

Cambridge Language Sciences Annual Symposium

Tuesday 13 November 2018, Cripps Court, Magdalene College

University of Cambridge

13.00-13.30 Registration and coffee; poster exhibition (gallery)

Talks will take place in the Cripps Court auditorium

Chair: Professor Ianthi Tsimpli, Co-Director of Cambridge Language Sciences

13.30-14.30 Language acquisition, neural entrainment, phonology and dyslexia

*Professor Usha Goswami, Centre for Neuroscience and Education,
Dept. of Psychology, University of Cambridge*

14.30-15.00 Health crises, digital media and community voices: utilising interactive radio for rapid social research to improve outbreak preparedness and response

Dr Claudia Abreu Lopes, Dept. of Politics and International Studies (POLIS), University of Cambridge

15.00-15.30 Poster slam – 1-minute talks by the poster presenters

15.30-16.30 Poster exhibition and refreshments (gallery)

16.30-17.00 Using NLP and heterogenous user generated content to sense mental well-being

Dr Maria Liakata, Dept. of Computer Science, University of Warwick

17.00-17.30 The effect of early language and communication environment on social outcomes for primary school aged children with language difficulties

Dr Jenny Gibson, Faculty of Education, University of Cambridge

17.30-18.30 Stability and change in child language

*Prof. Courtenay Norbury, Literacy, Language and Communication Lab,
University College London*

Award of the poster prize; closing remarks

18.40-19.45 Reception, offered with the generous support of Cambridge University Press



Language acquisition, neural entrainment, phonology and dyslexia

Professor Usha Goswami

Centre for Neuroscience in Education, University of Cambridge



Usha Goswami FBA is Professor of Cognitive Developmental Neuroscience at the University of Cambridge and a Fellow of St John's College, Cambridge. She is also Director of the Centre for Neuroscience in Education. After training as a primary school teacher at the UCL IoE, she decided to pursue research in child psychology, taking a D. Phil. in Psychology at the University of Oxford. Usha has worked on reasoning by analogy (structure mapping), and on reading and developmental dyslexia across languages. Most recently, she has been studying the neural mechanisms underpinning language encoding by neuroelectric oscillations, and relationships to the amplitude modulation structure of infant- and child-directed speech. Her goal is to understand the brain basis of dyslexia and speech and language difficulties, and the potential utility of assistive listening technology, coupled with music- and rhythm-based behavioural interventions. She has received a number of career awards, including the British Psychology Society's Spearman Medal and President's Award; the Aspen Brain Forum Senior Investigator Prize in Neuroeducation, New York Academy of Sciences; the Norman Geschwind-Rodin Prize for Dyslexia research, Sweden; and Research Fellowships from the National Academy of Education (USA), the Leverhulme Trust (UK), and the Alexander von Humboldt Foundation (Germany).

Abstract: Recent insights from auditory neuroscience provide a new perspective on how the brain encodes speech. Using these recent insights, I will provide an overview of key factors underpinning individual differences in children's development of language and phonology, providing a context for exploring atypical linguistic development. I will develop an oscillatory "temporal sampling" neural framework for linking rhythmic auditory processing to linguistic development by children. I will show that sensitivity to the amplitude modulation (AM) structure of infant-directed and child-directed speech is key to individual differences, and that this AM structure contains acoustic statistical cues to phonology and morphology. Children with dyslexia are relatively insensitive to amplitude modulations and rhythm patterns. I will show that their lack of rhythmic sensitivity is related to the atypical neural encoding of energy patterns in speech via neuronal oscillatory entrainment, and I will explain how this mechanistic process is atypical in dyslexia, offering new avenues for potential remediation via assistive listening technology.

Health crises, digital media and community voices: utilising interactive radio for rapid social research to improve outbreak preparedness and response

Dr Claudia Abreu Lopes

Dept. of Politics and International Studies (POLIS), University of Cambridge



Claudia Abreu Lopes led the pilot research project at the Centre of Governance and Human Rights, University of Cambridge, which led to the establishment of Africa's Voices Foundation. She is trained as a social psychologist and holds a PhD in Social Research Methods from the London School of Economics and Political Science. Claudia has several years of experience working in Africa on research projects related to new technologies and audience interactivity. Claudia is an Affiliated Lecturer at the Department of Politics and International Studies, University of Cambridge and was Research Advisor for the project *Epidemics, Digital Media and Health Communications in Africa*.

Abstract: In 2017 Somalia experienced the worst cholera outbreak in five years, with over 79,000 cases and over 1,100 deaths mainly among children under five years. Longitudinal analysis of case reports confirms that despite many years of public health interventions cholera remains a recurring and major risk to vulnerable communities in the country.

This project aims to evaluate a tool for understanding cholera risk and preparedness among communities in the South Central Zone of Somalia. Such an understanding could both provide an early warning system, as well as point to specific socio-cultural elements that could influence the success of an intervention during a cholera outbreak.

Specifically, the project considers an interactive radio and SMS-based method as a means for data gathering. This presentation will focus on the methodology that **Africa's Voices Foundation** employed to gather, label and analyse the SMS data, as well as lessons learnt and how these could support both programmatic interventions and other similar data gathering initiatives in the future.

Using NLP and heterogenous user generated content to sense mental well-being

Dr Maria Liakata

Dept. of Computer Science, University of Warwick



Maria Liakata is Associate Professor in Natural Language Processing (NLP) at the University of Warwick, Department of Computer Science, and a fellow at the Alan Turing Institute for data science and artificial intelligence, where she co-leads the NLP and data science for mental health interest groups and supervises two PhD students and two postdocs. Her research interests span opinion mining and summarisation, developing longitudinal models for tracking changes in linguistic, multi-modal and heterogeneous user-generated data, NLP for social and biomedical applications, including content verification and mental health monitoring. She is leading projects on emotion sensing using heterogeneous mobile phone data, language sensing for dementia monitoring & diagnosis and opinion summarisation in online data. She was a co-investigator on the EU Project PHEME, which studied rumour verification in social media. Previously she held a fellowship from the Leverhulme Trust on automatic extraction of information from the scientific literature and an IBM Faculty Fellow Award. Her Oxford DPhil was on automatically learning world knowledge from unstructured text.

Abstract: A large body of work in natural language processing (NLP) for clinical applications is based on processing electronic health records (EHRs). While the latter are rich in information there are typically only few records per patient. More recently there has been interest in processing user generated content (UGC) such as social media posts collected over time to make predictions about individuals' mental health. Such UGC data is available at much more frequent temporal intervals than EHRs but may be noisier. So far the majority of work in NLP on mental health prediction, even when using longitudinal social media data, involves distinguishing individuals with a condition from controls rather than assessing individuals' mental health at different points in time. Some work in the area of mobile computing has used sensor information to make longitudinal predictions but this hasn't considered any language content. I will present our work on integrating both linguistic data and heterogeneous and asynchronous mobile phone usage data for monitoring mental health over time. I will also discuss the challenges such work entails when evaluated in a challenging scenario for real world deployment.

The effect of early language and communication environment on social outcomes for primary school aged children with language difficulties

Dr Jenny Gibson



Faculty of Education, University of Cambridge

Jenny Gibson is a lecturer in Psychology & Education at the Faculty of Education, University of Cambridge. Jenny is a principal investigator in the centre for research on Play in Education, Development and Learning (PEDAL) where she leads a team investigating the role of play in children's linguistic, social and emotional development. Jenny also co-leads the Talking Research group, in collaboration with Dr Napoleon Katsos, this group conducts cross-disciplinary research spanning Education, Psychology and Linguistics. Jenny completed her PhD in 2011 at the School of Psychological Sciences, University of Manchester and went on to do postdoctoral research in the Developmental Psychiatry group at the University of Cambridge. Jenny is a member of the Royal College of Speech and Language Therapists.

Abstract: Children who have difficulties in linguistic development that persist into middle childhood are at higher risk of later social problems, in comparison to their typically developing peers. In this talk I will present findings from a study based on data from the Avon Longitudinal Study of Parents and Children (ALSPAC). The study aimed to explore the extent to which a child's early communicative environment may influence later social adjustment, and, whether the pathways for such influences were different for children with and children without language difficulties. I report an analysis using a subset of ALSPAC participants who completed direct assessments of linguistic/psycholinguistic abilities in middle childhood.

394 children who had evidence of language difficulties (LD) at age 7 years were identified, alongside a sample of typically developing (TD) children matched for age, gender and SES (788 children in total, 59% male, 50% with language difficulties). Pathways between early communicative environment (18-24 months), play and social development in middle childhood (7-9 years), and, later social difficulties (11 years) were compared between the groups.

Whilst for both groups of children, being prosocial and engaging in play were protective against later behavioural problems, for children with LD, these protective effects were more pronounced for those who had a more positive early language and communication environment. I will discuss these findings with reference to support and education strategies for children at risk of language difficulties.

Stability and change in child language

Professor Courtenay Norbury

Literacy, Language and Communication Lab, University College London



Courtenay Norbury is a Professor of Developmental Disorders of Language and Communication at University College London, where she directs the Literacy, Language and Communication (LiLAC) Lab. She is a Fellow of the Royal College of Speech and Language Therapists and a former joint-editor of the *Journal of Child Psychology and Psychiatry*. She obtained her PhD from the University of Oxford in 2004 and has since authored over 60 peer-reviewed publications and is a founding member of the RADLD campaign (Raising Awareness of Developmental Language Disorder).

<https://www.youtube.com/RADLD>

Abstract: Longitudinal studies of child language development and disorder demonstrate both steady language growth yet remarkable stability in the rank order of language competencies, at least from about the age of 4. The extent to which growth and stability are influenced by other aspects of child development is a focus of the current study.

In this talk I will present data from the Surrey Communication and Language in Education Study (SCALES), a population study of language change and stability from school entry. We followed approximately 500 children with a diverse range of language, cognitive, and social/emotional abilities from Reception to Year 3 (ages 4-8 years).

All children showed growth in language skill, yet language was incredibly stable (ICC = .95). Thus, children with relatively low language scores at the beginning of formal education continued to have relatively low language scores in Year 3. Importantly though, children with multiple developmental challenges were not falling further behind, at least in mid-primary school. In fact, the rate of language growth was remarkably similar in three groups of children with diverse language and cognitive profiles. These findings raise important questions about the nature and ultimate goals of intervention programmes for children with language disorder.

Posters

Poster exhibition and poster slam organised by Samantha Sie (*Theoretical & Applied Linguistics*) and Joyce Lim (*Faculty of Education*). Poster slam moderated by Samantha Sie.

1. A collaborative game-based approach to documenting linguistic variation in Brazil

Jenna Renjie Zhou, Andrew Caines, Paula Buttery, and Ioanna Sitaridou

**Research supported by the Language Sciences Research Incubator Fund and the Isaac Newton Trust*

2. Developing a prototype web-app for numeracy assessment and teaching Zhilin Wang, Andrew Caines, Russell Moore, Paula Buttery, and Ianthi Tsimpli

**Research supported by the Language Sciences Research Incubator Fund and the Isaac Newton Trust*

3. Developing prototype assistive listening technology for remediating developmental dyslexia Sheila Flanagan, Anji Wilson, Fiona Gabrielczyk, and Usha Goswami

4. Functional distributional semantics: learning linguistically-informed representations Guy Emerson and Ann Copestake

5. Historical codeswitching and language mutability in the history of English Marieke Meelen and Laura Wright

**Research supported by the Language Sciences Research Incubator Fund and the Isaac Newton Trust*

6. How clever are the models exhibiting 'super-human' performance on VQA datasets?

Huiyuan Xie, Alexander Kuhnle, and Ann Copestake

7. Indefinite NPs as subjects in L2 and L3 Mandarin grammars Jingting Xiang and Boping Yuan

8. Indirect corpus applications: collecting data and using it in ELT materials development Niall Curry and Olivia Goodman

9. Inter-symptom relationships across linguistic, cognitive, and behavioural problems in a developmentally at-risk population: a network approach Silvana Mareva, Joni Holmes, and the CALM team

10. Investigating mechanisms of change in children's social-attribitional thinking: a frame semantics approach to sociocultural discourse analysis Courtney Froehlig

11. Language, Brains & Machines: an initial literature review Anna Samuel, Andrew Caines, and Paula Buttery

**Supported by the Language Sciences Research Incubator Fund and the Isaac Newton Trust*

12. Language processing of personal beliefs Kaili Clackson, Tristan Bekinschtein, and Valdas Noreika

13. L2 English genitive choices of L1 Spanish speakers James Algie

14. Matrix language variation in a corpus of Vietnamese-English code-switching in Canberra Li Nguyen

15. Mobile-based Dictionaries (MBDs): investigating Chinese EFL learners' use and the effectiveness in incidental English vocabulary learning Danyang Zhang

- 16. Modelling lexical decision in adults with and without acquired dyslexia and semantic dementia** Ya-Ning Chang, Matthew Lambon Ralph, and Stephen Welbourne
- 17. Modelling polysemy in distributional semantic models** Guy Aglionby, Helen Yannakoudakis, Jean Maillard, and Ekaterina Shutov
- 18. Modulating speech processing with alternating current stimulation** Benedikt Zoefel, Isobella Allard, Megha Anil, Alan Archer-Boyd, and Matthew H. Davis
- 19. Multilingualism and wellbeing: a scoping review** Lisa-Maria Müller, Katie Howard, Elspeth Wilson, Jenny Gibson, and Napoleon Katsos
*Supported by the Language Sciences Research Incubator Fund and the Isaac Newton Trust
- 20. Multilingualism, multiculturalism and implications for health and wellbeing** Özge Ozturk, Julija Vaitonyte, and Lisa-Maria Müller
- 21. Multimodal semantic revision during inferential processing: the role of inhibitory control with story and picture information** Ana Pérez
- 22. Multiple sentence representations in machine translation** Danielle Saunders, Felix Stahlberg, Adria de Gispert, and Bill Byrne
- 23. Neural coding schemes for lexically-driven prediction in superior temporal cortex** Ediz Sohoglu, and Matthew H. Davis
- 24. Predictive neural mechanisms of spoken word recognition and learning** Yingcan Wang, Rebecca Gilbert, Richard Henson, and Matthew H. Davis
- 25. Semantic memory performance after left vs. right anterior temporal lobe resection** Grace Rice, Helen Caswell, Perry Moore, Paul Hoffman, and Matthew Lambon Ralph
- 26. The effects of language contexts on executive function: a pilot study** Orianna Bairaktari, Eva Periche-Thomas, Andriani Papageorgiou, Antonella Sorace, and Roberto Filippi
- 27. The neural representation of colour knowledge entails brain regions beyond the visual cortex** Rocco Chiou and Matthew Lambon Ralph
- 28. The school experiences of bilingual children on the Autism Spectrum** Katie Howard, Jenny Gibson, and Napoleon Katsos
- 29. Towards a Computational Model of Controlled Semantic Cognition** Rebecca Jackson, Timothy Rogers, and Matthew Lambon Ralph
- 30. Towards automatic grammatical error detection of non-native spoken learner English** Kate Knill, Mark Gales, Potsawee Manakul, and Andrew Caines
- 31. Why are Asians better in mathematics? A modern investigation into linguistic relativity on number counting** Ann Dowker and Anthony Li

Presenters (poster slam)

In alphabetical order:

Guy Aglionby
James Algje
Orianna Bairaktari
Andrew Caines
Ya-Ning Chang
Rocco Chiou
Kaili Clackson
Guy Emerson
Courtney Froehlig
Olivia Goodman
Katie Howard
Rebecca Jackson
Kate Knill
Anthony Li
Silvana Mareva
Marieke Meelen
Li Nguyen
Özge Ozturk
Grace Rice
Danielle Saunders
Ediz Sohoglu
Yingcan Wang
Anji Wilson
Jingting Xiang
Huiyuan Xie
Danyang Zhang
Benedikt Zoefel