality among different conditions.



Humans show concern for others, even non-kin

Emily Messer
Heriot-Watt University

Of interest over the development of this prosocial behaviour, is the role of social experience, is it merely the presence of another individual behaving prosocially, or is it the actual prosocial behaviour per se enough to elicit tit-for-tat donating when given the opportunity to respond to a partner's behaviour. In order to help address such questions the current study asked whether 3-8 year old children (N=88) would engage in reciprocal donating with a same aged peer in a 'prosocial choice task'. Alongside such child-to-child exchanges we included a novel (enhanced ghost) yoked control condition, typically used to distinguish between imitative and emulative learning, in which children received identical donations 'selected' by a non-human agent, while a child sat passively nearby. The inclusion of an agent versus non-agent comparison allowed us to more clearly tease apart social and non-social influences on identical resource donation. Although age dependent, in the child-partner condition, children reacted to the behaviour of their partner, whereas no such reciprocity was evident in the non-human agent condition. These findings suggest that an interaction with a partner distributing resources is essential in influencing young children's donating behaviour and not the value of the reward per se.

Modelling language change triggered by language shift

Anna Jon-And
Stockholm University
& Dalarna University

Language shift is widely believed to accelerate change in the target language, which is generally attributed to innovations introduced by new speakers during the second language acquisition process. If this hypothesis is correct, the rate of language change should be related to the rate at which second language speakers enter the population. The aim of this paper is to model the mechanism that makes second language acquisition accelerate language change on a population level and compare its predictions to a rare diachronic data set from the ongoing language shift in Maputo, Mozambique. In an agent-based simulation we let speakers meet in pairwise interactions and chose to utter one of two variants of a linguistic. The simulation starts with only one variant. The population then grows by recruitment of second language speakers and birth of first language speakers, and newly recruited second language speaker may introduce an innovative variant by assigning all the probability mass to a `mutant' variant. Each agent modifies their probability distribution of usage after a round of interactions. We then set parameters to demographic data (birth and death rate, number of first language and second language speakers) from Maputo over a thirty year period, and compared our model runs with diachronic data on innovative preposition use and reduced verbal morphology in Maputo Portuguese from two time points (1997 & 2007). Our simulation demonstrates how with minimal assumptions novel variants can be introduced and spread in a population, due to multiple introductions by different individuals. We suggest that this may be a basic typological difference between contact-induced and non-contact-induced language change.

Task difficulty and uncertainty affect social information use in foraging bumblebees

Baracchi D., *Vasas V.*, Jamshed Iqbal S., Alem S.

When foraging in the continuously and unpredictably changing natural environment many animals readily complement their personal knowledge with additional social information. However, to balance the costs and benefits of copying others as opposed to personal exploration, animals have to discern situations wherein it is more advantageous to use social rather than personal information. Here, we used foraging bumblebees (Bombus terrestris) in a controlled laboratory setting and showed that the difficulty of a foraging task affects the use of the two types of information. We used artificial flowers to devise easy and difficult discriminatory tasks and tested the influence of a social cue on decision making. Bumblebees used asocial and social cues additively to make foraging decisions when the cues both indicated the reward. However, when the two cue types were set in conflict, the first flower choice and the overall foraging behavior were strongly affected by the difficulty of the task. When facing an easy discrimination task foraging bees were likely to prioritize asocial information and were only marginally affected by social information. By contrast, they prioritized social over personal information when flower discrimination was difficult and therefore the probability of making errors was higher. As individuals differ in their sensory acuity, physiological states and problem-solving capabilities, our results open up the possibility that individuals less capable to solve a foraging task on their own may be more prone to rely on the available social information to make decision.