Great leaps or very short steps: How did language evolve?
Dr Richard Menary

Darwin held to the dictum: Natura non facit Saltum (Nature makes no leap). He famously stated in the Origin of Species that "natural selection acts solely by accumulating slight successive favourable variations, it can produce no great or sudden modification; it can act only by very short steps." (chapter 6) The modern synthesis also rules out saltationist theories that posit sudden mutation as a primary mechanism of evolution; such as Goldschmidt’s (1940) controversial theory of evolution by macromutation. In this presentation I will evaluate the key arguments for saltationist and gradualist approaches to the origin of language against the background of the arguments between saltationists and gradualists in evolutionary biology.

Darwinian linguistics: Songs to syntax
Professor Robert Berwick

Famously, in The Descent of Man, Charles Darwin extended his theory of evolution to human language. Darwin speculated that language emerged through a kind of Caruso theory for language’s origin: “some early progenitor of man, probably used his voice largely … in singing”; and “this power would have been especially exerted during the courtship of the sexes.” Whatever its past function though, Darwin took language’s current utility to lie in the mind: “a long and complex train of thought can no more be carried on without the aid of words, whether spoken or silent, than a long calculation without the use of figures or algebra.” The co-founder of modern evolutionary theory, Alfred Russell Wallace agreed, noting that language comprises a central component of what he called “man’s intellectual and moral nature” – the human cognitive capacities for creative imagination, language and symbolism generally, a complex that is sometimes simply called “the human capacity.” This complex seems to have crystallized fairly recently among a small group in East Africa of whom we are all descendants, distinguishing contemporary humans sharply from all other animals. How can we account for this evolutionary change, apparently unique to the human lineage? On the one hand, there has been convergent evolution for auditory-vocal learning and vocal production that humans and songbirds share, but non-human primates lack. On the other hand, both humans and non-human primates share a rich ability to categorize and reason about themselves and others, often in sophisticated social contexts. Language’s comparatively recent origin suggests a familiar route for the appearance of this evolutionary novelty: these two antecedent biological substrates were conjoined, in this case via the introduction of a combinatorial operator that ‘glues’ conceptual atoms – words – into hierarchically structured sentences. This yields an ability to produce a discrete infinity of possible meaningful ‘signs’ integrated with the conceptual system, one that we immediately recognize as the hallmark of human language. No other animal has this open-ended combinatorial promiscuity. Further, the relation of this new syntactic power to human sensory-motor and thought systems reveals language to be asymmetric in design: while it precisely matches the representations required for inner mental thought, acting as the lingua franca that binds together other internal cognitive and sensory modalities, at the same time it poses computational difficulties for producing and understanding sentences, as everyday experience demonstrates. Despite this mismatch, one can show that language syntax leads directly to the rich cognitive array that marks us as a symbolic species, including mathematics and music.
Behaviour-genetic studies of childhood language: Do they help in the search for the origins of language?
Emeritus Professor Brian Bryne

Among the resources for accounting for the evolution of some characteristic of a species is “natural” (genetic) variation in that characteristic among current members of the species. In the case of humans and language, the FOXP2 mutation, with associated language deficits in the KE family and others, is seen as promising instance of that resource. In this presentation I examine less dramatic types of language variation as employed in some current behaviour-genetic studies. I argue that the phenotypes used in these studies are rarely “pure” enough to be helpful in identifying genes that might have played a part in language evolution.

Logic and the evolution of language
Associate Professor Drew Khlentzos

Did the emergence of language-using hominins mark the appearance of the first creatures to use logic to inform their representations of the world or is logic itself no more than a very recent, specialized language? For some evolutionary psychologists “… there is no reason to expect a mind containing abstract principles of logic ever evolved”, for others logical rules can sometimes be violated by ecologically sound inference procedures. I argue a logic processor is required for language comprehension/use and conjecture how it may have evolved.

The language platform
Professor Kim Sterelny

In recent work, I have developed a picture of the evolution of human social behaviour (and especially the expansion of cooperation and collective action) and of the cognitive capacities that make that behaviour possible. The picture is interactive: it depends on a series of feedback loops both between individual humans and human social environments, and between various aspects of human social behaviour: reproductive cooperation, social foraging, the expansion of technical skill and of an increasingly nuanced understanding of the local environment. Communicative capacities are central to these interactions, both to mediate coordination in collective action, and to facilitate increasingly high volume, high fidelity social learning. This paper focuses on the emergence of these capacities: defending an incremental view of the emergence of language from a suite of communicative skills; defending the view that gesture was central to the expansion of communicative possibility; defending the close coevolution of communication and technical skill. I have defended this picture before: in this paper I will both revisit and develop these earlier attacks on the problem of the evolution of language.