

# OMLL (Origin of Man, Language and Languages) Highlights



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The European Science Foundation (ESF) was established in 1974 to create a common European platform for cross-border cooperation in all aspects of scientific research.

With its emphasis on a multidisciplinary and pan-European approach, the Foundation provides the leadership necessary to open new frontiers in European science.

Its activities include providing science policy advice (Science Strategy); stimulating cooperation between researchers and organisations to explore new directions (Science Synergy); and the administration of externally funded programmes (Science Management). These take place in the following areas: Physical and engineering sciences; Medical sciences; Life, earth and environmental sciences; Humanities; Social sciences; Polar; Marine; Space; Radio astronomy frequencies; Nuclear physics.

Headquartered in Strasbourg with offices in Brussels, the ESF's membership comprises 75 national funding agencies, research performing agencies and academies from 30 European countries.

The Foundation's independence allows the ESF to objectively represent the priorities of all these members.

The aim of the European Collaborative Research (EUROCORES) Scheme is to enable researchers in different European countries to develop collaboration and scientific synergy in areas where European scale and scope are required to reach the critical mass necessary for top class science in a global context.

The scheme provides a flexible framework which allows national basic research funding and performing organisations to join forces to support excellent European research in and across all scientific areas.

The European Science Foundation (ESF) provides scientific coordination and support for networking activities of funded scientists currently through the EC FP6 Programme, under contract No. ERAS-CT-2003-980409. Research funding is provided by participating national organisations.

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Project "From symbols to language: The archaeology of the origin of language and early diversification of languages"  
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- Campbell's monkey (*Cercopithecus campbelli*)  
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# 1. Introduction

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The OMLL programme was the first EUROCORES programme to be launched in 2001. This new structure offered the optimal solution to the area of research we envisioned – the study of the origins of human language and the current distribution of languages and language families across the globe. Our programme was developed specifically to counter arguments that the study of the origin of language was scientifically impossible and even irresponsible. To this aim, six areas of research were initiated: language and archaeology, language and brain, language and genes, language acquisition and language universals, language and animal communication, language evolution and computer modelling.

To produce significant advances in these areas an interdisciplinary approach involving European cooperation was necessary. A fruitful collaboration was established through dialogues in which researchers from differing disciplines aimed at ascertaining exactly what kind of questions were scientifically answerable considering our current state of knowledge in each discipline. The interdisciplinary approach went further than a simple juxtaposition of findings from different disciplines. It was essential in **defining new questions**. For example, the collaboration undertaken in the area of language and population genetics revealed that a careful ethnographic study of the sampled populations (e.g. rules governing marriage practices) was necessary.

A very large set of disciplines contributed to this research enterprise: linguistics, archaeology, genetics, anthropology, paleoanthropology, prehistory, animal communication, neuroscience and computer modelling.

The number and quality of research proposals submitted to this first EUROCORES programme were considered to be a success. Twenty Collaborative Research Projects from 10 different countries were selected and funded. The results of these research projects presented in the following pages illustrate the important progress that has been made in recent years. They also illustrate how the OMLL EUROCORES programme contributed to establishing interdisciplinary research networks between laboratories from different European countries.

Now that these networks have contributed concrete results advancing our knowledge of the emergence of human language, it is clear that these collaborations should be continued and strengthened in order to answer new challenging questions which have emerged from these recent studies.

Professor Jean-Marie Hombert,  
University of Lyon 2, France,  
author of the original OMLL research programme

## 2. OMLL Programme Description

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### Crossing boundaries

With 'The Origin of Man, Language and Languages (OMLL)' the European Science Foundation launched her first European Collaborative Research (EUROCORES) Programme. This launch, early 2001, marked the end of an intensive preparation phase and the beginning of a unique research programme crossing boundaries not only between very diverse disciplines, but also within Europe. Sixteen national funding organisations from 12 different European countries brought together a programme budget of six million Euro to create a platform for pan-European research on the question of the co-evolution of modern humans and language.

### The co-evolution of modern humans and language

Traditionally, the study of the origin of language was considered too speculative and insufficiently anchored in empirically based studies to merit serious scientific attention. However, around the time of the launch of the Call, new data had been collected in several disciplines, which led to interpretations yielding new insight into the emergence of anatomically modern humans and the related issue of language origin.

New perspectives were first opened by genetics, but also evolutionary anthropology, neurophysiology, and cognitive sciences were expected to converge on offering a solid ground for a fresh approach to the old problem of the origin of language(s). Following the pioneer intuition of L. Cavalli-Sforza, comparative maps of genetic and linguistic human families were produced, which show similarities between the distribution of genetic diversities and that of linguistic groups. Similarly, the development of linguistic skills was foreseen to be linked to the evolution of the brain and of its cognitive strategies.

Around the end of the 20<sup>th</sup> century, the study of the origin of language and of languages was emerging as a promising field for multidisciplinary research, where prehistoric archaeology, palaeo-anthropology, genetics, linguistics, neurophysiology, cognitive sciences, as well as computer science and robotics, can profitably collaborate, and where international collaboration promised great benefits.

To this end, the OMLL programme invited proposals on the following themes:

1. Language and Archaeology
2. Language and Brain
3. Language and Genes
4. Language acquisition and Language universals
5. Language and Animal Communication
6. Language evolution and Computer modelling

After an international peer review process carefully managed by the ESF, 21 Collaborative Research projects were launched in 2003. These 21 collaborative research teams consisted of 44 individual research projects based in 12 different European countries.

Bringing together expertise from such a wide range of disciplines and such a wide variety of countries with different research traditions has been a unique opportunity for the participating researchers. In Chapter 4 below, OMLL research teams share with us their experiences in the programme and the influence of their participation in the OMLL programme on their work. There you will learn about the outcomes of the programme that are highlighted by the participating research teams as their most original and important scientific contribution to the OMLL programme and the research field in general. It shows the pivotal role the OMLL programme has played in creating conditions for dialogue and it bears witness to the tremendous impact that the creation of synergy has had in this highly multidisciplinary, multinational research field.

What follows is a detailed description of the six OMLL themes, as submitted to the ESF in the original research programme by Professor Jean-Marie Hombert, University of Lyon 2, France.

### 1. Language and Archaeology

#### (1.a) Comparison between the complexity of communication systems and cognitive complexity inferred from archaeological findings

Speech does not fossilise but the interpretation of artefacts obtained from archaeological sites can be used to infer the degree of complexity of the communication system necessary to produce these artefacts and sometimes their associated behaviour. The degree of complexity of tool technology is often used as a marker for the level of cognitive ability but it is difficult to extrapolate the need for a sophisticated system of communication from tool technology alone. One reason is that the ability to manufacture complex tools can be learned from observation and imitation without explicit tutoring requiring the use of language. Intentional burials and seafaring are activities that appear to require a greater reliance on linguistic communication for the purpose of enacting rituals and solving problems. The dates and the intentionality of some of the oldest burial sites are still controversial. Further studies are needed to clarify these controversies because these dates may point to the earliest traces of our ancestor's full-fledged language. Similarly, seafaring from the Asian continent to Australia more than 60 000 years ago is difficult to imagine without an extremely efficient communica-

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tion system. If the presence of anatomically modern humans in Australia is confirmed at 60 000 years BP, it will strongly suggest that language was already fully operational by then.

### **(1.b) Comparison between linguistic and archaeological data for periods between 15 000 and 5 000 BP (especially in the Indo-European domain)**

The term 'Indo-European' may refer to a proto-language reconstructed from its modern descendants (and from written documents) as well as a culture inferred from written sources and archaeological studies. The association between the proto-Indo-European language and culture has been hotly debated. The nature of the diaspora of the proto-Indo-European language and culture is also controversial. The interface between language and culture, which is a dynamic process, should be studied with great care. Historical linguists have proposed various possibilities for the ancestor of the proto-Indo-European language (Eurasianic versus Nostratic families). This time window (5 000-15 000 BP) at the upper boundary of possible contributions from linguistic data to the reconstruction of our past seems to be perfectly adequate for interactions between historical linguists and archaeologists working on Indo-European languages and cultures. Similar collaborations for the same time period for other geographical zones should also be encouraged.

### **(1.c) Evaluation of Neanderthal communication system and cognitive abilities**

The proximity between Neanderthals and anatomically modern humans has been debated since the discovery of the first Neanderthal fossils. At first, the Neanderthals were classified as our direct ancestors with limited cognitive abilities. The current view is that the Neanderthals belong to a genetic branch, which separated from the human lineage some 500 000 years ago. Recent studies have also shown that Neanderthals had greater cognitive abilities than previously thought (more complex tool technology, more sophisticated hunting techniques). Were these new cognitive accomplishments the result of contacts with groups of anatomically modern humans or were they Neanderthal innovations? The two theories are currently under discussion and evaluation. If Neanderthals were able to exhibit complex behaviours, what was the nature of their communication system? Contrary to what has been accepted since the 1970s, their peripheral speech production system was probably not very different from ours. It has been suggested on the basis of a Neanderthal hyoid bone found at the Kebara site (Israel) that the position of their larynx did not prevent them from having a large enough set of articulated

sounds necessary for speech. The synthesis of data evaluating Neanderthal's cognitive and speech abilities should allow us to understand why our closest relatives disappeared some 30 000 years ago.

## **2. Language and Brain**

### **(2.a) Evolution of cortical regions involved in language production and perception**

It has been claimed that language is innate. Such a claim needs to be clarified and bolstered by empirical facts: what aspect of language is innate? Since when? What type of genetic basis and mutation does such a claim imply?

A distinct and contrasting point of view considers that our language abilities resulted from the adaptation of pre-existing cognitive abilities. For instance, our tremendously efficient system for coding and decoding of speech requires extremely fine-tuned control of serial neuromuscular events. Several possibilities have been proposed as the original source for such a system: hand gestures but also mouth and jaw movements. Recent brain imaging techniques on human and non-human primates can shed new lights on these hypotheses.

### **(2.b) Study of the neurophysiology of mimesis and its role in the emergence of the language faculty**

Compared to other species, including non-human primates, humans have a much greater capacity to learn new skills by imitation and practice (e.g. throwing skills). This ability may have played a determinant role in the development of motor skills necessary for refining intentional vocalisation. An interesting neurophysiological link between perception and action (and consequently with the possibility of mimesis) has recently been observed by researchers who have identified the so-called 'mirror neurons'. These visuomotor neurons were first identified in the monkey's premotor cortex; the same neurons discharge when the monkey executes a 'grasping' task or when the monkey sees another individual performing the same action. This discovery provides an insight on the transmission of a new communicative behaviour among members of the same species. It enables us to understand how an innovative and adaptive behaviour of serendipitous origin may be transmitted from generation to generation and evolve into a complex system. Here also brain imaging techniques will be useful to develop this line of investigation.

## 2. OMLL Programme Description

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### 3. Language and Genes

#### **Comparison between genetic classification of today's world populations and language families**

Genetic data from modern populations have been used to provide dates for the emergence of anatomically modern humans and to locate their continent of origin. They have also been used to infer information concerning more recent population movements (e. g. Austronesian populations). Depending on the type of analysis performed, results do not always converge (see for instance analyses based on mitochondrial DNA versus nuclear DNA). Reasons for divergence are currently under scrutiny. On the basis of linguistic data collected from modern languages it is possible to reconstruct earlier groupings of currently spoken languages into language families and thus infer population movements associated with these language groupings. Unfortunately, traditional methods of historical linguistics are limited to a time depth of less than 10 000 years. Other methods have been proposed but they remain controversial. A number of researchers in historical linguistics consider that the time has come to develop new methodologies for establishing linguistic groupings at a time depth of 10 000 years and beyond. Such methodologies will incorporate accumulated knowledge of linguistic change as well as statistical techniques developed in other fields (especially in biology). In the coming years we need to refine the seminal work of Cavalli-Sforza and his colleagues on the correlation between linguistic and genetic groupings. It will be particularly important to adapt the type of genetic markers and the size of the sample population to the time-depth of the language group under consideration. Progress in this area will depend on close collaboration between historical linguists and geneticists.

### 4. Language Acquisition and Language Universals

#### **(4.a) Comparison between processes involved in language acquisition versus language emergence/evolution**

It has been shown that the 'ontogeny recapitulates phylogeny' position is an oversimplification of evolutionary processes. However, these ontogenetic studies are not necessarily irrelevant to the understanding of evolutionary processes. In the case of language origin, apart from rare exceptions, researchers have been reluctant to extrapolate results from language acquisition of children to infer possible evolutionary scenarios of language origin. If we keep in mind the different contexts of language acquisition and language origin (language developing in a linguistically rich environment and a

rapidly developing brain in the case of language acquisition by children as opposed to a poor or non-existent linguistic context and a slowly evolving brain) we may profit from the large number of studies on language acquisition carried out over the last few decades in our effort to understand language origin.

#### **(4.b) Language universals and brain architecture (and processes)**

Since the 1960s, large-scale surveys of typological features of the world's languages have progressively shown that a wide variety of linguistic systems contain general 'patterns' or general tendencies (often called 'language universals'). These surveys have not been as thorough for all aspects of linguistic systems mostly because of the limitations of available data. They are more detailed and firmly grounded in a large number of languages when they concern sound systems; they are more limited when dealing with syntactic aspects and rare in the semantic domain. These studies should be continued in at least two directions. First, we need to compare the results of synchronic studies with surveys of diachronic processes; surveys based on synchronic data can provide information only on what the most common patterns in the world's languages are. They do explain how the linguistic system evolves from one stable state to another. Second, if recurrent linguistic patterns are observed in languages distant in time and space, they cannot be explained by linguistic inheritance from a parent language or by language contacts. A possible explanation for them may lie in general cognitive constraints inherent in the coding and decoding phases of human communication (e.g. speed of processing, memory capacity, etc.) An interesting source of data for the understanding of language contact and the role of cognitive constraints on the assimilation of a new linguistic system is the study of the emergence and development of Creole languages.

### 5. Language and Animal Communication

Language is often used as a central distinctive feature of our species. Consequently, it is crucial to be able to provide a detailed account of the emergence of this specific behaviour. Is it just a system comparable to but different from other animal communication systems or does it constitute a radically different way of communicating with other members of one's own species? A fast-growing literature on animal communication clearly indicates that animals are capable of communicating information and exhibiting behaviour far more complex than previously thought. In this context, it is important to re-evaluate what specific features characterise human communication versus animal communication.



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## 6. Language Evolution and Computer Modelling

Computer modelling has been used quite extensively in recent years to simulate the evolution of the human vocal tract, the emergence of sound systems, of the lexicon and of syntax. It is obvious that these new tools allow researchers to test hypotheses concerning the emergence of language and their development should be encouraged by our programme. We also strongly believe that computer modelling studies investigating the following questions should also be engaged.

### (6.a) Social impetus for the emergence of language

Language is a communicative system fundamentally dependent on the social context in which it operates. Individuals use language to disseminate and receive information for survival but also for establishing social networks. As social groups enlarged in the course of evolution, our hominid ancestors needed a more efficient tool of communication in order to establish and maintain social bounds. This need is one of the forces driving the evolution of hominid communicative behaviour towards the ultimate goal of language.

### (6.b) Use of self-organisation concepts in the study of language evolution

The notion of self-organisation in complex systems was first applied to the field of biology. Recently it has been found to be relevant to linguistic issues such as the emergence of sound systems and the stabilisation of certain linguistic structures. Hence free and natural order in the form of self-organisation without a pre-ordained master plan can emerge in a complex system whether the system consists of behaviours or entities. Some encouraging results have been obtained for predicting sound systems in the evolution of communicative behaviours of our hominid ancestors. This line of research should be encouraged and extended to other levels of linguistic structures.

### (6.c) Polygenesis versus monogenesis of language origin

Because the origin of language marks the beginning of human civilisation, the general assumption is that it occurred only once in hominid evolution. This is the theme of the monogenesis of language. From this point of view, the origin of language co-occurred with the emergence of anatomically modern humans in Africa. However, the theory of monogenesis is not without controversy, it is possible that language, as we know it today, might have emerged after the first modern humans left Africa over 100 000 years ago. In this case the polygenesis of language would be a real possibility. At this juncture the issue of monogenesis versus

polygenesis is not resolved; research effort on this question is of great significance to our understanding of language origin and human evolution.

### (6.d) Evaluation of population size between 100 000 years and 10 000 years ago

The mechanisms of language diversification and linguistic contacts are strongly influenced by the number of individuals in a given linguistic community, the number of linguistic groups at a given point in time, and the spatial displacements of populations. These population movements are to a great extent conditioned by climatic conditions. Data on group size and overall population during all periods of hominid evolution are crucial to research on the origin of language. Dunbar has focused on the role of group size for the emergence of articulated language when earlier forms of communication (still used to a large extent in non-human primates) became inadequate for maintaining social relationships in hominids. The importance of overall population size is also crucial for the understanding and the interpretation of results presented by Cavalli-Sforza and his colleagues who compared classifications based on genetic markers with linguistic classifications based on modern languages. A good correlation between these two types of classification is easier to understand if the total population is small and the different human groups are widely separated. Under such conditions, penetration of new habitats through migration will result in the creation of a new gene pool and a new language community. Data on prehistoric population size can be extrapolated from population densities of current hunter-gatherer groups, evaluation of resource potentials of inhabited zones at a given point in time, evaluation of population density in archaeological sites and more recently from estimates based on molecular genetic studies. Furthermore, studies devoted to the evaluation of the number of speech communities and their relative localisations at different periods would be very useful to improve our understanding of the nature of language contacts.

## 2. OMLL Programme Description

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### Participating ESF Member Organisations

- FNRS-CFB, Fonds National de la Recherche Scientifique (Belgium)
- FWO, Fonds voor Wetenschappelijk Onderzoek – Vlaanderen (Belgium)
- SHF, Statens Humanistiske Forskningsråd (Denmark)
- ETA, Eesti Teaduste Akadeemia (Estonia)
- SA, Suomen Akatemia (Finland)
- CNRS, Centre national de la Recherche Scientifique (France)
- DFG, Deutsche Forschungsgemeinschaft (Germany)
- MPG, Max-Planck-Gesellschaft (Germany)
- CNR, Consiglio Nazionale delle Ricerche (Italy)
- NWO, Nederlandse Organisatie voor Wetenschappelijk Onderzoek (the Netherlands)
- FCT, Fundação para a Ciência e a Tecnologia (Portugal)
- CSIC, Consejo Superior de Investigaciones Científicas (Spain)
- OCYT, Oficina de Ciencia y Tecnología (Spain)
- VR, Vetenskapsrådet (Sweden)
- KVHAA, Kungliga Vitterhets Historie och Antikvitets Akademien (Sweden)
- BA, The British Academy (UK)

### The EUROCORES Scheme

Not only did the programme ‘The Origin of Man, Language and Languages’ greatly contribute to creating pan-European synergy in her own, multi-disciplinary, research field. The programme has also been very successful in paving the way for establishing the EUROCORES format as a major instrument for transnational, collaborative research. Currently, the European Science Foundation runs 29 EUROCORES Programmes in all areas of research with a research budget – for the 22 Programmes that already started funding – of approximately 100 million Euro.

### Facts and Figures

Deadline for Applications: **15 May 2001**  
Funded Collaborative Research Projects: **21**  
consisting of **44** Individual Research Projects  
in **12** different countries  
New budget for research: **6 million Euro**

### 3. List of OMLL Projects

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#### **The cultural self-organisation of cognitive grammar (JA02)**

- Cristiano Castelfranchi, Università di Siena, Italy
- Peter Dominey, Institut des Sciences Cognitives, Bron, France
- Luc Steels, Free University of Brussels, Belgium

#### **Language and genes of the greater Himalayan Region (JA03)**

- Guido Barbujani, Università di Ferrara, Italy
- Peter de Knijff, Leiden University, the Netherlands
- Mark Jobling, University of Leicester, United Kingdom

#### **From symbols to language. The archaeology of the origin of language and early diversification of languages (JA04)**

- Paul-Louis van Berg, Free University of Brussels, Belgium
- Francesco d'Errico, Institut de la Préhistoire et de la Géologie du Quaternaire, Talence, France

#### **Action gesture and words in a developmental and evolutionary perspective (JA05)**

- Eva Berglund, Research Group for Language and Psychology, Uppsala University, Sweden
- Virginia Volterra, Institute of Cognitive Sciences and Technologies, CNR, Rome, Italy
- Domenico Parisi, Institute of Cognitive Sciences and Technologies, CNR, Rome, Italy
- Giacomo Rizzolatti, Università degli Studi di Parma, Italy

#### **Early diffusion of domestic bovids in the Middle East and Europe: transmission of animals, transfer of technical knowledge (JA06)**

- Jean-Denis Vigne, Muséum National d'Histoire Naturelle, Paris, France

#### **The berber and the Berber: genetic and linguistic diversity (JA07)**

- Jean-Michel Dugoujon, Université Paul Sabatier, Toulouse III, France
- Pedro Moral Castrillo, Universitat de Barcelona, Spain

#### **Categorical perception and its role in the evolution of language (JA10)**

- Joël Fagot, CNRS, Center for Research in Cognitive Neurosciences, Marseille, France

#### **Orofacial control in communication in human and non human primates (JA12)**

- Leonardo Fogassi, Università degli Studi di Parma, Italy
- Jean-Louis Heim, Laboratoire d'Anthropologie du Musée de l'Homme, Paris, France
- Jean-Luc Schwartz, CNRS, Institut de la Communication Parlée, Grenoble, France
- Jacques Vauclair, Université de Provence, Aix-en-Provence, France

#### **Mindreading and the emergence of human communication (JA13)**

- Vittorio Gallese, Università degli Studi di Parma, Italy
- Manuel García-Carpintero, Universitat de Barcelona, Spain
- François Recanati, CNRS/EHESS, Institut Jean Nicod, Paris, France

#### **The evolution of language: evidence from typology, ontogenesis and computational modeling**

- Chris Sinha, University of Portsmouth, UK

#### **Shared mechanisms for speech and gesture recognition? (JA15)**

- Luciano Fadiga, Department of Biomedical Sciences, Università degli Studi di Ferrara, Italy

#### **The prehistory of Amazonian languages: Ecological and cultural processes underlying linguistic differentiation (JA17)**

- Alf Hornborg, Lund University, Sweden

#### **East meets West. Linguistic and genetic comparison of modern Eurasian populations. A joint program in anthropology, ethnology, linguistics and population genetics (JA18)**

- François Jacquesson, Laboratoire des Langues et Civilisations de Tradition Orale, Villejuif, France
- Antti Sajantila, University of Helsinki, Finland

#### **The emergence of grammar in the brain: A comparative study of acquisition, processing and cortical organisation of the structural aspects of language in bilingual and monolingual populations (JA20)**

- Itziar Laka, Universidad del País Vasco, Vitoria-Gasteiz, Spain
- Marina Nespor, Università degli studi di Ferrara, Italy

### 3. List of OMLL Projects

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**Pioneers of Island Melanesia: a joint project between British, Dutch, German and Swedish teams (JA21)**

- Robert A. Foley, University of Cambridge, United Kingdom
- Stephen C. Levinson, Max-Planck-Institute for Psycholinguistics, Nijmegen, the Netherlands
- Eva Lindström, Stockholm University, Stockholm, Sweden
- Mark Stoneking, Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany

**Brain dynamics of language processing and acquisition (JA25)**

- Risto Näätänen, University of Helsinki, Finland

**Early word segmentation and representation: psychological responses and electrophysiological correlates (JA26)**

- Thierry Nazzi, Laboratoire de Sciences Cognitives & Psycholinguistique, EHESS, Paris, France

**Language, culture, and genes in Bantu: a multidisciplinary approach of the Bantuspeaking populations of Africa (JA27)**

- Jaume Bertranpetit, Universitat Pompeu Fabra, Barcelona, Spain
- Mark Stoneking, Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany
- Lolke J. van der Veen, UMR 5596 – CNRS/ Université Lumière – Lyon 2, France

**Comparison between processes in language acquisition by children and language evolution (JA30)**

- Sophie Kern, Institut des Sciences de l'Homme, Lyon, France
- Inge Zink, University of Leuven, Belgium

**Emergence and flow of gene lineages and languages along the steppe belt and beyond (JA31)**

- André Chaventre, Bordeaux University, France
- Richard Villems, Estonian Biocenter, Tartu, Estonia

**The origins of primate semantic and syntactic abilities (JA33)**

- Ronald Noë, Université Louis Pasteur, Strasbourg, France



A ruined citadel in the Karakalpak desert (Central Asia)

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## 4. Highlights of the OMLL Collaborative Research Projects

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### 1. Language and Archaeology

#### From symbols to language: The archaeology of the origin of language and early diversification of languages

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##### Principal investigators:

- Paul-Louis van Berg, Free University of Brussels, Belgium
- Francesco d'Errico, Institut de la Préhistoire et de la Géologie du Quaternaire, Talence, France

##### Funding organisations:

- Centre National de la Recherche Scientifique/ National Centre for Scientific Research (CNRS)
- Fonds de la Recherche Scientifique/ Fund for Scientific Research (FNRS)

By Francesco d'Errico

##### Embedding in the OMLL programme:

Studying the origin and the evolution of language was considered a tricky endeavour before the launch of the OMLL programme. It has become, in part as a consequence of this programme, a productive field of study and an ideal laboratory for interactions between a range of disciplines and scholars that could not have made contact without this collaborative research scheme.

##### Scientific results:

The members of our projects were able to demonstrate that long-lasting symbolic traditions existed in Africa well before the arrival of anatomically modern humans in Europe. Since recursive oral language is arguably an essential requisite for sharing and transmitting the meaning of a symbolic material culture we argued that human populations living in Africa were able to speak, probably like us, at least 100 000 years ago.

##### Publications:

- Henshilwood, Ch, d'Errico F., R. Yates, Z. Jacobs, C. Tribolo, G. A. T. Duller, N. Mercier, J. C. Sealy, H. Valladas, I. Watts, A. G. Wintle. 2002. Emergence of Modern Human Behavior: Middle Stone Age Engravings from South Africa. *Science*, 295: 1278-1280.
- d'Errico F., Ch. Henshilwood, G. Lawson, M. Vanhaeren, A.-M. Tillier, M. Soressi, F. Bresson, B. Maureille, A. Nowell, J. Lakarra, L. Backwell, M. Julien. 2003. Archaeological evidence for the origins of language, symbolism and music. An alternative multidisciplinary perspective. *Journal of World Prehistory*, 17: 1-70.
- Vanhaeren M., d'Errico F., C. Stringer, S.L. James, J.A. Todd, H.K. Mienis, 2006. Middle Paleolithic shell beads in Israel and Algeria. *Science*, 312 (5781): 1785-1788.
- d'Errico F., Henshilwood C., Vanhaeren M., van Niekerk K. 2005. Nassarius kraussianus shell beads from Blombos Cave: Evidence for Symbolic Behaviour in the Middle Stone Age. *Journal of Human Evolution* 48: 3-24.
- Vanhaeren M., d'Errico F., 2006. Clinal distribution of personal ornaments reveals the ethno-linguistic geography of Early Upper Palaeolithic Europe. *Journal of Archaeological Science*, 33: 1105-1128.

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Engraved abstract pattern on a slab of ochre found in the Middle Stone Age levels of Blombos Cave, South Africa, dated at 75 000 years

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## 4. Highlights of the OMLL Collaborative Research Projects

### Early diffusion of domestic bovids in the Middle East and Europe: Transmission of animals, transfer of technical knowledge

#### Principal investigator:

- Jean-Denis Vigne, Muséum National d'Histoire Naturelle, Paris, France

#### Funding organisation:

- Centre National de la Recherche Scientifique/ National Centre for Scientific Research (CNRS)

#### Scientific results:

The early Neolithic bovid of Europe has very few genetic relationships with the native European wild aurochs. This means that early domestic cattle were introduced from the Near East through Europe, together with sheep and goat. This suggests that a lot of know-how and technical knowledge accompanied the progression of the neolithisation wave, including probably words and languages.

#### Publications:

- Bollongino (R.), Edwards (C. J.), Burger (J.) Alt (K. W.) and Bradley (D. G.), 2005. Early history of European domestic cattle as revealed by ancient DNA, *Biology Letters*, 2, 155-159.
- Edwards C. J., Bollongino R., Scheu A., Chamberlain A., Tresset A., Vigne J.-D., Baird J. F., Larson G., Heupin T. H., Ho S. Y. W., Shapiro B., Czerwinski P., Freeman A. R., Arbogast R.-M., Arndt B., Bartosiewicz I., Benecke N., Budja M., Chaix I., Choyke A. M., Coqueugniot E., Döhle H.-J., Göldner H., Hartz S., Helmer D., Herzig B., Hongo H., Mashkour M., Ozdogan M., Pucher E., Roth G., Schade-Lindig S., Schmölcke U., Schulting R., Stephan E., Uerpman H.-P., Vörös i., Bradley D. G. & Burger J., Accepted. A mitochondrial history of the aurochs (*Bos primigenius primigenius*) in Europe. *Proc. Roy. Soc.*
- Fernandez H., Hughes S., Vigne J.-D., Helmer D., Hodgins G., Miquel C., Hanni C., Luikart G. and Taberlet P., 2006. Divergent mtDNA lineages of goat in an early neolithic site, far from the initial domestication areas. *Proc. Ntnl. Acad. Sc. USA*, 103, 42: 15375–15379.
- Marchand G. & Tresset A.(dir.), 2005. *Unité et diversité des processus de néolithisation de la façade atlantique de l'Europe (7<sup>e</sup>-4<sup>e</sup> millénaires avant notre ère)*. Actes des journées de la SPF, Nantes 26-27 avril 2002. Mémoire de la société préhistorique française 36, 288 p.
- Vigne J.-D., Helmer D. and Peters J. (dir.), 2005. *First steps of animal domestication: New archaeological approaches*. Oxford, Oxbow Books.

### The prehistory of Amazonian languages: Ecological and cultural processes underlying linguistic differentiation

#### Principal investigator:

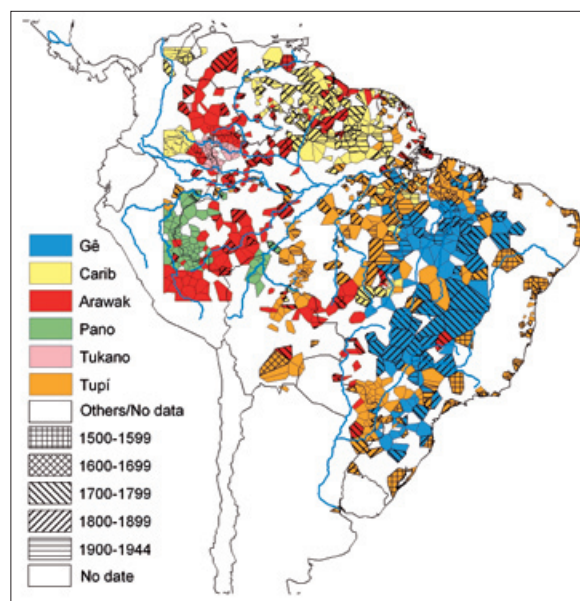
- Alf Hornborg, Lund University, Sweden

#### Funding organisation:

- Vetenskapsrådet/Swedish Research Council (VR)

#### Scientific results:

This project has shown that the diversification and distribution of Amazonian languages is best understood as the result not of demic migration but of processes of ethnogenesis within regional and interregional systems of exchange. Language is understood as an ethnic marker, comparable to various elements of material culture, which can be strategically shifted in relation to changing socio-political and economic circumstances. The wide distribution of Arawakan languages from the Antilles to Paraguay may reflect the distribution of an ancient (proto-Arawakan) lingua franca. This interpretation completely alters our understanding of prehistoric demography and economy and sheds light on contested issues regarding the extent of stratification, population concentrations, and intensification of resource use in ancient Amazonia. Moreover, the expansion of Arawak-speakers along major rivers may have contributed to the distinction and diversification of other linguistic families such as Tupí, Carib, and Gê. These hypotheses are being tested through systematic



Interpolation of ethno-linguistic data from Curt Nim Ethno-historical map

compilation and GIS correlation of archaeological, linguistic, historical, and paleoecological data from the Amazon and Orinoco Basins.

**Embedding in the OMLL programme:**

The ongoing communication with other OMLL researchers in the context of several workshops (see Publications/Presentations below) has been very stimulating, e.g. by providing comparative material. More generally, the topic of the OMLL programme has provided legitimacy for pursuing research on the geographical distribution of ethno-linguistic identities in prehistory.

**Publications/Presentations:**

- A. Hornborg 2005, "Ethnogenesis, regional integration, and ecology in prehistoric Amazonia", *Current Anthropology* 46:4:589-620.
- PhD thesis by Love Eriksen, Human Ecology Division, Lund University, forthcoming in 2009.
- Edited volume (A. Hornborg & J. Hill, eds.) based on two workshops in Lund (November 2006, May 2008) and an American Anthropological Association conference session (November 2007), tentatively titled "Amazonian Identities in History and Prehistory: Reconstructing the Expansion and Decline of Ancient Ethnic Categories in Lowland South America," forthcoming in 2008.
- Chapter in volume on Panoan peoples, edited by Javier Ruedas, forthcoming in 2008.
- Papers presented at various conferences, e.g. OMLL meetings (Leipzig, March 2004, and Cambridge, November 2005) and workshops on Eco-cultural Niche Modelling (Les Eyzies, September 2005) and Migrations (Porquerolles, September 2007); an International Symposium on Historical Linguistics (Belém, August 2005); and the IV and V Sesquiannual Meetings of the Society for the Anthropology of Lowland South America (Estes Park, June 2005, and Santa Fe, January 2007).

## 2. Language and Brain

### Shared mechanisms for speech and gesture recognition?

**Principal investigator:**

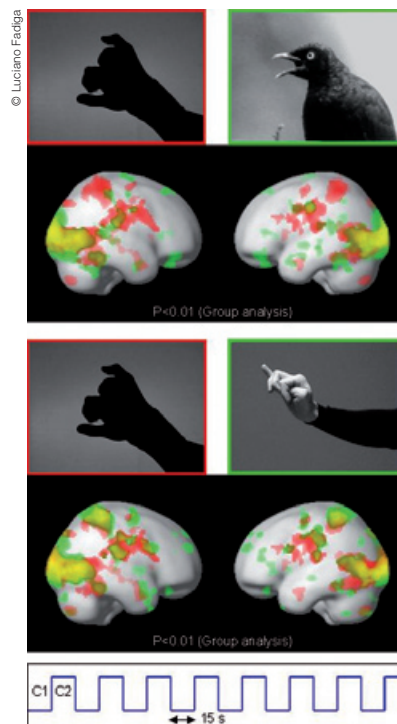
- Luciano Fadiga, Department of Biomedical Sciences, Università degli Studi di Ferrara, Italy

**Funding organisation:**

- Consiglio Nazionale delle Ricerche/ National Research Council (CNR)

**Scientific results:**

OMLL was an important scientific opportunity allowing us to investigate in depth how the motor system participates in perceptual mechanisms. The main results we achieved within this framework of research are two-fold. On one side we discovered that while listening to a speaker, the tongue's motor system is facilitated as if we were internally reproducing what we are listening to. Moreover, the lexical content of the speech influences this facilitation. On the other side, we discovered that Broca's aphasics have trouble in recognising others' actions. This evidence is further confirmed by the fMRI finding that hand gestures observation specifically activates the inferior frontal gyrus.



Transcranial magnetic stimulation of the tongue's motor cortex reveals motor facilitation during speech listening; Observation of gestures (hand shadows representing animals) activates, among other cortical centres, the human Broca's area.)

## 4. Highlights of the OMLL Collaborative Research Projects

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### **Embedding in the OMLL programme:**

OMLL gave us a unique opportunity in terms of sharing of scientific results and in receiving relevant stimuli also from colleagues involved in disciplines apparently far from neurophysiology. This is the confirmation of a trend that, in our view, is underlining a new idea of scientific research: that of a multidisciplinary environment where the borders between disciplines are rapidly disintegrating. Moreover, thanks to the publicity given to OMLL, the results of our research also reached the large non-specialist audience, as in the case of a substantial article published in the French journal *Science et Vie*.

### **Publications/Presentations:**

- Fadiga L., Craighero L. 'New insights on sensorimotor integration: From hand action to speech perception' *Brain and Cognition*, 53, 514-524. 2003.
- Fadiga L., Craighero L., Fabbri-Destro M., Finos L., Cotillon-Williams N., Smith A.T., Castiello U. 'Language in shadow'. *Social Neuroscience*, 1, 77-89. 2006.
- Fadiga L., Craighero L. 'Hand actions and speech representation in Broca's area'. *Cortex*, 42, 486-490. 2006.
- Fadiga L., Roy A.C., Fazio P. and Craighero L. 'From hand actions to speech: evidence and speculations' In P. Haggard, Y. Rossetti, M. Kawato (Eds.) *Sensorimotor Foundations of Higher Cognition, Attention and Performance XXII*. Oxford University Press, Oxford, New York, in press.
- Roy A.C., Craighero L., Fabbri-Destro M., Fadiga L. 'Phonological and Lexical Motor Facilitation during Speech Listening: A Transcranial Magnetic Stimulation Study'. *Journal of Neurophysiology*, Paris. In press.

Further information: [www.unife.it/neurolab](http://www.unife.it/neurolab)

### **The emergence of grammar in the brain: A comparative study of acquisition, processing and cortical organisation of the structural aspects of language in bilingual and monolingual populations**

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#### **Principal investigators:**

- Itziar Laka, Universidad del Pais Vasco, Vitoria-Gasteis, Spain
  - Marina Nespors, Università degli studi di Ferrara, Italy
- #### **Funding organisations:**
- Consiglio Nazionale delle Ricerche/ National Research Council (CNR)
  - Ministerio de Educación y Ciencia/ Spanish Ministry of Education and Science (MEC)

#### **Scientific results:**

Bilingualism is pervasive in human populations. Our main finding is that bilingualism has a significant impact on language emergence, representation and processing. We have found that monolinguals and bilinguals already differ at the earliest stages of language acquisition, particularly regarding language discrimination capacities and strategies for lexical representation. In adulthood, our results show that high proficiency bilinguals can switch languages at a very low cost, and the switching performance of highly proficient bilinguals is different from that of L2 learners. The effects of bilingualism on the way lexical access is achieved are not limited to the two languages for which the bilingual is proficient, but they extend to other languages, independent of the degree of proficiency. Regarding language representation and processing, we have also found that certain aspects of grammatical computation (word-order, relative clause attachment, case/agreement morphology) are processed differently by monolinguals and bilinguals, and in doing this, we have explored some grammatical phenomena that have not been looked at before (ergativity, objects agreement) in processing studies. Our results strongly suggest that a full picture of human language, its evolution, emergence and representation requires looking beyond monolingualism and significantly broadening the sample of languages under study, to get closer to the full array of human linguistic possibility.

We have also investigated the mechanisms involved in language acquisition. We have shown that different mechanisms are involved in segmentation and the extraction of generalizations. Our results indicate that while consonants are more relevant for segmentation and thus the acquisition of the lexicon, vowels on the other hand – the main carriers of prosody – are mainly involved in the acquisition of grammar. We have also shown that mechanisms of general perception are involved in both.





“The emergence of grammar in the brain”,  
Universidad del Pais Vasco.

#### Embedding in the OMLL programme:

Both in terms of funding and visibility, participation in this programme has been extremely important for us. It allowed us to strengthen synergies, coordinate efforts among the various teams, and create new research facilities. The programme also gave us the opportunity to interact with people working in different disciplines. The workshop organized in Ferrara by Marina Nespors, Luciano Fadiga and Guido Barbujani is a nice example of this interaction.

#### Publications/Presentations:

- Sebastian-Galles N., Nespors M., Mehler, J. (2004) Biological foundations of language: language acquisition, cues for parameter setting and the bilingual infant. In M. Gazzaniga (ed.) *The New Cognitive Neurosciences*. 3<sup>rd</sup> Edition, Cambridge, Massachusetts: MIT Press, 825-836.
- Diaz B., Erdozia K., Mueller J.L., Sebastian-Galles N., Laka I. (2006) ‘Individual differences in syntactic processing of a second language: Electrophysiological evidence’, *Journal of Psychophysiology* 20 (3): 228-228.

- Costa A & Santesteban M (guest editors) special issue of the journal *Bilingualism: Language and Cognition* entitled ‘Speech production in bilingual speakers’ (2006)
- Shukla, M., M. Nespors and J. Mehler (2007) Interaction between prosody and statistics in the segmentation of fluent speech. *Cognitive Psychology*. 54.1.1-32.
- Sebastian-Galles N., Rodriguez-Fornells A., De Diego-Balaguer R., Diaz B. (in press) ‘First and second language phonological representations in the mental lexicon’. *Journal of Cognitive Neuroscience*.

Further information:

<http://www.ub.es/pbasic/sppb>

#### Early word segmentation and ration: Psychological responses and electrophysiological correlates

##### Principal investigator:

- Thierry Nazzi, Laboratoire de Sciences Cognitives et Psycholinguistique, EHESS, Paris, France

##### Funding organisation:

- Centre National de la Recherche Scientifique/  
National Centre for Scientific Research (CNRS)

##### Scientific results:

The initial goal was to extend research on infants’ ability to extract words from fluent speech (known as ‘early word segmentation abilities’) in languages other than English. Research on English had shown that (a) segmentation abilities emerge around 8 months, and (b) infants use various cues such as prosodic, phonotactic, allophonic and distributional cues. However, it left open the issue of how infants began to use these cues in the first place, given that these cues are language specific. Our proposal was that infants begin segmenting speech according to the underlying rhythmic unit of their native language, based on a sensitivity to linguistic rhythm from birth (Nazzi, Bertoncini & Mehler, 1998). The data from English, showing an early use of trochaic units (the rhythmic unit of English), fit that proposal. Our research brought new behavioural data (using the Headturn Preference Procedure) in favour of this proposal from French, showing that French infants initially rely on the syllable, which is the rhythmic unit of French (Nazzi, Iakimova, Bertoncini, Frédonie & Alcantara, 2006). Follow-up studies are (a) exploring French infants’ use of the syllabic unit for segmentation using high-density ERPs, and (b) starting to explore their use of other segmentation cues.

## 4. Highlights of the OMLL Collaborative Research Projects

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### Embedding in the OMLL programme:

The previous conference (in Leipzig) was a great opportunity to meet other European researchers and exchange ideas. In particular, discussions with M. Nespor provided a new framework to explain initial results and extend experimental work on the issue of the consonant/vowel asymmetry in early lexical specificity, which led to publication of the first study exploring this issue in young infants (Nazzi, 2005) and opened up a new research field (e.g., Mani & Plunkett, 2007; Nazzi & New, 2007; Curtin et al., 2007), leading to new collaborations (with C. Floccia, University of Plymouth, United Kingdom, and B. Hohle, Potsdam University, Germany).

Discussions within the programme also led to the beginning of a collaboration with L. Polka (McGill University, Canada) and Marilyn Vihman (University of York, United Kingdom) exploring the effects of dialectal differences on early linguistic development.

### Publications/Presentations:

- Nazzi, T. (2005). 'Use of phonetic specificity during the acquisition of new words: differences between consonants and vowels'. *Cognition*, 98, 13-30.
- Nazzi, T., Iakimova, I., Bertoncini, J., Frédonie, S., & Alcantara, C. (2006). 'Early segmentation of fluent speech by infants acquiring French: emerging evidence for crosslinguistic differences'. *Journal of Memory and Language*, 54, 283-299.
- Nazzi, T., Iakimova, G., Bertoncini, J., Mottet, S., Serres, J. & de Schonen, S. (2007, in press). 'Behavioural and electrophysiological exploration of early word segmentation in French: distinguishing the syllabic and lexical levels'. TILAR.
- Nazzi, T., Iakimova, G., Bertoncini, J., Polka, L., Sundara, M., & Girard, S. (2006). The development of word segmentation in infants acquiring different dialects of French. Poster presented at the 31<sup>st</sup> Annual Boston University Conference on Language Development, Boston MA, USA, 3-5 November 2006.
- Havy, M., Nazzi, T., & Bertoncini, J. (2008). Asymmetrical use of consonantal and vocalic information at the lexical level in 3-to-5-year-old deaf children with cochlear implant. Poster presented at the 16<sup>th</sup> Biennial Meeting of the International Society for Infant Studies, Vancouver, Canada, 20-22 April 2008.

Further information:

<http://lpp.psych.univ-paris5.fr/Thierry-Nazzi.html>

## 3. Language and Genes

### Language and genes of the greater Himalayan region

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#### Principal investigators:

- Guido Barbujani, Università di Ferrara, Italy
- Peter de Knijff, Leiden University, the Netherlands
- Mark Jobling, University of Leicester, United Kingdom

#### Co-Investigators:

- George van Driem, Himalayan Languages Project, Universiteit Leiden, the Netherlands
- Chris Tyler-Smith, Wellcome Trust Genome Campus, United Kingdom

#### Funding organisations:

- Arts and Humanities Research Council (AHRC)
- Consiglio Nazionale delle Ricerche/ National Research Council (CNR)
- Nederlandse Organisatie voor Wetenschappelijk Onderzoek/Netherlands Organisation for Scientific Research (NWO)

By Peter de Knijff

#### Scientific results:

So far, we have found a remarkable degree of genetic diversity in the Himalayas, and have begun to discover how the complex interactions between the extraordinary topography of the region, the languages and the genetics have shaped the patterns we now see.

#### Embedding in the OMLL programme:

Without the close interaction – within our own project and with other projects within OMLL – with experts from other scientific disciplines, our project would hardly have been possible at all and would not have been so successful. The project has already generated a number of publications and our major findings still have to be fully released.

The most pleasing scientific aspect of this project was the opportunity to interact with and learn from international colleagues, local experts, geneticists and the foremost linguistic experts.

#### Publications:

- G. van Driem. 2002. 'Tibeto-Burman phylogeny and prehistory: Languages, material culture and genes', pp. 233-249 in Peter Bellwood and Colin Renfrew, eds., *Examining the Farming/Language Dispersal Hypothesis*. Cambridge: McDonald Institute for Archaeological Research.
- E. J. Parkin, T. Kraayenbrink, J. R. M. L. Opgenort, G. L. van Driem, N. M. Tuladhar, P. de Knijff, M. A.



Representatives of the Dura community of Nepal

Jobling. '26-locus Y-STR haplotypes in a Nepalese population sample: isolation and drift in the Himalayas'. *For. Sci. Int.* 2007; 166:176-181.

- C. P. Caetano, T. Kraaijenbrink, N. M. Tuladhar, G. L. van Driem, P. de Knijff, C. Tyler-Smith, D. R. Carvalho-Silva. 'Nepalese populations show no association between the distribution of malaria and protective alleles'. *J. Mol. Genet. Med.* 2006; 2: 101-106.

#### Lectures:

- G. van Driem. 'Reflections on the ethnolinguistic prehistory of the greater Himalayan region', presentation made at the workshop 'Landscape, demography and subsistence in prehistoric India: Exploratory workshop on the middle Ganges and the Vindhyas' held at the Leverhulme Centre for Human Evolutionary Studies, University of Cambridge and the Ancient India and Iran Trust, 2 June 2007.
- C. Tyler-Smith. 'Genetic, Linguistic and Geographical boundaries in the Himalayan region'. Presentation made at the EMBO workshop on Human Evolution and Disease. Hyderabad, India, 6-8 December 2006.

Further information:

<http://www.iias.nl/himalaya/?q=node/81>

<http://www.le.ac.uk/genetics/maj4/himalayas.html>

<http://www.sanger.ac.uk/Teams/Team19/himalayas.shtml>

## The berber and the Berber: genetic and linguistic diversity

### Principal investigators:

- Jean-Michel Dugoujon, CNRS and Université Paul Sabatier, Toulouse III, France
- Pedro Moral Castrillo, Universitat de Barcelona, Spain

### Funding organisations:

- Centre National de la Recherche Scientifique/ National Centre for Scientific Research (CNRS)
- Ministerio de Educación y Ciencia/ Spanish Ministry of Education and Science (MEC)

### Scientific results:

This project has confirmed the intricate division of the Berber language group. On the one hand, one has a typologically well-definable unit, Northern Berber, as opposed to a number of other groups. On the other hand, there is hardly anything that confirms the genealogical nature of the Northern Berber sub-group. In fact, what makes up Northern Berber is best described as a linguistic convergence area. As a result, it is questionable that an overall sub-classification is possible at all. At a more local level, some sub-groups which may be considered genetic have been established, such as Zenatic; the identification of Zenaga of Mauritania as the first branching of the Berber language tree is strengthened.

Our genetic results show that Berbers occupy an intermediate position between European and sub-Saharan populations. One observes a genetic differentiation between Northwestern and Northeastern African groups: populations from the Maghreb are related to European and Middle Eastern populations whereas populations of High Egypt have more affinities with sub-Saharans and East Africans. There is a clear and significant genetic difference between Berbers from Maghreb and Egyptian Berbers, with the first being related to Europeans while the latter share more affinities with East Africans.

### Embedding in the OMLL programme:

Our participation in the OMLL programme has allowed an interdisciplinary approach and talks between geneticists and linguists. Each population has been referenced on the basis of linguistic criteria. The quality of the sampling, the scientific objectives of the project and the necessity to obtain results at the highest scientific level have led to collaborations with internationally famous teams: genetics (A. Torroni, R. Scozzari and P. Moral) and linguistics (N. Louali and G. Philippson, M. Kossmann). A network is now operational, with student exchanges and a common project. Linguists have shown an unexpected view of the linguistic situation (Siwi language different from Northwestern speakers).

## 4. Highlights of the OMLL Collaborative Research Projects

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This shows that more genetic research on the Libyan populations should be conducted to establish the origin of this discrepancy and to find a possible scenario for the origin and expansion of Berber language.

### Publications/Presentations:

- Cruciani F., La Fratta R., Trombetta B., Santolamazza P., Sellito D., Beraud Colomb E., Dugoujon J.-M., Crivellaro F., Benincasa T., Pascone R., Moral P., Watson E., Melegh B., Barbujani G., Fuselli S., Vona G., Zagradisnik B., Assum G., Brdicka R., Kozlov A.I., Efremov G.D., Coppa A., Novelletto A., Scozzari R. 'Tracing past human male movements in northern/eastern Africa and western Eurasia: new clues from Y-chromosomal haplogroups E-M78 and J-M12'. *Molecular Biology and Evolution* 2007; 24(6):1300-1311.
- Olivieri A., Achili A., PalaM., Battaglia V., Formarino S., Al-Zahery N., Scozzari R., Cruciani F., Behar D.M., Dugoujon J.-M., Coudray C., Santachiara-Benereceti A.S., Semino O., Bandelt H.J., Torroni A. 'The mtDNA legacy of the Levantine Early Upper Palaeolithic in Africa'. *Science* 2006; 314: 1767-1770.
- Coudray C., Guitard E., Kandil M., Harich N., Melhaoui M., Baalia A., Sevin A., Moral P., Dugoujon J.-M. 'Study of GM immunoglobulin allotypic systems in Berbers and Arabs from Morocco'. *American Journal of Human Biology* 2006; 18:23-34.
- Athanasiadis G., Esteban E, Via M., Dugoujon J.-M., Moschonas N., Chaabani H., Moral P. 'The X chromosome Alu Insertions as a tool for human population genetics: data from European and African human groups'. *European Journal of Human Genetics*. 2007; 15(5):578-583.
- Louali N., Philippson G. 'Berber expansion into and within north-west Africa: a linguistic contribution', *Afrika und Uebersee*, 2004, 87:105-130.

### East meets West: Linguistic and genetic comparison of modern Eurasian populations. A joint programme in anthropology, ethnology, linguistics and population genetics

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#### Principal investigators:

- François Jacquesson, Laboratoire des Langues et Civilisations de Tradition Orale, Villejuif, France
- Antti Sajantila, University of Helsinki, Finland

#### Funding organisations:

- Suomen Akademia/Academy of Finland (AKA)
- Centre National de la Recherche Scientifique/ National Centre for Scientific Research (CNRS)

By François Jacquesson and Evelyne Heyer

#### Scientific results:

The project worked on the history of populations in two areas, Central Asia and Northeastern India. Population history was approached using written sources, language comparison and histories, in-depth studies in social anthropology and population genetics.

Our geneticists began (in 2004) by trying to measure to what extent social organisation has an impact on genetic diversity on Y-chromosome diversity and more recently (2007) also on mitochondrial genetic diversity. We have shown that current Turkic speaking populations, but not Indo-European populations, exhibit a significant loss of intrapopulation genetic diversity for their Y chromosome (transmitted from father to son) as a result of the dynamics of their patrilineal descent groups and significant genetic differences among populations regardless of their ethnic group. We have also shown that Indo-European populations are differentiated by their mitochondrial DNA (transmitted from mother to daughter) whereas current Turkish speaking populations are not differentiated even at the ethnic group level. This observation is likely to result from the different ways of exchanging spouses among populations, with fewer exchanges between Tajik populations than between Turkish populations.

Using autosomal neutral markers, we further observe that the Turkic groups are more closely related to eastern Eurasia groups and that the Indo-European speaking populations are closely related to European and Pakistan groups. Autosomal markers also enable us to identify several populations who have gone through a language shift.

Regarding linguistic data, we have been able to design a field study and methodology that enable the computation of linguistic distances. The correlation between linguistic and genetic distances is in progress.

These linguistic groups also have differences in life style that have had an impact on the evolution of their



The multi-national research team in Central Asia

genes involved in the detoxication (NAT2) and genes involved in alimentation (Lactase persistency).

#### *Linguistics*

Central Asia. The comparative description of Turkic Kipchak languages given in 2002 included a detailed appreciation of the linguistic, historical and political factors of the 'Karakalpak' entity. Further, in 2004, a detailed linguistic mapping of the mountain zone (Hindu-Kush, Pamir) was produced, taking into account the history of Indo-Iranian languages there. The result was a study of the two main groups of languages (Iranian and Turkic) in Central Asia.

Northeastern India. We then concentrated on the more complicated situation of NE India which has more than 100 languages. While a complete grammar of the Deuri language was published (2005), a comparative study of the lowland (Brahmaputra valley) language group was produced (2005). Possible scenarios of peopling were published in 2006.

Throughout the project, a leading theory was the relationship between the density of speakers' population and the rapidity of language change. This was described in 2003 in a paper that also took genetics into account, and this has happened several times since in talks and conferences.

#### *Social anthropology*

Detailed descriptions of several ethnic/political groups were provided at the beginning of the project, the first expeditions of which were organised by S. Jacquesson. A complete volume was edited and published (2002), which described the situation around the Aral sea.

Then, work concentrated on the Kyrgyz mountains and people, both from the ecological and the socio-political points of view. Ecology and people (use of mares and milk, pastures and moves in the mountains) are strongly related to rituals and social cohesion (meat and funeral feasts, sacrifice of horses). Moreover, recent political debates re-examined both the past and present feelings of identity.

Since 2005, work has been extended to the Kyrgyz communities in western China, in order to appreciate how far relationships are maintained. This comparison provides interesting data and hypotheses about cultural divergence.

The project resulted in numerous publications, talks and workshops, among which was one devoted to 'Steppes and their Suburbs', see: <http://lacito.vjf.cnrs.fr/colloque/steppes/index.htm>

#### **Embedding in the OMLL programme:**

The fact that we could work within the OMLL programme was highly profitable. The first OMLL meetings were a great opportunity for meeting colleagues, and contacts were reactivated in the following years with much profit. Therefore, we would advise future programmes to follow this excellent method and help participants to meet in the first months of their respective projects. The workshops we organised in the last year were, in a large measure, the development of these rich contacts. It is certain that our work and its impact would have been very different without this context.

#### **Publications:**

- Chaix R, Quintana-Murci L, Hegay T, Hammer MF, Mobasher Z, Austerlitz F, Heyer E. From social to genetic structures in central Asia. *Current Biology* 2007 Jan 9;17(1):43-8.
- Chaix, Raphaëlle, Austerlitz, Frédéric, Khégay, Tatyana, Jacquesson, Svetlana, Hammer, Michael F., Heyer, Evelyne, Quintana-Murci, Lluís The Genetic or Mythical Ancestry of Descent Groups: Lessons from the Y Chromosome. *Am J Hum Genet.* 2004 December; 75(6): 1113–1116.
- Jacquesson, François. 2003. Linguistique, génétique et la vitesse d'évolution des langues. *Bulletin de la Société de linguistique de Paris*, 98/1, 101-122.
- Jacquesson, Svetlana. 2005 with A. Japarov. Domestic Animals in Social Relations among the Kyrgyz. (in Russian), *Central Asia and Culture of Peace (Journal of the Central Asian Centre for Conflict Prevention, Bishkek)*, No. 1-2, 2005, pp. 67-81.
- Jacquesson, Svetlana. 2003. In the Heart of Tian Shan: History and Future of Pastoralism in Kyrgyzstan (in French), *Cahiers d'Asie centrale* No. 11-12, pp. 203-244.

Further information: <http://lacito.vjf.cnrs.fr/programmes-partenariat/pp-east-west.htm>

## 4. Highlights of the OMLL Collaborative Research Projects

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### **Pioneers of Island Melanesia: a joint project between British, Dutch, German and Swedish teams**

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#### **Principal investigators:**

- Robert A. Foley, University of Cambridge, United Kingdom
- Stephen C. Levinson, Max-Planck-Institute for Psycholinguistics, Nijmegen, the Netherlands
- Eva Lindström, Stockholm University, Stockholm, Sweden
- Mark Stoneking, Max-Planck-Institute for Evolutionary Anthropology, Leipzig, Germany

#### **Funding organisations:**

- Arts and Humanities Research Council (AHRC)
- Deutsche Forschungsgemeinschaft/German Research Foundation (DFG)
- Nederlandse Organisatie voor Wetenschappelijk Onderzoek/Netherlands Organisation for Scientific Research (NWO)
- Vetenskapsrådet/Swedish Research Council (VR)

By Michael Dunn

#### **Scientific results:**

Our aim was to tackle the question of the relationships among a group of Papuan isolate languages which have hitherto resisted accepted attempts at demonstration of interrelatedness.

Instead of using existing vocabulary-based methods, which cannot be applied to these languages due to the paucity of shared lexemes, we created a database of ‘structural features’ – abstract phonological and grammatical features apart from their form. We have found that using biological methods, such as maximum parsimony, Bayesian phylogenetic inference, and structure algorithm, on structural features can be a valid way of extracting linguistic history.

#### **Embedding in OMLL Programme:**

Our OMLL project “Pioneers of Island Melanesia” has benefitted from the collaboration, especially between the linguists based in Nijmegen and Stockholm and the biological anthropologists based in Cambridge, in applying computational methods developed in biological sciences to linguistic data. This has further resulted in collaboration with population geneticists, such as Jonathan Friedlaender of Temple University, and evolutionary biologists, such as Russell Gray (Auckland University). One of the outcomes of this project has been the NWO funded programme “Breaking the time barrier: structural traces of the Sahul past” (Pieter C. Muysken and Stephen C. Levinson, Radboud University and Max-Planck-Institute for Psycholinguistics, Nijmegen). In this program additional computational methods are

explored to investigate the history of linguistic structures, both in terms of correlated evolution of such features and in terms of their capacity to signal ancient migration patterns in the area of New Guinea and Australia.

#### **Publications:**

- Dunn, M., Terrill, A., Reesink, G., Foley, R., Levinson, S. 2005. Structural Phylogenetics and the Reconstruction of Ancient Language History. *Science*, Vol. 309:2072-2075.
- Eva Lindström, Angela Terrill, Ger Reesink, Michael Dunn. 2007. The Languages of Island Melanesia. *Genes, Language, and Culture History in the Southwest Pacific*, ed. by Jonathan S. Friedlaender, 118-140. Oxford: Oxford University Press.
- Keith Hunley, Michael Dunn, Eva Lindström, Ger Reesink, Angela Terrill, Heather Norton, Laura Scheinfeldt, Françoise R. Friedlaender, D. Andrew Merriwether, George Koki, Jonathan S. Friedlaender. Inferring Prehistory from Genetic, Linguistic, and Geographic Variation. *Genes, Language,*



© Stephen C. Levinson

Rossel boy dressed to play his part in an all-night songfest

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and *Culture History in the Southwest Pacific*, ed. by Jonathan S. Friedlaender, 141-154. Oxford: Oxford University Press.

- Dunn, Michael, Robert Foley, Stephen Levinson, Ger Reesink, Angela Terrill. Statistical reasoning in the evaluation of typological diversity in Island Melanesia. *Oceanic Linguistics*, Vol. 46, no. 2:388-403.
- Dunn, Michael, Stephen C. Levinson, Eva Lindström, Ger Reesink, Angela Terrill. 2007. Structural phylogeny in historical linguistics: Methodological explorations applied in Island Melanesia. *Language* [submitted]



Mark Stoneking obtains information for genetic sampling from a resident of Koriovuku village on Ranongga Island, in the Western Province of the Solomon Islands

By Mark Stoneking and Sean Myles

#### Scientific results:

We are particularly excited about the patterns of human genetic variation we observe in the Solomon Islands in Island Melanesia. Overall, there tends to be no correlation between mtDNA sequences and language in this part of world. However, one island (Santa Cruz) is an outlier in terms of its mtDNA sequences; this population appears to be more closely related to populations in New Guinea and the Bismarcks to the northwest rather than to its geographic neighbours in the Solomon Islands. We are currently working with linguists and archaeologists to try to decipher the population history of the inhabitants of Santa Cruz.

#### Publications/Presentations:

- Myles S, Torsten Blass, Ilka Oerlecke, Manfred Kayser, Mark Stoneking (2006) Human mtDNA variation in the Solomon Islands. Oral presentation at the OMLL workshop in Uppsala, Sweden: Language and Genes in East Asia/Pacific.
- Myles S, Torsten Blass, Ilka Oerlecke, Manfred

Kayser, Mark Stoneking (2006) Human mtDNA variation in the Solomon Islands. Poster presentation at the EMBO Workshop: Human Evolution and Disease, Hyderabad, India

Further information:

<http://www.eastpapuan.ling.su.se/>

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### Language, culture, and genes in Bantu: A multidisciplinary approach to the Bantu-speaking populations of Africa

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#### Principal investigators:

- Jaume Bertranpetit, Universitat Pompeu Fabra, Barcelona, Spain
- Mark Stoneking, Max-Planck-Institute for Evolutionary Anthropology, Leipzig, Germany
- Lolke J. van der Veen, UMR 5596 – CNRS/ Université Lumière, Lyon 2, France

#### Funding organisations:

- Centre National de la Recherche Scientifique/ National Centre for Scientific Research (CNRS)
- Deutsche Forschungsgemeinschaft/ German Research Foundation (DFG)
- Ministerio de Educación y Ciencia/ Spanish Ministry of Education and Science (MEC)

By Lolke van der Veen

#### Scientific results:

##### *Results concerning human diversity in west Central Africa*

Until very recently the west-Central part of the African continent was only very poorly represented from the genetic point of view (Salas et al. 2002; Cruciani et al., 2002), but currently more than 1 400 samples are available from this region, most of which have been carefully studied in the context of our project.

There is lack of clear correlations between languages and genetic markers, especially for the Bantu-speaking agriculturalists. The homogeneity within Bantu-speaking villagers is high, maybe because of the recent Bantu expansion (from 4 000 YPB on) and/or to the extent of admixture.

However, there are clear genetic differences between the agriculturalist ('Bantu') populations and the (semi-)nomadic hunter-gatherer populations (the so-called 'Pygmies').

The study of the mtDNA variation strongly suggests the shared (ancient) maternal ancestry of modern (currently Bantu-speaking) agriculturalists and western hunter-gatherer populations. More generally, our mtDNA data suggest (a) an initial divergence of the

## 4. Highlights of the OMLL Collaborative Research Projects

ancestors of contemporary 'Pygmies' from an ancestral Central African population starting not earlier than ~70 000 years ago; (b) a period of isolation between the two groups needed to explain their phenotypic differences; and (c) longstanding and asymmetrical maternal gene flow from 'Pygmies' to (proto) agriculturalists, starting not earlier than ~40 000 years ago and persisting until the last few thousands of years.

Some typical agriculturalist male lineages have been found in the hunter-gatherer populations, but not the other way around. This finding can be accounted for by paternal gene flow from Bantu-speaking villagers to hunter-gatherers. A small amount of (non-African) lineages present in agriculturalist populations have been found. These could be the result of expansions in Central Africa (Nilo-Saharan?) coming from northern parts of the continent, and prior to the Bantu expansion. Although the origin and the distribution of this particular haplogroup still remain to be examined more closely, it might deliver a valuable contribution to the study of the history of the populations of sub-Saharan Africa.

Most obviously, the extent of language replacement has been clearly underestimated. The extremely complex and probably frequent interactions between the different Bantu-speaking populations will most certainly have caused language shift, language merger and language death. Mating patterns must have played a considerable role.

### *Other stimulating aspects*

- Trying to understand colleagues' disciplines: strengths, weaknesses.
- Explaining one's own discipline to specialists in other fields of research.
- Discovering shared difficulties, common to several fields, and reflecting on appropriate solutions.
- Together, working out new, better, methodological approaches.
- Reinforcing exchanges between fieldwork-oriented and laboratory-oriented researchers.

### **Publications/Presentations:**

- Alewijnse B., Nerbonne J., Van der Veen L. J. et Manni F. (2007). A Computational Analysis of Gabon Varieties. In Petya Osenova (ed.). *Proceedings of the RANLP Workshop on Computational Phonology*. Workshop at the conference *Recent Advances in Natural Language Phonology* Borovetz, 2007.
- Berniell-Lee G., Comas D., Hombert J.-M., Quintana-Murci L., Sica L. et Van der Veen L. J. (forthcoming). Linguistic and Genetic Perspectives on Human Diversity in West-central Africa. In Comrie B. (ed.) *Proceeding of the Language and Genes Conference*, UCSB (Santa-Barabara), du



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The collaborative researchers meeting at the Institut Pasteur in Paris (november 2004). Seated from left to right: David Comas, Lluís Quintana-Murci, Gisèle Teil-Dautrey. Standing from left to right: Patrick Mouguiama-Daouda, Blandine Massonnet, Pither Medjo Mvé, Lolke Van der Veen

8 au 10 septembre 2006. Cambridge: Cambridge University Press.

- Quintana-Murci L., Quach H., Harmant C., Luca F., Massonnet B., Sica L., Mouguiama-Daouda P., Comas D., Shay Tzur, Balanovsky O., Kidd K. K., Kidd J., Van der Veen L. J., Hombert J.-M., Gessain A., Verdu P., Froment A., Bahuchet S., Heyer E., Dausset J., Salas A., Behar D. M. (Submitted). The shared maternal ancestry of Bantu agriculturists and Pygmy hunter-gatherers in western Central Africa. *Proceedings of the National Academy of Sciences*, USA.
- Van der Veen L. J. (ed.) (forthcoming). *The peopling of Gabon: Evidence from Linguistics, Cultural Anthropology, Archaeology and Population Genetics*. Synopsis of the results of the LCGB project.
- Van der Veen, L. J. (2007), The Origins of the Fang: Language, Culture and Genes, Myth and Reality, *Linguistics colloquium*, Center for Language and Cognition Groningen, RUG, Groningen, Pays-Bas. 30 November 2007.



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## 4. Language Acquisition and Language Universals

### Action, gesture and words in a developmental and evolutionary perspective

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#### Principal investigators:

- Eva Berglund, Research Group for Language and Psychology, Uppsala University, Sweden
- Virginia Volterra, Institute of Cognitive Sciences and Technologies, CNR, Rome, Italy
- Domenico Parisi, Institute of Cognitive Sciences and Technologies, CNR, Rome, Italy
- Giacomo Rizzolatti, Università degli Studi di Parma, Italy

#### Funding organisations:

- Consiglio Nazionale delle Ricerche/ National Research Council (CNR)
- Vetenskapsrådet/Swedish Research Council (VR)

By Virginia Volterra

#### Scientific results:

The main finding of our work on the interplay between gesture and speech is that there is a continuity between an earlier 'preverbal' and a subsequent, functionally 'equivalent', linguistic stage. The collaboration with colleagues from Sweden gave us the opportunity to highlight that gesture is a robust developmental phenomenon, exhibiting similar features across different children and cultures. The research project carried out together with neuroscientists from University of Parma focused on the progression from action to language through gesture in young children. Our main findings confirmed that, since the early stages, language can be considered as a gesture-speech integrated system, both in typical and in atypical development. Our developmental data support the neurophysiological perspective that language exploits the pre-existing multimodal character of the sensory-motor system.

Natural language is a symbolically embodied social construction, related to other aspects of human cognition that arose from previously existing social-communicative activities.

#### Publications:

- Bello, A., Capirci, O., Volterra, V. (2004) Lexical production in children with Williams syndrome: spontaneous use of gesture in a naming task. *Neuropsychologia*, 42,2, 201-213.

- Russo, T., Volterra, V. (1 July 2005) Comment on 'Children Creating Core Properties of Language: Evidence from an Emerging Sign Language in Nicaragua' *Science*, Vol 309, Issue 5731, 56. <http://www.sciencemag.org/cgi/reprint/309/5731/56b.pdf>
- Capirci, O., Contaldo, A., Caselli, M.C., Volterra, V. (2005). From action to language through gesture: A longitudinal perspective. *Special issue of Gesture*, 5 (1), 155-177 (Gestural Communication in Nonhuman and Human Primates, Edited by Katja Liebal, Cornelia Mueller and Simone Pika).
- Piszuto, E., Capobianco M., (2005). The link and differences between deixis and symbols in children's early gestural-vocal system, *Special issue of Gesture*, 5 (1), 179-199. (Gestural Communication in Nonhuman and Human Primates, Edited by Katja Liebal, Cornelia Mueller and Simone Pika).
- Stefanini, S., Caselli, M.C. Volterra, V. (2007). Spoken and gestural production in a naming task by young children with Down syndrome. *Brain and Language*, 101,3,208-221.

Further information:

<http://www.istc.cnr.it/gall/>

<http://www.istc.cnr.it/material/tools/macarthur/>

<http://www.istc.cnr.it/sll/>

<http://www.istc.cnr.it/ladd/>

### Mindreading and the emergence of human communication

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#### Principal investigators:

- Vittorio Gallese, Università degli Studi di Parma, Italy
- Manuel Garcia-Carpintero, Universitat de Barcelona, Spain
- François Recanati, CNRS/EHESS, Institut Jean Nicod, Paris, France

#### Funding organisations:

- Consiglio Nazionale delle Ricerche/ National Research Council (CNR)
- Centre National de la Recherche Scientifique/ National Centre for Scientific Research (CNRS)
- Ministerio de Educación y Ciencia/ Spanish Ministry of Education and Science (MEC)

By François Recanati

#### Scientific results:

In our project we wanted to explore the hypothesis that mindreading is a precondition of communication, and communication a precondition of language. The aim was to model the transition from mindreading to communication, and from communication to language, using suggestions and data from developmental psy-

## 4. Highlights of the OMLL Collaborative Research Projects

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chology, philosophy of mind, neurophysiology and linguistics. To some extent, this is a well-trodden path, but near the end of the project we managed to draw a rather unexpected connection between the capacity for simulation (which many take to be centrally involved in mindreading) and specific linguistic features such as the existence of so-called 'intensional operators'. We established this unexpected connection in attempting to account for a distinctive characteristic of human thought-processes: 'their capacity to be detached from present activity and circumstances' (Dummett).

### **Embedding in the OMLL programme:**

The OMLL programme and the collaborations it has made possible are to a large extent responsible for the fruitful emphasis that was laid, within our research group, on the 'mirroring system' and its putative role as the basis for mindreading abilities.

### **Publications/Presentations:**

- *The Innate Mind: Structure and Content*, ed. by Carruthers, P., Laurence, S. & Stich, S., Oxford: Oxford University Press, 2005. Contributions by S. Atran ('Strong vs Weak Adaptationism in Cognition and Language') and D. Sperber ('Modularity and relevance: How can a massively modular mind be flexible and context-sensitive?').
- Dokic, J. & Pacherie, E. (2006) 'Mirror neurons, understanding of action and joint action'. *Cognitive Systems Research*, 7, 101–112.
- F. Recanati, F. (2007) *Perspectival Thought: A Plea for (Moderate) Relativism*. Oxford: Oxford University Press.
- Jacob, P. (forthcoming) 'What do mirror neurons contribute to human social cognition'. *Mind and Language*.
- Proust, J. (forthcoming) 'Metacognition and metarepresentation: is a self-directed theory of mind a precondition for metacognition?'. *Synthese*.

By Manuel García-Carpintero and Josep Macia

### **Scientific results:**

Our contribution was addressed to confronting philosophical or conceptual issues relating to the role of communicative intentions in full understanding of the referential apparatus of natural languages, particularly indexicals, demonstratives and proper names. We are extremely pleased with the results, which are reflected in a series of publications (see below) that are deeply influenced by the discussions fostered by the project.

We wish to highlight especially the results of the workshop we organized as the final activity of the project, the LOGOS workshop on the Role of Intentions in Reference and Communication, that was held in Barcelona on 3 and 4 April 2006. We described the purpose as follows: "to discuss different perspectives on the role of intentions and the recognition of intentional states in reference and communication. The main objective is to deepen our understanding of the points of contention among different theories of the role of intention within Linguistics, Neuroscience, Philosophy and Psychology, to obtain a clear perspective on the alternative hypotheses and to identify proposals that cut across those disciplines." It was a very fruitful occasion for interdisciplinary discussion, from which everybody benefited, including the local community of linguists, psychologists and philosophers. All participants thought that their respective perspectives on the issues had been greatly improved by the interaction.

### **Embedding in the OMLL programme:**

LOGOS already has a long tradition of interdisciplinary interaction with groups regarding matters relating to the nature of reference from different perspectives, both inside and outside philosophy; for instance, its researchers were involved in the first steps of the European Society for Psychology and Philosophy. Participating in the OMLL programme has given us the opportunity of a closer interaction with other philosophers, linguists and cognitive neuroscientists in Europe, has made our group known to more people sharing our interests and thus has opened up new research opportunities. Following that tradition, in 2004 we organised, in part with the help of funding from the project, the first joint venture of the European Society for Philosophy and Psychology and the (American) Society for Philosophy and Psychology.

### **Publications/Presentations:**

- García-Carpintero, M. & Macià, J. (eds.), 2006: *Two-Dimensional Semantics*, Oxford: Oxford University Press.
- García-Carpintero, Manuel (2006): 'Nonconceptual Modes of Presentation', *European Review of*

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*Philosophy*, 6: The Structure of Nonconceptual Content, C. Van Geen & F. de Vignemont (eds.), Stanford: CSLI, 65-81

- García-Carpintero, Manuel (forthcoming): 'Singular Thought and the Contingent A Priori', *Revue Internatinal de Philosophie*, special issue 'Contemporary Analytic Philosophy of Mind' edited by J. Proust.
- Macià, J. (2004). 'Proper Names: Ideas and chains'. *Canadian Journal of Philosophy*, Supplementary Volume, 30 pp. 129-155.
- Martí, Genoveva: 'The Question of Rigidity in New Theories of Reference'. *Nous* 2003, pp. 161-179.

Further information: [http://www.ub.es/grc\\_logos/](http://www.ub.es/grc_logos/)

### **Comparison between processes in language acquisition by children and language evolution**

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#### **Principal investigators:**

- Sophie Kern, CNRS, Laboratoire Dynamique du Langage, Lyon, France
- Inge Zink, University of Leuven, Leuven, Belgium

#### **Funding organisations:**

- Centre National de la Recherche Scientifique/ National Centre for Scientific Research (CNRS)
- Fonds voor Wetenschappelijk Onderzoek – Vlaanderen/Research Foundation Flanders (FWO)

#### **Scientific results:**

The main objective of this project was to describe the relationships between children's pre-linguistic vocalisation patterns and characteristics of the production system as well as to explore the relative role of learning from ambient language input in children acquiring different languages. These goals have fully been reached, especially for the first period under examination (babbling period, 8-12 months of age). Moreover the results were able to confirm the predictions made by the 'Frame-content' perspective on languages which have not yet been studied. But, it also raised some questions concerning the proposed model in so far as unpredicted behaviours emerged from the data.

#### **Embedding in the OMLL programme:**

The OMLL programme enabled us to launch new international collaborations with researchers from the same field. We e.g., organised an international conference 'ELA2005: Early language abilities', 8-10 December 2005 (edited volume in preparation).

#### **Publications/Presentations:**

- Kern, S. & B. Davis to appear, 'Emergent complexity in early vocal acquisition: Cross-linguistic comparisons of canonical babbling'. In *Approaches to phonological complexity* Phonology and Phonetics Serie. Mouton de Gruyter.
- Davis, B., Kern, S., MacNeilage, P., Koçbas, D., Zink, I. & Vihman, M. 2005, 'Vocalisation Patterns in Canonical Babbling: A cross-Linguistic Perspective', Symposium of X<sup>th</sup> IASCL, Berlin, Germany, 25-29 July 2005.
- Zink, I. (2005). 'De verwerving van de klankproductie tijdens de brabbelperiode bij vier Vlaamse kinderen', *Logopedie*, 18, 4, 13-20.
- Kern, S., 2005, 'De l'universalité et des spécificités du développement langagier précoce', in *Aux origines du langage et des langues*, Hombert, J.M. (ed), Fayard
- Zink, I., 2004: The origin of man, language and languages: comparison between processes in language acquisition and language evolution: from the first syllables to the lexical spurt, Research-based paper, Summer school Malta, July 29-August 8, 2004.

## 4. Highlights of the OMLL Collaborative Research Projects

### 5. Language and Animal Communication

#### Orofacial control in communication in human and non-human primates

##### Principal investigators:

- Leonardo Fogassi, Università degli Studi di Parma, Italy
- Jean-Louis Heim, Laboratoire d'Anthropologie du Musée de l'Homme, Paris, France
- Jean-Luc Schwartz, CNRS, Institut de la Communication Parlée, Grenoble, France
- Jacques Vauclair, Université de Provence, Aix-en-Provence, France

##### Funding organisations:

- Consiglio Nazionale delle Ricerche/ National Research Council (CNR)
- Centre National de la Recherche Scientifique/ National Centre for Scientific Research (CNRS)

By Jacques Vauclair

##### Scientific results:

A major advance in our research was the discovery that baboons (*Papio anubis*) were strongly lateralised in favour of the right-hand not only for bimanual coordinated manipulation (Vauclair et al., 2005) but also to a higher degree for the use of intentional gestures (Meguerditchian & Vauclair, 2006). Interestingly, individual hand preferences for gestures showed no

correlation with those for bimanual actions. These findings led us to propose the hypothesis that a specific left-lateralised communicatory cerebral system, different from the one involved in manipulative actions, may control communicative gestures. From a comparative viewpoint, regarding our results and the literature, we suggest the existence of a continuity between asymmetries of speech-related gestures and asymmetries of communicative gestures in chimpanzees and now in baboons. From an evolutionary viewpoint, we suggest that the neuro-anatomical substrate of manual communication controlled by the left cerebral hemisphere may have existed in the common ancestor at least 30 million years ago and may be considered as the precursor of the human language area. Our results therefore bring additional support to the view that lateralisation for language in humans may have evolved from a gestural system of communication lateralised in the left hemisphere.

##### Embedding in the OMLL programme:

The participation in the OMLL programme was of the utmost importance for presenting and discussing our work and for meeting other scientists with whom we were then able to launch collaboration (e.g., the team of Prof. W.D. Hopkins at the Yerkes National Primate Research Center, Atlanta, Georgia, USA).

In addition, we were constantly in contact with our partners in the programme (the group led by Prof. Abry and by Dr Schwartz in Grenoble) in order to exchange on our respective projects. This collaboration allowed us to organise with our partners in May 2007 the VOCOID International Conference in Grenoble (**V**Ocalisation, **C**ommunication, **I**mitation and **D**eixis in infant and adult human and non-human primates).



Hand slapping gesture (repetitive rubbing or slapping on the ground), performed significantly more often with the right hand than the left hand by a baboon for intimidating a conspecific or a human (from Meguerditchian, A. & Vauclair, J., 2006)

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### Publications/Presentations:

- Meguerditchian, A. & Vauclair, J. (in press). Vocal and gestural communication in nonhuman primates and the question of the origin of language. In L. Roska-Hardy & E.M. Neumann-Held (Eds.), *Learning from Animals?* London: Psychology Press.
- Vauclair, J., & Meguerditchian, A. (in press). The gestural origin of language and its lateralisation: theory and data from studies in nonhuman primates. In Kern, S. & Gayraud, & E. Marsico (Eds.), *Emergence of Linguistic Abilities: From Gestures to Grammar*. Newcastle upon Tyne, United Kingdom: Cambridge Scholars Publishing Ltd.
- Vauclair, J., & Meguerditchian, A. (2007). Perceptual and motor lateralisation in two species of baboons. In W.D. Hopkins (Ed.) *Evolution of Hemispheric Specialisation in Primates*, Special Topics in Primatology (pp. 177-198). New York: Academic Press.
- Meguerditchian, A., & Vauclair, J. (2006). Baboons communicate with their right hand. *Behavioural Brain Research*, 171, 170-174. This paper received the mention 'must read' by the 'Faculty of 1000'. <http://www.f1000biology.com/article/16621056/evaluation>.
- Vauclair, J., Meguerditchian, A., & Hopkins, W.D. (2005). Hand preferences for unimanual and coordinated bimanual tasks in baboons (*Papio anubis*). *Cognitive Brain Research*, 25, 210-216. This paper received the mention 'must read' by the 'Faculty of 1000'. <http://www.f1000biology.com/article/15993042/evaluation>.

Further information:

<http://www.icp.inpg.fr/~avilain/vocoid.html>

### The origins of primate semantic and syntactic abilities

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#### Principal investigators:

- Ronald Noë, Université Louis Pasteur, Strasbourg, France
- Klaus Zuberbühler, University of St. Andrews, United Kingdom

#### Funding organisations:

- Arts and Humanities Research Council (AHRC)
- Centre National de la Recherche Scientifique/ National Centre for Scientific Research (CNRS)

#### Scientific results:

We have been able to make progress on questions concerning the evolutionary origins of human linguistic



© Kate Arnold

Putty-nosed monkeys (*Cercopithecus nictitans*) of Gashaka Gumti, Nigeria, combine different alarm calls into structurally more complex sequences with different meanings

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abilities. Our work has shown that non-human primates are able to produce calls that function as referential signals that are meaningful to recipients. We have found that there are substantial interspecies differences in the kinds of vocal systems used by primates to encode events in the environment. Vervet monkeys have long been the paradigmatic example. In these monkeys, there is a close relationship between acoustically different alarm calls and types of predators, something that we have also found in Diana monkeys. However, our fieldwork has also shown that there are several additional ways by which primates can encode external information, such as the one used by the King colobus, which is based on numerosity and call combinations. Another important outcome of our work concerns the question about the origins of syntax. Syntax sets human language most decisively apart from other natural communication systems, although its evolutionary origins have remained obscure. We have been able to show that free-ranging putty-nosed monkeys combine two vocalisations into different call sequences that are linked to specific external events, such as imminent group movement and predator presence. Non-human primates are capable of combining calls into higher order sequences with novel meanings, a fundamental prerequisite for any grammatical system.

#### Embedding in the OMLL programme:

The OMLL programme has allowed us to build a number of international collaborations that have strengthened our research, notably with colleagues at the universities of Rennes (France), Cocody (Ivory Coast), Freiburg

## 4. Highlights of the OMLL Collaborative Research Projects

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(Germany), Jena (Germany), Leipzig (Germany), Oxford (United Kingdom), Manchester (United Kingdom), York (United Kingdom), and London (United Kingdom). The programme has enabled us to supervise and co-supervise several Masters and PhD theses, most of which have led to publishable results. Finally, OMLL-mediated funding has allowed us to maintain our field site in the Tai Forest, Ivory Coast, despite substantial political difficulties in the country.

### Publications/Presentations:

- Arnold, K., Pohlner, Y. & Zuberbühler, K. 2007. A forest monkey's alarm call series to predator models'. *Behav. Ecol. Sociobiol.*, in press.
- Arnold, K. & Zuberbühler, K. 2006. 'Language evolution: semantic combinations in primate calls'. *Nature*, 441, 303.
- Schel, A. M., Tranquilli, S. & Zuberbühler, K. submitted. 'A numerosity-based alarm call system in King colobus monkeys'.
- Zuberbühler, K. 2005. 'The phylogenetic roots of language: evidence from primate communication and cognition'. *Current Directions in Psychological Science*, 14, 126-130.
- Zuberbühler, K. & Noë, R. submitted. 'The phylogenetic roots of speech: Vocal communication in non-human primates'. In: *Evolution of language and languages* (Ed. by Klein, R.).

Further information:

[www.budongo.org](http://www.budongo.org)

<http://www.orn.mpg.de/~knauer/noe/taan.html>

## 6. Language Evolution and Computer Modeling

### The cultural self-organisation of cognitive grammar

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#### Principal investigators:

- Cristiano Castelfranchi, Institute of Cognitive Sciences and Technologies, CNR, Rome, Italy
- Peter Ford Dominey, CNRS/Université Lyon 2, Laboratoire d'Étude des Mécanismes Cognitifs, France
- Luc Steels, Free University of Brussels, Belgium

#### Funding organisations:

- Consiglio Nazionale delle Ricerche/National Research Council (CNR)
- Centre National de la Recherche Scientifique/National Centre for Scientific Research (CNRS)
- Fonds voor Wetenschappelijk Onderzoek – Vlaanderen/Research Foundation Flanders (FWO)

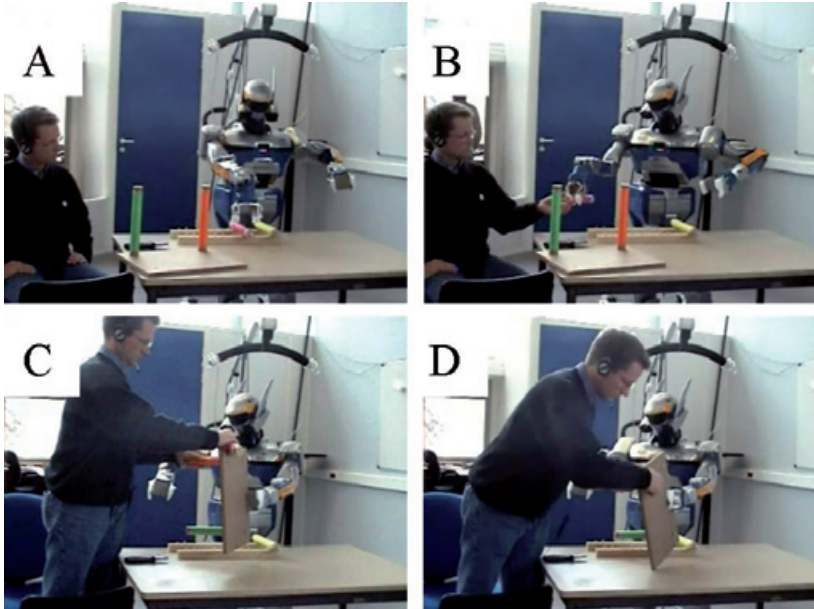
By Peter Dominey

#### Embedding in the OMLL programme:

Participating in the OMLL program has significantly enriched the scope of our approach. Within our project the diversity of simulation and modelling approaches provided a solid background that has informed our work. Within the overall scope of OMLL, the exposure to the wide diversity of approaches to man and language has provided – and continues to provide – a network of connections in vast domains including primate neurophysiology and development that has been extremely complimentary to our modelling activity.

#### Scientific results:

Our simulation work has now covered the problem of language emergence and acquisition, from theoretical simulation results to human fMRI studies and to implemented robotic systems that demonstrate language acquisition. These results demonstrate how a model of grammatical construction processing, based on the known neurophysiology, can learn reduced versions of English, French and Japanese and how this learning can take place in a physical, robotic system. Furthermore, we are now investigating how this framework can lead to the next generation of human-robot interaction systems.



Use of grammatical constructions for cooperative task execution with a human and the Kawada Industries HRP-2 Humanoid Robot.  
**A.** Robot prepares to grasp rose leg  
**B.** Robot hands leg to User.  
**C.** User gives table to Robot to hold.  
**D.** Robot holds table and waits while User attaches leg. In order to perform this task, the robot learned a kind of “verb island” construction “Give me X” where X is an element of the set of objects the robot can see and manipulate

#### Publications/Presentations:

- Dominey P.F., Hoen M, Inui T (2006) A Neurolinguistic Model of Grammatical Construction Processing, In Press, *Journal of Cognitive Neuroscience*. 18:12, pp. 2088-2107
- Dominey P.F. (2005a) From sensorimotor sequence to grammatical construction: Evidence from Simulation and Neurophysiology, *Adaptive Behavior*, 13, 4: 347-362
- Dominey P.F. (2005c) Emergence of Grammatical Constructions: Evidence from Simulation and Grounded Agent Experiments. *Connection Science*, 17(3-4) 289-306
- Dominey P.F., Boucher J.D. (2005) Learning To Talk About Events From Narrated Video in the Construction Grammar Framework, *Artificial Intelligence*, 167 (2005) 31-61
- Dominey P.F. (2003) Learning Grammatical Constructions from Narrated Video Events for Human-Robot Interaction, IEEE Conference on Humanoid Robots, Karlsruhe, Germany.

Further information:

<http://dominey.perso.cegetel.net/RobotDemos.htm>

## 5. OMLL Networking Activities

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Networking and collaboration within every EUROCORES Programme takes place at two levels:

1. between the various Individual Projects within each Collaborative Research Project (CRP);
2. between the funded CRPs within the programme as a whole.

The intra-CRP collaboration is motivated by the nature of the CRP's research objectives, i.e., by the scope and the complexity of the questions it deals with. In a CRP, the participating groups have the opportunity to gather the required critical mass to successfully address the objectives and challenges of their project.

The cross-CRP networking and collaboration – more on which you will find in this chapter – is inspired by the aims and the nature of this particular EUROCORES Programme. The OMLL programme has been developed precisely because of the clear need for collaboration in this field. The funded CRPs have collectively set up and further streamlined this new collaboration. To this end, the CRPs have engaged their members and, when of clear benefit, colleagues from outside the programme, in joint activities such as working groups, seminars, workshops, invited sessions and/or training activities either stand-alone or as part of other larger events.

Through active participation of scientists in the abovementioned activities, not only existing collaborations have been enhanced but also new and strategic partnership opportunities have been identified. Furthermore, these activities provided opportunities to explore aspects of the programme which are not covered by the funded research projects.

The integrative activities between the CRPs, which are listed below, have helped to strengthen the field by building coherence within this emerging research community and served as a platform for the research work which is done in the programme.

Further information can be found at the programme website [www.esf.org/omll](http://www.esf.org/omll), click on **Events**.

### • **First OMLL Conference**

3-6 April 2004, Leipzig, Germany

At the first OMLL conference, 20 international Collaborative Research Projects, representing approximately 200 scientists participating in the programme, presented the latest results of their research. Presentations addressed the evolution of language and the diversity of languages from a variety of fields, such as genetics, linguistics, palaeo-anthropology, archaeology, neuroscience, computer science and psychology.

#### *Organisational Committee:*

Bernard Comrie (chair), Sophie Kern, Peter de Knijff, Colin Renfrew, Adriënné Heijnen  
Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany

### • **Workshop 'Evolving communication: from action to language.**

**An "implicit vs. explicit" cognitive and pragmatic perspective.'**

13-14 May 2004, Siena, Italy

This workshop brings together leading scholars in different disciplines to address one of the most controversial issues in cognitive science: the evolution of communication. The main purpose of the workshop is to compare researches and results in two closely related, but not yet integrated, fields of study: the evolution of communication before language, and the distinction between implicit and explicit knowledge in communication.

#### *Local organisers:*

Cristiano Castelfranchi, Fabio Paglieri  
Graduate College Santa Chiara, Siena, Italy

### • **Virtual Workshop 'what do mirror neurons mean? Theoretical implications of the discovery of mirror neurons'**

15 November 2004–13 March 2005

The discovery of mirror neurons in the frontal lobes of macaques and their implications for human brain evolution has been one of the most important findings of neuroscience in the last decade. Today, mirror neurons play a major explanatory role in the understanding of a number of human features, from imitation to empathy, mindreading and language learning. It has also been claimed that damage in these cerebral structures can be responsible for mental deficits such as autism. The virtual workshop will address the theoretical implications of the discovery of mirror neurons. The discussion



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will try to set the explanatory scope of the phenomenon, and evaluate to what extent it can provide a new empirical ground for a variety of human mental abilities.

*Local organiser:* Gloria Origgi  
<http://www.interdisciplines.org/mirror>

- **Workshop ‘Early word segmentation: A cross-linguistic approach taking advantage of Europe’s linguistic diversity’**  
25-26 February 2005, Paris, France

The goal of the workshop is to bring together researchers working in the domain of word segmentation; i.e. the extraction of the sound pattern of words from the speech stream. The main focus is on the study of the emergence of these procedures in early infancy, with special attention to cross-linguistic differences.

*Local organiser:* Thierry Nazzi  
École Supérieure de Physique et Chimie Industrielle, Paris

- **Workshop ‘Phylogeny and ontogeny of human communication’**  
2-4 June 2005, Ferrara, Italy

The coexistence in Ferrara of three distinct OMLL research projects gives a unique occasion for organising a particularly articulated workshop on the OMLL main issue. This workshop aims to open the discussion on the following important topics:

- From primates to humans: what evolution says on communication
- Action, imitation and communication development in infants
- Genes and language evolution

Presentations coming from different streams, covering neurophysiology, development and genetics, will be intermixed during the workshop to allow a common discussion among scholars with different backgrounds and points of view.

*Local organisers:*  
Guido Barbujani, Luciano Fadiga, Marina Nespor  
Università di Ferrara, Sala dell’Arengo, Ferrara, Italy

- **Workshop ‘Languages and genes: recent work and emerging results’**  
22-25 September 2005, Aussois, France

As is only natural in an expanding and rapidly evolving field, methodological questions arise. What exactly are we comparing? How compatible are our concepts? Which markers are most informative?

This workshop will enable European research to write the state-of-the-art of a field at an exciting time of its development. Specifically, the workshop will meet the following needs:

- Allow ideas and results to circulate between teams: one team’s problem is another’s result
- Evaluate methodologies
- Allow pooling of data and resources
- Address the issue of compatibility of hypotheses at regional level
- Permit the emergence of peopling hypotheses at continental level.

*Local organisers:*  
Laurent Sagart, François Jacquesson  
Centre Paul Langevin, Aussois, France

- **Workshop ‘Exploring the potential of eco-cultural niche modelling for reconstructing the geography of past human populations’**  
22-26 September 2005, Les Eyzies-de-Tayac, France

This symposium seeks to explore the potential of eco-cultural niche modelling softwares, such as GARP, CSM, and Physiology, as tools to predict the geography of past human populations and associated mammal/vegetal communities. These tools have already demonstrated their ability to model ecological niches of plant and animal species and predict their geographic distributions based on biotic and environmental data.

Should these predictive methods be considered viable, the second aim is to establish an interdisciplinary cooperation among archaeologists, paleoclimatologists, paleobiologists, informaticists, linguists and geneticists that can allow these scientific communities to work together to extend the successful programme of biodiversity information science to patterns and processes of cultural evolution and adaptation in changing environments.

*Local organisers:*  
Francesco d’Errico, Guido Barbujani, Robert A. Foley, Alf Hornborg  
Auditorium of the Musée National de Préhistoire, Les Eyzies-de-Tayac, France

## 5. OMLL Networking Activities

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- **Workshop ‘Language and genes in East Asia/Pacific’**

11-13 December 2006, Uppsala, Sweden

The central topic in this workshop is the extent to which genetic data reveal details of the history of our language, and the amount there is to learn from a comparison of genetic and linguistic variation among human populations. The focus at the workshop will be on the geography of East Asia, which is taken loosely to include the whole area stretching from the Arctic into the Pacific.

The workshop aims to be a melting pot in the true sense of the word. Not only does the workshop bring together linguists, archaeologists and geneticists, but it will also be a meeting place for experts from the East and the West. The main objective of the meeting is to serve as a potential starting point for further fruitful collaborations in the future.

*Local organisers:*

Swedish Collegium for Advanced Study (SCAS)  
in Uppsala, Sweden

Supported by the Chiang Ching-kuo Foundation  
for International Scholarly Exchange (CCKF)

- **Workshop ‘VOCOID: Vocalisation, Communication, Imitation and Deixis in infant and adult human and non-human primates’**

14-16 May 2007, Grenoble, France

This workshop aims at examining to what extent recent discoveries in the field of perceptuo-motor links in the brain, orofacial and manual system control, human development, imitation, non-human primate abilities, computational robotics and artificial life systems, can convince scientists to take the ‘derive language from non-language’ stance seriously (Lindblom, 1984; Tomasello, 2003). Presentations and discussions will focus on the connection between studies on humans, non-human primates and primatoids/humanoids (or models and technologies) in order to discuss evidence that some of the supposed building-blocks of language, analysed from human behaviour, development and brain, can actually be learnt and controlled in the monkey brain and simulated in a cognitively plausible way in the ‘humanoid brain’.

*Local organisers:*

Christian Abry, Jean-Luc Schwartz, Jacques Vauclair  
ICP, Speech and Cognition Department of GIPSA-lab,  
Grenoble, France

- **OMLL Results Presentation ‘Human Language Dynamics’**

16-20 July 2007, Erice, Italy

‘Human Language Dynamics’ comprises two network activities within the broader International School on Semiotic Dynamics, Language and Complexity on theoretical investigations of social dynamics. More concretely, it consists of a presentation of key results from the OMLL programme together with a workshop where students can learn through lectures and hands-on experimentation the computational framework developed for simulating language evolution resulting from one of the OMLL projects.

*Local organiser:* Luc Steels

Ettore Majorana Foundation and Centre for Scientific  
Culture, Erice, Italy

- **Workshop ‘Migrations’**

5-7 September 2007, Porquerolles, France

Migrations entered the scientific scene in the romantic era when it was believed, mainly for nationalistic purposes, that ‘peoples’ roamed through lands or across seas and eventually ‘settled’. This racialist scenario is still obvious in maps where big arrows point from somewhere vague to definite and sensitive places, never doubting that the presumed entity that moved was essentially identical throughout the movement. But migrations are not like that. They are, if we stick to the label ‘migration’ at all, far more complex in their demographic reality and economic and cultural explanations and meanings.

This workshop would like to invite scholars to describe enlightening cases of migrations, wherever in the world and in the period they find most interesting, in order to improve our knowledge of what we mean by ‘migration’. And to help assemble fine-grained examples which would remind fellow researchers, or a wider audience, that migrations do exist, but are to be analysed with historical caution. Historians and prehistorians, anthropologists and linguists, demographers and geographers, political scientists and population geneticists are all concerned by these thematic reflections – at once methodological and comparative – to which we invite them to contribute.

*Organiser:* François Jacquesson

IGESA centre, Porquerolles, France

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• **OMLL Final Conference**  
**12-14 December 2007, Rome, Italy**

At the OMLL Final Conference the 20 OMLL Collaborative Research Projects will highlight their most original and important contributions to the OMLL programme.

The conference will be organised around the six thematic lines from the Call for Proposals:

1. Language and Archaeology
2. Language and Brain
3. Language and Genes
4. Language acquisition and Language universals
5. Language and Animal Communication
6. Language evolution and Computer modelling

The conference will not only look back, but also forward and explore possibilities for the continued development of collaborative research and research networking in this field.

*Programme Committee:*

Francesco d'Errico, Luciano Fadiga, Alf Hornborg,  
François Jacquesson, Peter de Knijff, Itziar Laka,  
Marina Nesper, Domenico Parisi, Chris Sinha,  
Jean-Luc Schwartz, Virginia Volterra  
CNR, Aula Marconi, Rome, Italy



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Sailing canoe heading Nimowa, a main waypoint from Rossel Island

## 6. OMLL Governing Bodies

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### Review Panel

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**Ekkehard König** (Chair)  
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**Peeter Beekes** (until 2004)  
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Brussels



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Forskningsråd – Danish  
Humanities Research Council  
Rådskonsulent, Copenhagen

**Finland**

Academy of Finland  
Research Council for Culture  
and Social Sciences, Helsinki

**France**

CNRS Centre de recherches  
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**Germany**

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Deutsche  
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**Italy**

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**Portugal**

Fundação para a Ciência e a Tecnologia (FCT), Lisboa

**Spain**

Ministerio de Educación y Ciencia  
(MEC), Madrid

**Sweden**

Vetenskapsrådet, Stockholm



Vetenskapsrådet

**United Kingdom**

Arts and Humanities Research  
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