Kyoto Lectures in Evolinguistics 2019

Abstracts

Network-based approaches to vocal learning

Stephanie White

Socially-learned vocal communication signals are often best acquired during developmental critical periods. A great deal of progress has been made toward understanding the molecular basis for critical periods underlying cortical processing of primary sensory information. Whether these processes extend to sensorimotor integration and how sub-cortical regions such as the basal ganglia may contribute is unknown. Thanks to decades of neuroethological study, birdsong is the leading model for human speech development, having established numerous key parallels to human vocal learning. These include shared critical periods and reliance on cortico-basal ganglia circuitry. A great experimental attribute of the songbird model is that within cortex, basal ganglia and thalamus, sub-regions dedicated to vocal learning are visibly clustered, forming tractable targets for linking brain and behavior. We have leveraged this organization to identify spatio-temporal profiles of the song-dedicated transcriptome in the basal ganglia. Our findings suggest a new model whereby the intersection of learning related gene co-expression modules intersect with song related modules to provide a permissive nexus for vocal learning.

How learning and interaction create and destroy linguistic structure

Kenny Smith

Human languages are culturally-transmitted systems, which persist in populations via a repeated cycle of learning and use, where learners learn from linguistic data which represents the communicative behaviour of other individuals who learnt their language in the same way. Languages evolve as a result of this cycle of learning and use, and are therefore the product of a potentially complex interplay between the biases of human language learners, the communicative functions which language serves, and the ways in which languages are transmitted in populations. In this talk I will present a series of experiments, based around artificial language learning, dyadic interaction and iterated learning paradigms, which allow us to explore the relationship between learning and use in shaping linguistic structure. I'll summarise some of our older work showing how and when linguistic structure is created through this process, then present some recent work

using these techniques to test hypotheses about the mechanisms linking population demographics and linguistic complexity, in particular exploring why it might be the case that languages spoken in larger populations are relatively simple.

Syntax in the light of evolution:
Intermediate stepping stones toward hierarchy, Move, and recursion
Ljiljana Progovac

It is often stated that the nature of human language cannot be fully understood without reference to its evolution. If so, then not only should theories of language evolution be grounded in linguistic analysis, but, also, linguistic theories should accommodate what is already known or hypothesized about language evolution. In this lecture I consider how one such (theoretically grounded) decomposition of syntax leads to a deeper understanding of attested syntactic phenomena, both those well-supported in syntactic theory (e.g. the small clause foundation of sentences), and those which remain largely unresolved (e.g. islandhood). The proposal is that proto-syntax started flat, intransitive, non-recursive, and static (without Move), and that these rigid but robust beginnings still pervade the fabric of modern syntax, producing some intricate effects and echoes of the past. Here I explore the fluidity/overlaps of structure found in e.g. (i) parataxis-coordination-subordination progressions, as well as (ii) intransitive-middle-transitive progressions. Both of these continuums are of relevance to the gradual emergence of the (delicate and decomposable) hallmarks of modern syntax, which include hierarchy, Move, and recursion. The discussion will also point to how evolutionary proposals of this kind can be tested, communicating the results of an fMRI experiment.