2ND ANNUAL MEETING OF THE

European Society for the study of Human Evolution

ESHE

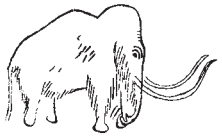
21–22 SEPTEMBER 2012

BORDEAUX / FRANCE

European Society for the study of Human Evolution (ESHE)

2nd Annual Meeting

Bordeaux, France – 21 and 22 September, 2012



Proceedings of the European Society for the study of Human Evolution 1

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Dear Participant of the 2nd Annual meeting of the *European Society for the study of Human Evolution,*
Welcome to Bordeaux!

We are very pleased to welcome you to the heart of Aquitaine, the cradle of European prehistory, where in the 19th century some of the most iconic European Paleolithic archaeological sites were discovered. Dordogne is an archaeological paradise where countless rock art and occupation sites are found along the impressive valleys of the Vézère and the Dordogne. The excursions that will take place after the scientific meeting will give you a chance to visit these scenic landscapes and the famous sites of Rouffignac and Abri Pataud. In the 20th century, the University of Bordeaux became a leading center for Paleolithic studies, and the names of two of its professors, François Bordes and Bernard Vandermeersch, are forever attached to the history of paleoanthropology. The very departments that they established now host our 2012 meeting.

The *European Society for the study of Human Evolution (ESHE)* is now fully established, and its official statues have been approved. At the time these lines are being written, more than 210 professionals and students in the field of human evolutionary studies have already joined the society, and this number is constantly growing. The meeting in Bordeaux will be an opportunity to hold the first general assembly of these members, who come not only from all over Europe, but from around the world.

This year's conference has been made possible by the continuous efforts of the *ESHE* board officers and board members, by the commitment of local organizers, namely Jean-François Caro, Michèle Charuel, Anne Delagnes, Francesco d'Errico, Jacques Jaubert, Bruno Maureille and Catherine Morel-Chevillet and by the restless work of Philipp Gunz, Shannon McPherron and Alyson Reid. A substantial financial support has been provided by the *CNRS (INEE, Federation des Sciences Archéologiques,* the *University of Bordeaux 1*, the *Fédération des sciences archéologiques*, the INRAP, and the *Labex of Archaeological Sciences of Bordeaux. The Musée National de Préhistoire (Les Eyzies-de-Tayac),* the *Musée d'Aquitaine (Bordeaux)*, the *Musée de l'abri Pataud (National Museum of Natural History, Paris)*, the *Pôle International de la Préhistoire (Dordogne),* and the *site of Rouffignac* have also contributed to make this event a success.

The main hosting institution of this year's meeting is the *UMR-PACEA* (director B. Maureille & assistant director C. Ferrier) jointly supported by the *CNRS*, the *University of Bordeaux 1*, and the *French Ministry of Culture and Communication*. This research unit is organized into two departments: Prehistory, Paleoenvironment, Heritage (PPP, director F. d'Errico) and The Laboratory of Anthropology of Past and Present Populations (A3P, director D. Castex). Established on the campus of the *University of Bordeaux 1* in Talence, this team of scientists is responsible for undergraduate, Master's, and PhD programs in Biological Anthropology and Prehistory, representing one of the main academic centers in France for paleoanthropological studies.

Our 2013 meeting will be held in Vienna, Austria, a capital at the heart of Europe, with a wealth of architecture and culture. For now, we hope you will enjoy your time in Bordeaux, a town also rich in history, which gained its fame not only from science but also from its gastronomy and world-renowned vineyards.

With best wishes,
Jean-Jacques Hublin
President, European Society for the study of Human Evolution

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ESHE

European Society for the study of Human Evolution

2nd Annual Meeting, 21-22 September 2012, Bordeaux, France

Friday, 21 September	
7:30-8:15	**Registration**
8:15	**Opening Speech: Jean-Jacques Hublin**
Plenary Session 1	
8:30	*Early hominin auditory ossicles from South Africa* **Rolf Quam et al.**
8:50	*New early* Homo *fossils from Koobi Fora, northern Kenya* **Meave G. Leakey et al.**
9:10	*Bovid mortality profiles and early hominin meat-foraging capabilities at Olduvai Gorge, Tanzania* **Henry Bunn et al.**
9:30	*Mulhuli-Amo, a new late Early Pleistocene paleoanthropological site in the northern Danakil Depression, Eritrea* **Alfredo Coppa et al.**
9:50	*Structural dissymmetry in the iliac cancellous network supports postural/gait-related problems in the KNM-WT 15000 early adolescent from Nariokotome* **Virginie Volpato et al.**
10:10	**Coffee Break**
Plenary Session 2	
10:30	*An early Pleistocene lithic sequence from the southern Loess Plateau, Central China and the first arrival of hominins in NE Asia* **Zhaoyu Zhu et al. (presented by Robin Dennell)**
10:50	*What are Big Brains for?* **Alexandra de Sousa & Michael Proulx**
11:10	*Genetic Changes in Sialic Acid Biology during Hominin Evolution* **Ajit Varki**
11:30	*Evidence for Economization of Lithic Resources Over the Last 2.0 Ma* **Harold L. Dibble et al.**
11:50	*Out of Africa and Into Europe. Hominin Ecology, Faunal Change and Pleistocene "Dark Ages"* **Lutz Kindler & Sabine Gaudzinski-Windheuser**
12:10	*Neandertals in the Last Interglacial lake area of Neumark-Nord (Germany)* **Wil Roebroeks et al.**
12:30-14:00	**Lunch Break**

	Parallel Session 1	Parallel Session 2
14:00	*Quantitative comparison of dental macrowear patterns in* Australopithecus afarensis, Australopithecus africanus *and* Pan troglodytes **Stefanie Stelzer et al.**	*New insights to the transitional sequence of Les Cottes (Saint-Pierre-de-Maillé, France). A zooarchaeological approach* **William Rendu et al.**
14:20	*Late juvenile cranial growth in hominids* **André Strauss et al.**	*Comparison of Middle to Upper Palaeolithic transition sites in Central France. An accurate chronology* **Sahra Talamo et al.**
14:40	*Masticatory loading and craniofacial adaptations in robust* Australopithecus boisei *vs. gracile* Australopithecus africanus **Laura C. Fitton et al.**	*A new ending for the Mousterian in South-western France? A revision of the Final Middle Palaeolithic record in South-western France and its implications* **Brad Gravina et al.**
15:00	*Revisiting Genus* Homo **Jeffrey H. Schwartz**	*How do we reconstruct relationship between late Middle and early Upper Paleolithic lithics industries in Western Europe? The case study of the MTA and the Châtelperronian, and inferences about the makers of the Châtelperronian* **Marie Soressi**
15:20	*Earliest Porotic Hyperostosis on a 1.5-Million-Year-Old Hominin (Olduvai Gorge, Tanzania) and its Bearing on Meat Consumption by Early Humans* **Manuel Domínguez-Rodrigo et al.**	*The Rio Secco Cave in the North Adriatic Region, Italy. A new context for investigating the Neanderthal demise and the settllement of Anatomically Modern Humans* **Marco Peresani et al.**
15:40	*Testing the paleobotanical evidences for spring-associated woodlands and wetlands at Laetoli, Olduvai, and Peninj Plio-Pleistocene sites (Northern Tanzania)* **Doris Barboni**	*From Late Mousterian to Evolved Aurignacian: New evidence for the Middle-to-Upper Paleolithic transition in Mediterranean Spain* **João Zilhão et al.**
16:00	*Groundwater-fed springs and wetlands at Olduvai Gorge (1.85-1.75 Ma), an important ecological niche* **Gail Ashley**	*First Evidence Of Late Neanderthals And Anatomically Modern Humans In Serbia* **Ana B. Marin-Arroyo & Bojana Mihailovic**
16:20	*New Taphonomic Diagnostic of Hominoid Behavior and the Consumption of Meat and Bone by 1.2 Ma Hominins at Olduvai Gorge, Tanzania* **Travis Rayne Pickering et al.**	*Structure and explanation models of the East European Early Upper Palaeolithic* **Andrey Sinitsyn**
16:40	*Mammoths among Handaxes: Neanderthal-Megafauna interactions at the Late Middle Palaeolithic site of Lynford, UK* **Geoff Smith**	*Fashion Change in Middle Stone Age Shell Beads from Blombos Cave (South Africa)* **Marian Vanhaeren et al.**
17:00	*The bigger picture – a (mega)faunal approach to the site of Bilzingsleben* **Monika Brasser**	*Evaluating recent evolution, migration and Neandertal ancestry in the Tyrolean Iceman* **John Hawks**
17:30-19:30	**Poster Session with open bar**	
19:30-20:30	**Public Conference: Jean Clottes, *How can we interpret cave art?***	

Poster Presentations: ESHE 2012 Friday 21 September	
1	*The Yabroudian in Syria; state of the question* **Amjad Al Qadi**
2	*Sir Arthur Keith's Legacy: Shukbah Cave* **Isabelle De Groote et al.**
3	*Gone with the wind. The Acheulean/MSA transition viewed from SW Libya (Central Sahara)* **Emanuele Cancellieri**
4	*Palaeolithic Landscapes and Archaeology of the Southwestern Arabian Peninsula: Preliminary Reconnaissance in Jizan Region, Saudi Arabia* **Robyn Inglis et al.**
5	*Concretization and improvement of bifacial pieces in Lower and Early Middle Pleistocene. Contribution of the techno-evolutionary approach applied to Kokiselei 4 and Isenya sites in East Africa* **Benoît Chevrier**
6	*Distinguishing core reduction strategies through flake attributes: implications for reconstructing Middle Pleistocene landscape use at Elandsfontein, Western Cape, South Africa* **William Archer et al.**
7	*A revision of the southern African "MSA 1" based on new excavations at Elands Bay Cave (South Africa)* **Viola C. Schmid et al.**
8	*Heat treatment in the South African Middle Stone Age: New data on its cost in terms of investment and firewood* **Patrick Schmidt**
9	*Reconstructing Howiesons Poort mobility and territoriality in the Western Cape, South Africa* **Alex Mackay & Peter Hiscock**
10	*New Middle Stone Age human remains found at the site of Diepkloof Rock Shelter (Western Cape, South Africa)* **Christine Verna et al.**
11	*Single Grain OSL-dating of Palaeolithic sediments from the Rhafas cave site (NE Morocco)* **Nina Dörschner et al.**
12	*Conflicting dates for the Late Aterian* **Marcel Otte**
13	*The small vertebrates of Témara's caves (Morocco): implications for the understanding of the Middle-Late Palaeolithic and Neolithic occupations* **Emmanuelle Stoetzel et al.**

14	*Diet and Environment at Taforalt, Morocco: an isotopic study* **Angela Vaughan et al.**
15	*Iberomaurusian Funerary Behaviour at Grotte des Pigeons* **Louise Humphrey et al.**
16	*Taphonomic indicators of post-mortem body manipulations during the Mesolithic and transition to the Neolithic in the Danube Gorges, Serbia* **Rosalind Wallduck & Silvia Bello**
17	*Archaeological context of two cases of penetrating wounds of Upper Paleolithic persons from Sunghir, Russia* **Alexandra Buzhilova**
18	*MARS (Multimedia Archaeological Research System): An open-source web database to manage all data from collection to repository* **Patrick Semal et al.**
19	*Cutmarks on Neandertal remains from Les Pradelles: preliminary results using 3D microscopy (Alicona InfiniteFocus®)* **Célimène Mussini & Silvia Bello**
20	*Interest of Virtual 3D reconstruction and Printing (VIRCOPAL®) in Palaeoanthropology: example of Subalyuk immature skull (Hungary)* **Hélène Coqueugniot et al.**
21	*Muscle Area Estimation - Neanderthal vs. Modern* **Astrid Slizewski**
22	*Differentiating between archaic and anatomically modern morphology: evidence by microfocus X-ray use* **Maria Mednikova et al.**
23	*Neanderthal vs. anatomically modern: the endostructural signature of the human femoral shaft* **Laurent Puymerail**
24	*Comparative tooth crown endostructural morphology in two penecontemporaneous samples of Indonesian* H. erectus *(Sangiran) and African* H. heidelbergensis *(Tighenif)* **Clément Zanolli**
25	*Investigation of 2D dental tissue proportions in deciduous first and second upper molars of modern humans and Neanderthals* **Cinzia Fornai et al.**
26	*Dental tissue proportions and enamel thickness in European Late Pleistocene and Early Holocene humans* **Mona Le Luyer et al.**
27	*Outline analyses of Neanderthal and modern human lower second deciduous molars* **Stefano Benazzi et al.**

28	*Three-dimensional microstructure finite element modeling of the third proximal phalanx in the siamang (*Symphalangus syndactylus*)* **N. Huynh Nguyen et al.**
29	*The relationship between diet, craniofacial form and deformation in a papionin sample: Implications for fossil hominin dietary interpretations* **Miguel Prôa et al.**
30	*A biogeographical model for hominin evolution in Africa between 5 and 2.5 Ma* **Josephine Joordens et al.**
31	*First partial skeleton of* Paranthropus robustus *from Swartkrans (South Africa)* **Sandrine Prat & Dominique Gommery**
32	*An hypothesis for the phylogenetic position of* Homo floresiensis **Debbie Argue et al.**
33	*Revisiting "Zinj:" Premolar morphology supports multiple robust australopith genera* **Kes Schroer & Bernard Wood**
34	*A Lower Pleistocene human fossil from Kocabaş (Denizli, Turkey) pushing* Homo erectus *far to the west of Asia* **Amelie Vialet & M. Cihat Alçiçek**
35	*Frontal sinuses in Pleistocene hominins* **Laura T. Buck et al.**
36	*Thickened cranial vault and parasagittal keeling, correlated traits and autapomorphies of* Homo erectus*?* **Antoine Balzeau**
37	*The wolf-child never stands up ! At the search of this ideal model … The influence of the learning process of walking on the skeleton. Evolutionary implications* **Christine Tardieu**
38	*Evolutionary adaptations of the hominid vertebral column* **Martin Häusler et al.**
39	*Locomotion-related patterns of cortico-trabecular bone organization beneath the tibial plateau in extant humans,* Pan*, and* Papio*: a 2-3D high-resolution analytical approach* **Amélie Beaudet et al.**
40	*Our quadrupedal origin recorded in the three-dimensional orientation of the hip joint* **Noémie Bonneau et al.**
41	*Does metatarsal torsion in African apes reflect use of arboreal versus terrestrial settings?* **Tea Jashashvili & Kristian J. Carlson**

42	*The functional morphology of the early hominid scapula* **Sandra Mathews & Peter Schmid**
43	*The Functional Morphology of the Hominid Fibula* **Sabrina Meyer & Peter Schmid**
44	*Locomotor Convergence and other Homoplasies: the* Homo *and* Hylobates *Example* **Trenton Holliday**
45	*Taphonomical analysis of the Cranium 5 from the Sima de los Huesos Site (Atapuerca, Spain)* **Nohemi Sala et al.**
46	*Subadult shoulder girdle and long bones from Sima de los Huesos site (Sierra de Atapuerca, Spain)* **Rebeca García-González et al.**
47	*Systems-approaches to skeletal variation in paleoanthropology: the human thorax* **Markus Bastir et al.**
48	*The Sima de las Palomas Neanderthal skeletons: First steps towards "virtual" reconstruction* **Michael J. Walker et al.**
49	*The trunk remains from Sima de los Huesos (Sierra de Atapuerca, Spain)* **Asier Gómez Olivencia et al.**
50	*Estimating fetal-pelvic disproportion in our ancestors, with special reference to the MH2 and Tabun pelvis* **Pierre Fremondiere & François Marchal**
51	*3D reconstruction of Regourdou 1 pelvis: estimation of missing parts and first functionnal analysis* **Valentine Meyer et al.**
52	*Heel bones from the Middle Pleistocene site of Sima de los Huesos (Atapuerca, Burgos, Spain)* **Adriàn Pablos et al.**
53	*Handedness on 11 Neanderthals from the El Sidrón cave (Asturias, Spain): Evidence from the non-dietary dental wear* **Almudena Estalrrich et al.**
54	*Size and shape analysis of human and non-human third metatarsals: a geometric morphometric assessment of the Upper Pleistocene fossil from Callao cave (Luzon, Philippines)* **Florent Detroit et al.**

Saturday, 22 September	
Plenary Session 3	
8:00	*Neandertal and Denisovan Genomes from the Altai* **Susanna Sawyer et al.**
8:20	*A Neanderthal mandible fragment from Chagyrskaya Cave (Altai Mountains, Russian Federation)* **Bence Viola et al.**
8:40	*Uncovering the Contribution of Archaic Humans to the Immune Systems of Modern Humans* **Laurent Abi-Rached et al.**
9:00	*Who are you calling "modern"? An assessment of the dental morphology and metrics of* Homo sapiens **Shara Bailey & Jean-Jacques Hublin**
9:20	*Evidence for long distance terrestrial locomotion among early Modern Humans and Neandertals relative to Holocene foragers and modern human athletes* **Jay Stock & Colin Shaw**
9:40	**Coffee Break**
Plenary Session 4	
10:00	*Recent research into the North African Middle Stone Age in Morocco* **Abdeljalil Bouzouggar & Nick Barton**
10:20	*A Middle to Later Stone Age shift in eastern Ethiopia?* **Alice Leplongeon et al.**
10:40	*A New Framework for the Upper Paleolithic of Eastern Europe* **John F. Hoffecker**
11:00	*Language origin, language contacts and linguistic diversity: the case of Hunter-gatherers in Africa* **Jean-Marie Hombert et al.**
11:20	*Organic artefacts from Border Cave: earliest evidence of San material culture* **Francesco d'Errico et al.**
11:40	*The "Vale da Pedra Furada", Serra da Capivara (Brazil), case study: human occupation in South-America more than 20 kyears ago* **Christelle Lahaye et al.**
12:00-13:30	**Lunch Break**

	Parallel Session 3	Parallel Session 4
13:30	*Comparative morphological and morphometric description of the hominin calvaria from Bukuran (Sangiran, Central Java, Indonesia)* **Dominique Grimaud-Hervé et al.**	*Archaeological levels from Lower, Middle and Upper Pleistocene of Pradayrol (Caniac-du-Causse, Lot, France): preliminary studies* **Jean-Luc Guadelli et al.**
13:50	*Endocranial asymmetries and vascular imprints in Crania 4, 5 and 6 from Sima de los Huesos site (Atapuerca, Spain)* **Eva María Poza-Rey & Juan Luis Arsuaga**	*Geological study of the middle Pleistocene site of the Sima de los Huesos (Sierra de Atapuerca, Spain)* **Arantza Aranburu et al.**
14:10	*A juvenile mandible from the El Sidrón (Asturias, Spain) site and the growth of the Neandertal craniofacial system* **Antonio Rosas et al.**	*Coudoulous I in Quercy (SW France): from marginal scavenging to a kill-butchery site for Preneandertal* **Jacques Jaubert et al.**
14:30	*Unrolled roots: topographic variation of the dentine thickness in Neandertal and modern human anterior teeth* **Priscilla Bayle et al.**	*The Mid Pleistocene and early Middle Palaeolithic site of Tourville-la-Rivière, Seine-Maritime, France: technology and techno-economic behaviors* **Jean-Philippe Faivre et al.**
14:50	*New Neanderthal remains from Mani peninsula, S. Greece* **Katerina Harvati et al.**	*A 700-years-old Acheulean occupation in the Center of France. Data on the lithic assemblage and technical behavior* **Marie-Hélène Moncel et al.**
15:10	*Using bulk and laser ablation isotope sampling to understand the paleoecology and development of* Homo heidelbergensis *from the Sima de los Huesos in northern Spain* **Robert Feranec et al.**	*No longer Acheulian, not yet Mousterian: Cultural and biological transformations at Middle Pleistocene Qesem Cave, Israel* **Avi Gopher & Ran Barkai**
15:30	*Neandertal Humeri may Reflect Adaptation to Scraping Tasks, but not Spear Thrusting* **Colin Shaw et al.**	*The Arabian Nubian Tradition: an enduring Middle Stone Age technocomplex in southern Arabia* **Jeffrey Rose et al.**
15:50	*Preliminary anthropological results from Cussac Cave (Gravettian)* **Dominique Henry-Gambier et al.**	*New insight on the chronostratigraphic background of the Last Interglacial and Early Glacial loess-paleosol sequences related to Middle Palaeolithic assemblages in North-Western Europe* **Stephane Pirson et al.**
16:10	*Upper Palaeolithic ritualistic cannibalism: Gough's Cave (Somerset, UK) from head to toe* **Silvia M. Bello et al.**	*Chronostratigraphic background of the early Upper Palaeolithic site Markina Gora (Kostenki 14): a reference sequence for Central Russia* **Paul Haesaerts et al.**
16:30-18:30	**Poster Session 2**	
19:00-20:00	**General Assembly at Musée d'Aquitaine**	
20:00-22:00	**Closing Party**	

Poster Presentations: ESHE 2012 Saturday 22 September	
55	*People, prey and predators: how faunal dynamics inform our models of hominin dispersal* **Eline van Asperen**
56	*A Genetic Theory of Hominin Evolution* **Timothy J. Crow & Thomas H. Priddle**
57	*Evidence of neutral microevolution of human pelvic shape after the expansion out of Africa* **Lia Betti et al.**
58	*Neanderthal in Malthusian demographic trap* **Jean-Pierre Bocquet-Appel**
59	*Neanderthal territoriality: an ecological approach* **Elinor Croxall & Elisabeth H.M. Sterck**
60	*Land use and palaeodemography in the Upper Palaeolithic. Data from of the Iberian Peninsula* **Gerd-Christian Weniger et al.**
61	*Population dynamics of the Early Upper Palaeolithic (Aurignacian and Perigordian) hunter-gatherers of South-Western France* **Jennifer C. French**
62	*Modelling the spread of Aurignacian material culture: Were the first modern humans in Europe ethno-linguistically structured?* **Mirna Kovacevic et al.**
63	*Population dynamics in the Late Glacial refugium of Southwest France* **Christina Collins**
64	*Whats modern in modern human spatial behaviour? Spatial analyses as a guide book to Palaeolithic and Mesolithic socioeconomic organisation* **Daniela Holst et al.**
65	*Brain size and parietal shape in the genus* Homo **Martin Friess**
66	*Comparing endocranial ontogenies in extant hominoids* **Nadia Scott et al.**
67	*The evolution of the emotional brain* **Penny Spikins**
68	*Endocranial traits of the Sima de los Huesos (Atapuerca) and Petralona Middle Pleistocene ursids. Phylogenetic and biochronological implications* **Elena Santos et al.**
69	*Shaping the language faculty. Functional asymmetry of the inferior frontal gyrus in the genus* Homo **Fabio Di Vincenzo et al.**

70	*Cognitive 'barriers', synchronic development, and autism: A proposal for the integration of intelligence modules in the hominid cognitive architecture* **Karenleigh A. Overmann et al.**
71	*Climatic adaptation vs. neutral evolution: what clues from craniofacial form in native Northern Asiatics?* **Andrej Evteev et al.**
72	*Adaptation to Arctic climate in the native populations of North-East Asia: comparing body morphology and craniometric data* **Anna Berdieva & Andrej Evteev**
73	*New Mousterian neonates from the South-West of France (Saint-Césaire, Charente-Maritime)* **Pauline Colombet et al.**
74	*Virtual reconstruction and biomechanical analysis of the Magdalenian perinate Wilczyce 11* **Thomas O'Mahoney**
75	*Morphological and morphometric study of the mandibular symphysis with Elliptic Fourier Analysis: an application on Neanderthal children* **Julie Arnaud**
76	*A new assessment of the Neanderthal child mandible from Molare, SW Italy, using x-ray microtomography* **Claudio Tuniz et al.**
77	*The study of the human remains from Baousso da Torre cave: implications for lifestyle, sexual dimorphism and burial practices during the Gravettian* **Sebastien Villotte & Dominique Henry-Gambier**
78	*The Final Gravettian occupation at the Abri Pataud (Dordogne France). Results of recent excavations and cultural implications* **Roland Nespoulet et al.**
79	*New frontiers? – A Solutrean assemblage from the Magdalenahöhle (Eifel Uplands, Western Central Europe)* **Mathias Probst**
80	*The Central European Magdalenian – regional diversity and internal variability* **Andreas Maier**
81	*Gönnersdorf goes 3D - Palaeolithic art from a different angle* **Alexandra Güth**
82	*Two new Upper Palaeolithic/Mesolithic finds of portable art from Eastern Thuringia, Germany, and there 3D investigations of the ornament succession* **Tim Schüler**
83	*Personal ornaments: a proxy for tracing cultural geography and population dynamics at the Mesolithic-Neolithic transition in Europe* **Solange Rigaud**
84	*The Mid Pleistocene and early middle Palaeolithic site of Tourville-la-Rivière (Seine-Maritime, France): preliminary micro wear use analysis and first results* **Stéphanie Bonilauri & Jean-Philippe Faivre**

85	*New radiometric dates on the archaeological Early Pleistocene levels (TD1-TD6) of Gran Dolina (Atapuerca, Spain)* **Davinia Moreno et al.**
86	*Loess archives as contextual records of prehistoric human migration and environmental change in the Lower Danube loess steppe* **Kathryn Fitzsimmons et al.**
87	*Results from the geoarchaeological research in Schöningen, Germany: Contextualizing the archaeological remains* **Mareike C. Stahlschmidt et al.**
88	*Hand preference of Lower Palaeolithic hominins in UK: results from 3D laser scanning of stone flakes* **Natalie Uomini**
89	*From Keilmesser to Bout-Coupé Handaxes: Regional Variability in Western European Late Middle Palaeolithic Bifacial Tools* **Karen Ruebens**
90	*New insights on the chronology of Grotte Vaufrey through TT-OSL dating on sedimentary quartz* **Marion Hernandez et al.**
91	*Luminescence dating of the Quaternary volcanism in the Eifel (Germany): First results for the Neanderthal remains from Wannen/Ochtendung* **Daniel Richter et al.**
92	*A Palaeomagnetic Signal from the Last Interglacial* **Mark Sier et al.**
93	*Change and adaptation? Insights into Neanderthal subsistence in interglacials from a new archaeozoological analysis of faunal remains from level 11 at Kulna Cave (Czech Republic)* **Elaine Turner et al.**
94	*Late Pleistocene (MIS 3–4) climate inferred from micromammal communities and oxygen isotope compositions of rodents from Les Pradelles, Charente, France* **Aurélien Royer et al.**
95	*Mousterian workshops on a source of raw material in the Charente (France): the site of 'Le Chêne Vert' at Dirac* **Marie-Claire Dawson et al.**
96	*Three new archaeological sites with Neanderthal remains in the Centre of the Iberian Peninsula (Pinilla del Valle, Madrid)* **Juan Luis Arsuaga et al.**
97	*Lithic Assemblages Variability Of Middle Paleolithic In The Guadalquivir River Valley (Southern Spain) During Upper Pleistocene* **José Antonio Caro Gómez et al.**
98	*A refined chronology of the Mousterian reindeer hunting camp of Les Pradelles (Marillac-le-Franc, France)* **Marine Frouin et al.**

99	*The great fossil mine of the southern North Sea; exploring the potential of submerged Palaeolithic archaeology through forgotten finds* **Rachel Bynoe**
100	*New Excavations at the Mousterian of Acheulian Site of Abri Peyrony (France)* **Shannon McPherron et al.**
101	*The disappearance of the Neandertals in the Central Mediterranean region of Iberia. New integrated and multidisciplinary data from El Salt (Alicante, España)* **Cristo M. Hernandez et al.**
102	*Chatelperronian technical unity as seen from three open-air sites in the Aquitaine Basin* **François Bachellerie**
103	*New excavation at Le Fontenioux. A forgotten Châtelperronian/Aurignacian cave site in the Seuil du Poitou (France)* **Morgan Roussel et al.**
104	*Exploring cave use among hominins and carnivores in the Swabian Jura, Germany* **Keiko Kitagawa et al.**
105	*Bone artifacts from Bulgarian Initial Upper Paleolithic (42-36 Ky)* **Aleta Guadelli**
106	*Subsistence strategies during the Early Upper Palaeolithic of northern Central Europe: A re-analysis of the faunal remains from Lommersum (Germany)* **Tim Matthies**
107	*Aurignacian occupation of the British peninsula* **Rob Dinnis**
108	*δ13/12C and 15N/14N ratio in bone collagen from individuals of Kostenki VIII and Kostenki XIV (to problems of diets and landscapes reconstruction)* **Maria Dobrovolskaya et al.**
109	*Does temperature make the difference? Experimental heating of flint from the Baltic and Meuse regions* **Frank Moseler**
110	*Investigating Paleolithic projectile armatures and delivery systems: results from a new controlled ballistic experimental protocol* **Radu Iovita et al.**
111	*Late Aurignacian and early Gravettian technological strategies: Intensity of raw material use as an indication of mobility in stone artifact assemblages from Breitenbach, Germany, and Maisières-Canal, Belgium* **Luc Moreau**
112	*Understanding technological variability during the Gravettian in Northern Spain* **Marcel Bradtmöller**

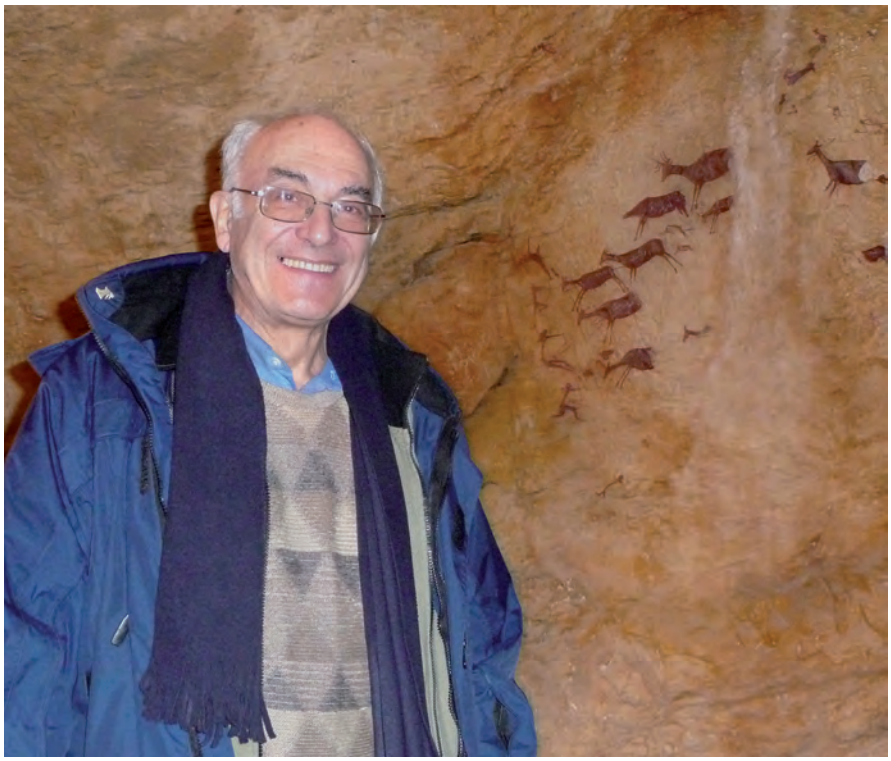
How can we interpret cave art ?

The most important and interesting question about European cave art is "Why?". For example, why did they go into the deep caves –where they did not live- to make the art? Why did they draw mostly animals and so few humans? Why make those images in the first place and what role might they have had?

The only bases we can rely on to approach the problem in a scientific manner are: what Palaeolithic people represented and in which conditions; the basic unity of Modern Humans; the comparisons one can make with traditional cultures that used to practices rock art and that are known ethnologically.

All this can cast some light on some of the main lines in the framework of thinking of the people who frequented the caves and left their images there.

Jean Clottes, *How can we interpret cave art ?*
Friday, 21 September, 19:30 – 20:30



Abstracts
European Society for the study of Human Evolution

Bordeaux September 2012

Podium Presentation

Uncovering the Contribution of Archaic Humans to the Immune Systems of Modern Humans

Laurent Abi-Rached[1], **Jung-Hua Yeh**[1], **Paul J. Norman**[2], **Peter Parham**[2]

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The recent characterization of two archaic genomes (Neandertal and Denisovan) revealed that interbreeding occurred between archaic and modern humans. The reconstruction of these ancient genomes now also allows investigation of the functional consequences for modern humans of this admixture, particularly for the rapidly-evolving, highly polymorphic Human Leukocyte Antigen (*HLA*) molecules of the immune system. Virtual genotyping of the draft Denisovan and Neandertal genomes for the three classical *HLA class I* genes (*HLA-A*, *-B* and *-C*) identified archaic *HLA class I* haplotypes carrying functionally distinctive alleles that have introgressed into modern Eurasian and Oceanian populations. These alleles, of which several encode unique or strong ligands for natural killer cell receptors, now represent at the *HLA-A* locus more than half the alleles of modern Eurasians and 66-95% of the alleles in Papua New Guinea. Of the 12 alleles characterized for the three *HLA class I* loci and two ancient genomes, 10 were identical to modern alleles but two, the Denisovan *HLA-B* alleles, had novel sequences. Using a recently released high coverage shotgun sequence of the Denisovan genome, we could precisely reconstruct the sequences of these two novel alleles by remapping all the reads specific of *HLA-B* against relevant modern *HLA-B* sequences. This reconstruction shows that the Denisovan *HLA-B* alleles contain no unique mutations but represent unique combinations of functionally important segments that render them distinct from all >2400 modern *HLA-B* alleles. The short segments of these 'recombinant' structures define functional epitopes that are rare or absent in Africa but very common in Oceania, representing 43-78% of the *HLA-B* allotypes in Papua New Guinea. Thus, this analysis of only a single Denisovan genome uncovered strong evidence that archaic admixture provided a significant source of *HLA class I* diversity for the subset of modern humans who first migrated out of Africa.

Poster Presentation

The Yabroudian in Syria; state of the question

Amjad Al Qadi[2]

1 – Archéologie préhistorique et anthropologie; Université de Genève

Dating around 350,000 years, the Yabroudian is a regional archeaological culture of the Levant, stratigraphically situated between the Acheulean and the Mousterian. In Syria this facies is represented in several areas: in the Kalamoon, in central Syria (the region of El Kowm and Palmyra), in Bal'as, in the region of Afrin and on the Euphrates. In the region of El Kowm in central Syria, The Yabroudian material of Hummal is similar to that of Nadaouiyeh Aïn Askar presenting a debitage mainly oriented to the production of thick flakes which have a wide and smooth butt, obtained by heavy, hard-hammer percussion. Soft-hammer technique was used during the operations of retouching and resharpening the scrapers. Typical scalariform/yabroudian retouch dominates. Bifacial pieces present in the assemblages of central Syria and the eponymous site of Yabroud, normally are marginally worked and clearly distinct from Acheulean handaxes. These industries have technological and typological similarities with European industries of the Middle Paleolithic of southwestern France as Quina Mousterian type. The Yabrudian culture has been described as a lithic transition between the Lower and Middle Paleolithic, notably because of the association of bifacial pieces and scrapers with scaliform retouch. All these technical characteristics of the Yabrudian in central Syria and the eponymous site of Yabroud lead to the conclusion that this culture is a distinct culture, closer to the Middle Paleolithic than to the Lower Paleolithic.

Podium Presentation

Geological study of the Middle Pleistocene site of the Sima de los Huesos (Sierra de Atapuerca, Spain)

Arantza Aranburu[1], Juan Luis Arsuaga[2], Nohemi Sala[2], Ignacio Martínez[3], Ana Gracia-Téllez[3], Nuria García[2], José Miguel Carretero[4], Carlos Lorenzo[5], Rolf Quam[6], Ana Isabel Ortega[7], Alejandro Bonmatí[2]

1 - Departamento de Mineralogía y Petrología; Universidad del País Vasco/EHU · 2 - Paleontología; Centro UCM-ISCIII de Evolución y Comportamiento Humanos · 3 - Área de Paleontología, Departamento de Geología; Universidad de Alcalá de Henares · 4 - Laboratorio de Evolución Humana, Dpto Ciencias Históricas y Geografía; Universidad de Burgos · 5 – Area de Prehistoria; Universitat Rovira I Virgili · 6 – Binghamton University · 7 – Centro Nacional de Investigación sobre Evolución Humana

The Sima de los Huesos site in the Sierra de Atapuerca in northern Spain is well-known as a rich human-fossil-bearing locality. A full understanding of the geology of the site is vital for dating the fossil-bearing sediments as well as understanding the origin of the hominin bone accumulation. The site is a small subterranean gallery deep within the Cueva Mayor karst system, far from the present day entrance, and can be grossly divided into three parts along its major axis. Sedimentary infill of the site has led to the uppermost and lowermost sections being nearly horizontal, while the intermediate section is an inclined ramp. All three sections have been partially excavated and have yielded hominin and carnivore fossils. There are three major vertical conduits in the roof of the gallery. One conduit is in the ceiling of the lowermost section, while the largest shaft is at the top of the ramp and the third conduit is in the uppermost section. Only the one at the top of the ramp is open at its upper end, representing the present-day access to the site, while the other two are closed off by limestone blocks. At its upper opening, the main shaft is connected, through a short passage to the west, with the Sala de los Cíclopes hall, where cave bear remains (but no human fossils) have been excavated. To the east of the upper opening, another passage is completely filled up by sediments. This passage once lead to the outside, because it contains small rounded limestone pebbles that derive from a Miocene conglomerate lying outside. The depositional sequence begins with a thick layer of Miocene white marls coming from outside. These marls entered the karstic system as the result of roof collapse under vadose conditions. The base of the conduit in the uppermost section of the Sima de los Huesos is almost filled up by these marls, so it could not be an access point for humans and carnivores to the site. Above the marls is a thick layer of sands, seen only in the lowermost section of the site, which were transported during the lower Pleistocene by a nearby river. A pool-spar and flowstone were formed on top of the sands. Another flowstone covering the marls in the intermediate and uppermost sections could be approximately synchronic. Subsequently, strong water flow eroded the marls and sands, and the overlying flowstones collapsed onto the irregular floor. Later on, a homogeneous clay deposit formed over the fallen speleothems. The lower part is sterile, while the upper part contains primarily hominin and cave bear fossils. The massive clay structure reveals a quiet depositional environment. Above the clay deposits is another layer containing cave bear bones and other carnivores. These clayish sediments contain small limestone pebbles, identical to the ones in the sealed passage at top of the main conduit, fragments of speleothems, and others lithoclasts. Finally, a flowstone formed throughout the entire gallery, sealing the Pleistocene deposits below from Holocene sediments above.
Acknowledgements: This study was possible thanks to the Atapuerca excavation team, especially to the Sima de los Huesos group. This research has been funded by the MICINN project CGL2009-12703-C03-03. Thanks to the Ministerio de Educación (FPU grant AP2006-04737), Fundación Atapuerca and Fundación Ancestros.

Poster Presentation

Distinguishing core reduction strategies through flake attributes: implications for reconstructing Middle Pleistocene landscape use at Elandsfontein, Western Cape, South Africa

William Archer[1], **Darya Presnyakova**[2], **David Braun**[1], **Shannon McPherron**[1], **Wesley Flear**[3]

1 - Human Evolution; Max Planck Institute for Evolutionary Anthropology · 2 - Anthropology; Rutgers University · 3 - Archaeology; University of Cape Town

Simple core and flake production (e.g. Mode 1) as well as bifacial shaping (e.g. Mode 2) co-occur in many Middle Pleistocene assemblages. Currently these flaking patterns are documented through the identification of characteristic core forms. Certain flaking strategies may be overlooked in assemblages where cores are underrepresented. Several attributes on experimentally produced whole flakes are used to distinguish Mode 1 flakes from those associated with bifacial shaping (Mode 2). Our experimental protocol factors in the (i) initial roughing out and (ii) thinning stages of bifacial reduction. A discriminant function analysis was applied to predict whether archaeological flakes from Middle Pleistocene localities at Elandsfontein (South Africa) are indicative of Mode 1 or 2 strategies. This study suggests that (a) Mode 1 and 2 strategies are identifiable at sites where diagnostic core forms are absent; and (b) Bifacial tool manufacture and reduction occur at different localities to their eventual discard.
Acknowledgements: University of Cape Town University Research Council. Alexander von Humboldt Foundation, Palaeontological Scientific Trust

Podium Presentation

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Poster Presentation

Distinguishing core reduction strategies through flake attributes: implications for reconstructing Middle Pleistocene landscape use at Elandsfontein, Western Cape, South Africa

William Archer[1], **Darya Presnyakova**[2], **David Braun**[1], **Shannon McPherron**[1], **Wesley Flear**[3]

1 - Human Evolution; Max Planck Institute for Evolutionary Anthropology · 2 - Anthropology; Rutgers University · 3 - Archaeology; University of Cape Town

Simple core and flake production (e.g. Mode 1) as well as bifacial shaping (e.g. Mode 2) co-occur in many Middle Pleistocene assemblages. Currently these flaking patterns are documented through the identification of characteristic core forms. Certain flaking strategies may be overlooked in assemblages where cores are underrepresented. Several attributes on experimentally produced whole flakes are used to distinguish Mode 1 flakes from those associated with bifacial shaping (Mode 2). Our experimental protocol factors in the (i) initial roughing out and (ii) thinning stages of bifacial reduction. A discriminant function analysis was applied to predict whether archaeological flakes from Middle Pleistocene localities at Elandsfontein (South Africa) are indicative of Mode 1 or 2 strategies. This study suggests that (a) Mode 1 and 2 strategies are identifiable at sites where diagnostic core forms are absent; and (b) Bifacial tool manufacture and reduction occur at different localities to their eventual discard.
Acknowledgements: University of Cape Town University Research Council. Alexander von Humboldt Foundation, Palaeontological Scientific Trust

Poster Presentation

An hypothesis for the phylogenetic position of *Homo floresiensis*

Debbie Argue[1], **Colin Groves**[1], **William Jungers**[2]

1 - School of Archaeology and Anthropology; Australian National University · 2 – Department of Anatomical Sciences; Stony Brook University Medical Center

Two primary hypotheses have been proposed for the phylogenetic position of *Homo floresiensis*. This species comprises a series of bones discovered during excavations in Liang Bua cave, on the island of Flores, Indonesia. The remains are dated from c. 18,000 years ago to 94,000 years ago and represent a population of very small hominins, a little over a meter tall, with relatively short legs in relation to arms, relatively large feet, and archaic shoulder and wrist configurations. Only one cranium is available – part of a skeleton (LB1) –and its cranial capacity is a mere 416cc. *H. floresiensis* was originally hypothesised to be the outcome of dwarfing of *H. erectus*. This was later rescinded when further skeletal material was described, and it was proposed that *H. floresiensis* was a population of an unknown small-bodied and small-brained archaic hominin. Not surprisingly, with two such widely varying hypotheses, consensus of opinion is yet to be achieved. To explore these hypotheses we use 76 characters from the crania, mandibles, dentition, and postcrania of *Au. afarensis*, *Au. africanus*, *H. habilis*, *H. ergaster*, *H. erectus*, *H. floresiensis* and *H. sapiens* to perform cladistic analyses. Cladistic analyses are designed to find the shortest possible phylogenetic tree or trees that may be hypothesised to represent the most parsimonious solution for the evolutionary relationships among the taxa being considered. Our cladistic analysis places *H. floresiensis* unequivocally as part of a clade with *H. habilis*. We hypothesize that these two species, although separated by almost two million years and thousands of kilometers, shared a unique common ancestor. We further test for a *H. floresiensis*/*H. erectus* clade, but the resulting phylogenetic tree is much longer than the most parsimonious tree, and the hypothesis that *H. floresiensis* is a dwarfed *H. erectus* cannot be supported by our dataset and analyses.
Acknowledgements: Research funded by the Australian Research Council Discovery Project Grant DP 1096870. Access to specimens kindly provided by: Dr Tony Djubiantono and Thomas Sutikna, ARKENAS, Indonesia, and Professor Mike Morwood, University of Wollongong, Australia; Dr Harry Widianto, Sangiran Museum, Indonesia; Dr Fachroel Aziz, Centre for Geological Survey, Bandung, Indonesia; Professor Lee Berger, Ms Wilma Lawrence and Ms Bonita de Klerk, University of Witwatersrand, South Africa; Dr Bernard Zipfel, University of Witwatersrand, Johannesburg, South Africa; Ms Stephany Potze, Ditsong Museum, Pretoria, South Africa; Dr A. Kwekason and Dr Christine Ngereza, National Museum and House of Culture, Dar es Salaam, Tanzania; Dr Berhane Asfaw, and Tomas and Yared, National Museum of Ethiopia; Dr Emma Mbua, Kenya National Museums, Nairobi, Kenya; Dr Jon de Vos, Naturalis, Leiden, Holland; Dr Friedemann Schrenk and Dr Ottmar Kullmer, Research Institute Senckenberg, Frankfurt, Germany; Dr Sandy Ingleby, Australian Museum, Sydney, Australia; Dr Denise Donlon, Shellshear Museum, University of Sydney, Australia.

Poster Presentation

Morphological and morphometric study of the mandibular symphysis with Elliptic Fourier Analysis: an application on Neanderthal children

Julie Arnaud[1,2]

1 - Biologia ed Evoluzione; Università degli Studi di Ferrara · 2 - Département de Préhistoire; Muséum National d'Histoire Naturelle de Paris

The aim of this research is to highlight the morphological differences on the mandible between Neanderthal and modern human children, and especially shape differences of the symphysis. Neanderthal morphology is well known and considerably documented. Numerous morphometric and morphological studies showed that several features are peculiar to *Homo neanderthalensis* (autapomorphies). These derived features are observable on all the skeletal parts but the cranium and the mandible are generally acknowledged to allow a more accurate diagnosis of Neanderthal specimens. On the mandible, among the most evident features are the absence of a chin, a posterior position of the mental foramen and a wide retromolar space. The appearance of such features during individual development is an important question for the understanding of the evolution of *Homo neanderthalensis*. Several studies, especially on dental and cranial structures, allowed to hypothesize about the appearance of such features during the individual development of Neanderthal specimens. Juvenile remains, although there is a high intraspecific variability, show adults features early in the growth compared to *Homo sapiens*, which indicate precocity in the maturation. In this present study, we tried to test this hypothesis through the study of the outline of the symphysis The sample is composed of 11 mandibles of infant *Homo neanderthalensis* compared to a reference collection which includes 45 mandibles of infant *Homo sapiens* (Neolithic and protohistoric time periods). All the specimens were classified into five growth stages, from an incomplete deciduous dentition (stade 1) to the beginning of the eruption of the third molar (stade 5). In order to test for the presence of adult features on the juvenile mandibles, we add a reference collection including 43 adult mandibles of *Homo sapiens* and *Homo neanderthalensis*. We compare the symphyseal profiles in 2D using Elliptic Fourier Analysis (EFA). Each outline was built from 3 anatomical landmarks (Infradentale, Intersection of digastrics fossae, projection of the Infradentale on the lingual face) and 41 semi-landmarks digitized on the 3D models of the mandibles (realized with a NextEngine surface scanner). Prior to statistical analyses, raw data were transformed into 2D through a simple procedure of dimensionality reduction (PCA). Fourier descriptors were analyzed with PCA and FDA, using the dental eruption stages and the species as a priori groups for the latter. The results show structural differences between Neanderthals and modern human infants from the same dental age not only on the general size of the mandible but also on the shape of the symphysis profile. Thus, this research gives further perspectives on the utilization of the symphysis for the diagnosis of Neanderthal specimens. In terms of individual development, the FDA on Neanderthal infants compared to adults shows that from dental stage 4 (beginning of the eruption of the second molar), the juvenile specimens exhibit already an adult morphology. This result is in line with the hypothesis of a faster maturation process in Neanderthals compared to *H. sapiens*.
Acknowledgements: Pr. Carlo Peretto, Pr. Dominique Grimaud-Hervé, Pr. Giorgio Manzi, Pr. Giacomo Giacobini, Dr. Florent Detroit, Dr. Antoine Balzeau, Dr. Raffaele Sardella, Dr. Luca Bellucci, Luciano Bruni.

Poster Presentation

Three new archaeological sites with Neanderthal remains in the Centre of the Iberian Peninsula (Pinilla del Valle, Madrid)

Juan Luis Arsuaga[1], Enrique Baquedano[2], Alfredo Pérez-González[3]

1 - Centro de Evolución y Comportamiento Humanos (UCM-ISCIII) · 2 - Museo Arqueológico Regional de la Comunidad de Madrid · 3 - Centro Nacional de Investigación sobre la Evolución Humana

Archaeological surveys and excavations have been undertaken from 1979 until now, leading to the discovery of five sites in the promontory named Calvero de la Higuera (Pinilla del Valle, Madrid, Spain). These sites are Camino Cave, Navalmaíllo Shelter, Buena Pinta Cave, Ocelado Shelter, and Des-cubierta Cave. Fossil remains of *Homo neanderthalensis* have been found in three of five sites (Camino Cave, Buena Pinta Cave and Des-cubierta Cave). A right M1 and M3 were found in Camino Cave in 1982 and 1984. Their discoverers considered them as anteneanderthals (Alférez and Roldán, 1992). Nevertheless our later studies have described them to be *Homo neanderthalensis* (Arsuaga et al 2012). Camino Cave was used as hyaena den. So far, it has been recovered the more complete MIS 5 faunistic sample from the interior Iberian Peninsula, being the fallow deer (Dama dama) the herbivore species best represented. Navalmaíllo Shelter was discovered in 2002 at about 100 m southeast from Camino Cave. The chronology by TL of level F, the main occupation layer, ranges between 71.685 ± 5.082 and 77.230± 6.016 years ago (Huguet et al 2010, Arsuaga et al 2011). This rock shelter is a big open cavity that was used as a camp site. Against Camino Cave, the main accumulator agents are hominids. The shelter conserves an important industrial and faunistic sample. Buena Pinta Cave was discovered in 2003. It is located some 40 m southeast of Navalmaíllo Shelter. The main accumulator agents are hyaenids (Crocuta crocuta). The other two *Homo neanderthalensis* molars (M2 and M3) were found in 2007 at layer 3 (63.451+-5.509 years ago - MIS 4). Finally, Des-cubierta Cave was discovered only recently (2009) and is still under study. This site is located 20 m East from Buena Pinta Cave. The archaeological remains which have been recovered are associated with *Stephanorhinus hemitoechus*, being the more recent dates of this species in the Iberian Peninsula around 40.000 years. Five deciduous teeth were recovered during 2011 campaign belonging again to *Homo neanderthalensis*.

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Podium Presentation

Groundwater-fed springs and wetlands at Olduvai Gorge (1.85-1.75 Ma), an important ecological niche

Gail Ashley[1]

1 - Earth and Planetary Sciences; Rutgers University

Olduvai basin has 2 million year paleontological and archaeological records that include four hominin species. Approximately 75% of the sites are in the "Junction" which represents only 1% of the 250 km2 of the fluvio-lacustrine deposits. This unusually high concentration of life is apparently due to a fortuitous interplay of the basin hydrology, the structural geology (a rift-related fault system) and the 3-dimensional architecture of the sedimentary deposits. Precipitation (similar to modern) would have been monsoon-driven and seasonal with surface water infiltrating into the subsurface and moving into the basin in the groundwater system. Thus, most rivers systems draining into the basin would have dried up seasonally. They were likely ephemeral and not a dependable year round water source. A large shallow, playa lake occupied the center of the basin, but the water was saline and alkaline, and not likely potable (Hay and Kyser, 2001). Water levels in the lake were driven by Milankovitch precession cycles (23 kyr) (Ashley, 2007) and shorter term regional climate variability. Precipitation is estimated to range from 500 mm/yr during dry periods of astronomically driven cycles and 900 mm/yr during wet periods (Sikes and Ashley, 2007). Evapotranspiration is estimated at 2800 mm/yr. The sedimentological records of freshwater seeps and spring deposits are abundant and vary morphologically. Deposits range from localized tufa mounds to broad expanses of both carbonate and siliceous wetland deposits. Groundwater discharge deposits (GWD) have been documented for this 100,000 year interval from Bed I (FLK, DK and MK), Lowermost Bed II (VEK, HWK-W, TK and MCK) and Upper Bed II at BK and SC in the Side Gorge. δ18O stable isotope analyses of the carbonates verify their freshwater origin. The plant remains (phytoliths and organic biomarkers) from several sites support the interpretation of the associated wetland paleoecology. Some sites like FLk Zinj (Ashley et al., 2010b) and FLK North (Ashley et al., 2010a; Barboni et al., 2010) have been directly correlated with freshwater resources. The research progresses on other sites. In summary, concentration of "bones and stones" in the central part of the Olduvai basin is best explained by the abundant evidence for local freshwater sites during Bed I and Bed II times rather than the original assumption that attraction to the area was Lake Olduvai or riparian corridors.

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Poster Presentation

People, prey and predators: how faunal dynamics inform our models of hominin dispersal

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The climate and largely forested environment of the Last Interglacial (marine isotope stage 5e) are thought to have been similar over large stretches of north-west and central Europe. Though the British Isles are climatically comparable to the European mainland at this time, certain key species, notably hominins, horses and forest rhino, are missing from Last Interglacial faunas of the British Isles. Various explanations have been offered for the enigmatic absence of evidence for hominin occupation of the British Isles during this period, including taphonomic factors (e.g. Gaudzinski-Windheuser & Roebroeks, 2011), sea level rise (e.g. Lewis et al., 2011), population dynamics (Roebroeks et al., 2011) and adaptive limitations which prevented hominins from surviving in densely forested environments (e.g. Gamble, 1999). Here detailed faunal and environmental records for the Last Interglacial are used to investigate the impact of community composition on the dynamics of the large mammal fauna and the role of hominins in the faunal community. Using GIS approaches and statistical methods, the relationships between community composition and environmental variables are explored. Some species (e.g. horses and steppe rhino) are adapted to the steppic environments that have been proposed as the most suitable habitat for Last Interglacial hominins (Gamble, 1999). Besides habitat availability, factors such as the location of glacial refugia, geographical barriers, competition with other species and population density are shown to influence dispersal of these species. The distribution of other species, particularly megaherbivores, raises the question of how densely forested Europe really was at this time. The highly carnivorous Last Interglacial hominin diet (Bocherens et al., 1999) brought the hominins in direct competition with large carnivores that focus on similar-sized prey. Approaching hominins as an integral part of the large mammal community thus opens new avenues of investigating hominin behaviour.

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Poster Presentation

Chatelperronian technical unity as seen from three open-air sites in the Aquitaine Basin

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The Chatelperronian represents the final expression of the Neanderthals in France and Northern Spain and is traditionally viewed as being the transition to the new world of the Upper Palaeolithic commonly associated with anatomically modern humans (AMH). This techno-complex plays an important role in various models held to account for the Middle-to-Upper Palaeolithic transition and has been interpreted as 1) resulting from the acculturation of the final Neanderthals by AMH (Mellars, 2004), 2) an independent development of the Upper Palaeolithic by Neanderthal populations (d'Errico et al. 1998) or 3) a bio-cultural absorption of indigenous populations by new arrivals in the form of genetic and cultural exchanges (Zilhão, 2011). However, recent studies of Châtelperronian sites are rare and, as a result, complex models rest on outdated information or unresolved suspicions of the mixture of different cultural materials. In order to properly address the techno-cultural definition of the Châtelperronain, in other words, the commonly cited 'Mousterian' component of these industries as representing a genuine cultural trait or the product of post-depositional mixing (Rigaud, 1996), we must focus attention on assemblages whose stratigraphic integrity has been thoroughly tested. Here we present a techno-economic and taphonomic analysis of three open-air sites in the Aquitaine region: Le Basté (Pyrénées Atlantique), Bidart (Pyrénées-Atlantique), and Canaule II (Dordogne). Limited taphonomic problems associated with these essentially in-place open-air sites allow better control over assemblage coherence than do cave or rockshelter contexts and therefore allow us to propose an updated definition of the Châtelperronian. A substantial technical unity of Châtelperronian emerges from this analysis and is likely indicative of an equally substantial cultural unity expressed in the modes and objectives of an almost exclusively laminar production system. These generally short and wide blades with rectilinear profiles were detached using soft-stone hammer percussion and were mainly designed for the manufacture of Châtelperronian points. Furthermore, while some independent flake production can be observed, it is not comparable with typically Mousterian technical systems. Finally, the considerable morphometric unity of the backed pieces, coupled with doubt casts on the reality of a genuine Mousterian component of the Châtelperrronian, calls into question the idea of an internal evolution. The Chatelperronian, in the absence of a cultural composite in associated chaînes opératoires, can no longer be defined as a 'transitional' industry in the literal sense of the term, but should more appropriately be considered as a fully Upper Palaeolithic industry. Nevertheless, its formation seems to be have been driven by the desire for lightweight points that were potentially employed as armatures. This process is comparable with those seen in other 'transitional' techno-complexes during the same period across the rest of Western Europe. The available stratigraphic and chronological data indicates a gradual appearance of the elements structuring the Upper Palaeolithic of which certain features were already in place well before the emergence of the Aurignacian (laminar production, the predominant role of armatures in the lithic tool-kit, and the presence of bone and antler artefacts) (Teyssandier et al, 2010).

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Podium Presentation

Who are you calling "modern"? An assessment of the dental morphology and metrics of *Homo sapiens*

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Most studies emphasizing morphological differences between Neandertals and *Homo sapiens* have focused on the distinctiveness of Neandertal features. *H. sapiens*, however, has been suggested to possess as many, if not more, derived characters of the skull and teeth as Neandertals (Trinkaus, 2006). This study focuses on the dental record, which is particularly well-preserved and comprises a large proportion of the fossils discovered. The primary questions addressed by this study are: (1) To what extent are the dental morphology and metrics derived in *H. sapiens*? (2) Which teeth are most diagnostic of *H. sapiens*? And (3) if present, when do these derived characters first appear in the *H. sapiens* lineage? These questions are especially relevant considering that recent discoveries and re-dating of fossil hominin material suggests multiple hominin species overlapped in time and space between 200,000 and 18,000 years ago, meaning that we cannot assume 'not Neandertal' is synonymous with '*H. sapiens*'. We examined frequencies of 23 dental crown traits in Middle to Late Pleistocene hominin taxa in order to uncover traits and/or trait frequencies that are unique to *H. sapiens*. In addition we compared standard crown dimensions, crown areas, and dental ratios among groups. Our results suggest that *H. sapiens* possesses a number of derived morphological characters that appear in the earliest members of the lineage. These include the U-shaped fissure pattern of the lower P4, relatively flat and featureless upper incisors, four cusped lower second molars and lower molars lacking any form of trigonid crest on both enamel and dentine surfaces. Although dental reduction has long been cited as a derived feature of *H. sapiens*, our data indicate this claim may be no longer tenable. Early *H. sapiens* does not differ significantly from the Middle Pleistocene sample in mandibular buccolingual breadths or crown areas and are significantly smaller only in buccolingual breadths and crown areas of the upper P4 and M2. Early *H. sapiens* is most similar to *Homo erectus* in its maxillary anterior:posterior dental ratio, while the mandibular anterior:posterior dental ratio of *H. sapiens* lies between that of *Homo erectus* and Neandertals. Summed posterior crown area of early *H. sapiens* is actually greater than that of later Neandertals. The single metrical assessment that groups all *H. sapiens* (early, Upper Paleolithic and recent) apart from other taxa is the ratio between mandibular:maxillary crown areas. The results of our study are important for assessing recent claims of great antiquity for *H. sapiens* outside of Africa.

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Poster Presentation

Thickened cranial vault and parasagittal keeling, correlated traits and autapomorphies of *Homo erectus*?

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Among the numerous features that are generally proposed to characterize *Homo erectus* species are thickened cranial vault bone and the presence of parasagittal keels. However, the definition and the meaning of these features vary between authors and remain generally unclear. Moreover, many methodological limitations have to be considered in analyzing such complicated features. We propose here comparative analyses of imaging datasets for large samples of hominids (including extant chimpanzees and modern humans) and fossil hominins to analyse the potential polarity of the observed traits. To evaluate vault-bone thickness, rather than measuring thickness values quantified at isolated points, we compare absolute bone thickness on a large area of the upper vault allowing us to better determine individual variation and modifications related to specific anatomical features. To evaluate parasagittal keeling, we analyse the topography of the exocranial surface, while also considering the corresponding topography of the endocranial surface. This approach permits to better analyse the covariation of exo and endocranial surfaces, and readily establish the bone thickness where the external cranial surface keels. This study definitely demonstrates that absolute increased bone thickness is not an autapomorphic trait of the *Homo erectus* species. We also show that if the frontal and sagittal keels in *Homo erectus* constitute a relief on the external cranial vault surface, they do not necessary correspond to a real thickening of the underlying bone. In any case, keels are a complex feature that are related to variations in exocranial surface anatomy, but also to those of the bone thickness, of the orientation of the wall of the cranial vault and therefore to brain anatomy.

Podium Presentation

Testing the paleobotanical evidences for spring-associated woodlands and wetlands at Laetoli, Olduvai, and Peninj Plio-Pleistocene sites (Northern Tanzania)

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Laetoli, Olduvai, and Peninj are some of the most important paleontological and archaeological sites in East Africa for which paleobotanical data are available. Altogether they provide some insights into what the vegetation looked like and how it evolved during the last 4 million years, when our early ancestors *Australopithecus afarensis*, *Homo habilis*, *Paranthropus boisei*, and *Homo erectus/ergaster* where present in the Serengeti – Crater highlands region of Northern Tanzania. For several decades the only existing botanical evidence were some pollen data (Bonnefille 1984; Bonnefille and Riollet 1987), which surprisingly showed very little difference with the modern pollen data, as if vegetation in the past had not been much different than today. Yet, it is hard to believe that what drew our early ancestors to Olduvai, Laetoli and Peninj looked like the places we know today as arid steppe and desert-like areas. Geological evidences indicate the presence of a paleolake in the Olduvai basin, but the paleolake was saline/alkaline and not likely potable (Hay and Kyser 2002). Phytoliths and organic biomarker studies of archaeological sites FLK N and FLK Zinj at Olduvai Gorge (Tanzania) provide the unique botanical evidences for spring-associated woodlands in an otherwise grass-dominated landscape 1.8 to 1.75 million years ago (Ashley, et al. 2010a; Ashley, et al. 2010b; Barboni, et al. 2010). The evidences come from time-constrained samplings of several kilometers square areas in the Gorge, which reveal a great spatial heterogeneity in the vegetation at the local scale. At FLK N and FLK Zinj patches of dense (woody) vegetation with palms and sedges are inferred from the abundance of forest-indicator phytoliths in samples collected close to groundwater discharge deposits (localized tufa mounds, i.e. spring), while grass phytoliths occur in samples collected some 200 m away from the tufa spring deposits. A re-evaluation of the published pollen data by Bonnefille (1984) suggest that the pollen signal of spring-associated woodlands was most likely overlooked because of the over-representation of grasses pollen grains which may account for more than 60% in the Olduvai fossil samples (Barboni, et al. 2010). Today, in some localized areas near the saline and alkaline Lake Manyara and Lake Eyasi, but also near Laetoli and elsewhere in the Numbu Mounts and Nguruman Escarpment, freshwater springs sustain the presence of dense woodlands and even dense evergreen forests despite the arid climate. The springs create steep vegetation gradients over less than 100 m-long transects, as those inferred for FLK N and FLK Zinj. Carbon isotopic data suggest that spring-associated woodlands due to active faulting in the Olduvai basin may have occurred throughout Bed I and Bed II time in the Olduvai Gorge (Cerling and Hay 1986). A re-evaluation of the Laetoli, Olduvai, and Peninj pollen data using a so-called objective method will be applied to test the presence of spring-associated forests and woodlands at these sites in the past. New modern pollen and phytolith data from spring-associated vegetation at Manyara and Eyasi will also be presented for comparison.

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Poster Presentation

Systems-approaches to skeletal variation in paleoanthropology: the human thorax

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Systems-approaches provide an epistemological framework that guides morphological studies of skeletal variations and its interpretations within the concept of organism (Bastir, 2008). In human evolution, the respiratory system is particularly interesting as it links craniofacial and post-cranial skeletal morphology. The nasal cavity and the thorax belong to a morpho-functional system, represented in different cranial and postcranial regions, which share a common function, that is, respiration. Respiration provides oxygen for energetics and metabolism of the organism. It is therefore relevant for different aspects of hominin paleobiology. Patterns of physical activity, body shape and mass and ecological factors are all intrinsically connected with the respiratory system. Yet, so far the postcranial part of the respiratory system, the thorax, has received little attention in paleoanthropology. One interesting problem in this context is the size and shape of the Neanderthal thorax. A recent study has compared the thorax of Kebara 2 with a series of modern humans and found that it was larger than that of modern humans, but not by an isometric pattern of enlargement (Gomez-Olivencia et al., 2009). This hypothesis implies differences in thorax size and shape between the human species. We used 3D geometric morphometrics to test a hypothesis, which would explain the thorax morphology of Kebara 2 by allometric extension of a modern human thorax growth trajectory. 3D landmarks and semilandmarks (N=292) were measured on the rib cage of the Neanderthal reconstruction of Sawyer and Maley (2002) (cast) and of 3D reconstructions of thorax CT-scans of a growth series of modern humans (newborns to adults). First, we enquired the details of ontogenetic size and shape changes in modern human rib cages. Then we used multivariate regression and residual analyses to test the hypothesis of ontogenetic scaling. Finally, we explored shape variation of individual ribs in isolation. Growth in modern humans modifies the overall configuration from a triangular (funnel-shaped) to a more rectangular (barrel-shaped) thorax outline by changing rib length, curvature and angulation. The Kebara 2 thorax reconstruction differs in shape from modern humans. Its centroid size is large, but appears within the range of adult *H. sapiens*. Shape differences remain after accounting for allometric variation and are evident at the upper and lower thorax, suggesting antero-lateral expansions in rib curvature. In axial view the Neanderthal ribs show two curvature maxima, while there is only one in modern humans. Consequently, the thorax appears relatively wider, particularly at its lower part, in the Neanderthal (Franciscus and Churchill, 2002). Whether our findings are due to the anatomical reconstruction, to taphonomic deformations or whether they reflect actual differences in body shape is part of ongoing research. However, the fact that antero-lateral rib expansion appears common to all ribs of Kebara 2, could suggest a systemic, biological factor with relations to body mass and overall body shape.

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Podium Presentation

Unrolled roots: topographic variation of the dentine thickness in Neandertal and modern human anterior teeth

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External root morphology globally reflects dietary adaptations as well as tooth use (e.g., Kovacs, 1971; Kupczik and Dean, 2008). For instance, hard-object feeders among primates have larger root surfaces than those feeding on mechanically less resistant objects (Kupczik and Dean, 2008). In *Homo*, differences in external mandibular molar root morphology (volume proportions, occurrence of pyramidal roots, metameric root surface area variation) observed among Neandertals, Late Pleistocene anatomically modern, and recent humans have been linked to distinct occlusal loading regimes (e.g., Kupczik and Hublin, 2010). However, the topographic variation in internal root structure of the anterior human dentition has not been precisely quantified and the differential biomechanical impact of distinct masticatory and paramasticatory activities remains to be evaluated. By using a high-resolution microtomographic record of Neandertal, European Upper Paleolithic (UP), and extant human incisors and canines, we applied morphometric mapping techniques to virtually unroll the tooth roots and to comparatively assess their (genetically- and/or functionally-related) variation in dentine thickness topography. More specifically, the analyses were run in order to evaluate if the recent pattern evolves in a predictable way through life and to comparatively assess the Neandertal, UP, and extant conditions. The investigated fossil sample includes deciduous teeth of the immature Neandertals from La Chaise Abri Suard and Roc de Marsal, in France, Engis and Spy, in Belgium, and of the UP specimens from Lagar Velho, in Portugal, Pataud and La Madeleine, in France, as well as the permanent lower incisors and canines of adult Neandertals from La Chaise and Regourdou, in France. After threshold-based segmentation and surface rendering, the dental roots have been virtually unzipped vertically along the middle of their lingual aspect and then unrolled (Bondioli et al., 2010). The region of interest has been restrained and represents the dentine thickness variation comprised between 50% and 85% (cervical) of the total root length. Preliminary results show an evolving pattern of dentine thickness distribution through life in extant humans. For the deciduous teeth, while broad similarities in the patterns of thickness distribution are found between the recent and the fossil samples, as well as among the fossil specimens represented in the analysis, in Neandertals the structural signatures are systematically accompanied by accentuated localized contrasts, notably towards the cemento-enamel junction. When compared to recent individuals of similar age at death, the Neandertal adults also show higher maximum thickness values. In the case of the right-handed Regourdou 1, it is noteworthy that its dentine thickness values are slightly higher on the right side. As supported also by differences in its molar wear pattern, the influence of differential mechanical loads on dentine thickness variation thus seems very likely. Differences in molar root extension rates between Neandertals and modern humans suggest that various developmental mechanisms likely act on root formation, finally leading to different root structures (Kupczik and Hublin, 2010). This may also be the case for the anterior dentition, even if no data are currently available on root extension rate in Neandertal anterior teeth.

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Poster Presentation

Locomotion-related patterns of cortico-trabecular bone organization beneath the tibial plateau in extant humans, *Pan*, and *Papio*: a 2-3D high-resolution analytical approach

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Within a developmentally and rheologically constrained setting, bone organization at hind limb articular sites locally reflects the nature, direction, frequency, and magnitude of locomotion-related biomechanical loads (Ruff, 2002). While some questions concerning the nature of the functional relationships between "container" and "contents" still remain unresolved (Shaw and Ryan, 2012), the characterization of local morphometric properties at selected articular sites of the human and nonhuman primate skeleton should allow the identification of distinct locomotion-related structural features and patterns. Microtomographic-based comparative investigation of the tibial plateau in humans, apes, and Old World monkeys has revealed a close relationship between bone thickness variation and locomotory patterns (Mazurier et al., 2010). More specifically, when scaled to the articular surface area, the human cortex is significantly thinner at both condyles. Given the potential implications for the assessment of postural-locomotory behaviours in fossil hominin taxa, here we test the possibility that some taxon-specific features in the structural organization of the cancellous network beneath the tibial plateau, reflecting functional differences in body weight transfer to the ground and in the dissipation of the stresses generated by the ground reaction force during locomotion, distinguish extant humans from *Pan* and *Papio*. In our exploratory study, we investigated 3 human, 2 chimp, and 2 baboon tibiae. Unfortunately, information for *Pan* and *Papio* about their original living environment (captive vs. wild) is not systematically available. The analyses were run on microtomographic records generated at the ESRF ID 17 beamline of Grenoble (45.5×45.5×43.6 μm voxel size) and the Univ. J. Goethe of Frankfurt (equip. Nanotom Phoenix, 18.3-22.5 μm isometric voxel size). We defined the cortico-trabecular complex (CTC) as the most dense bony area underlying the articular surface which includes the cortical shell and the adjoining portions of the supporting trabecular network (plate-like structures). Situated just beneath the CTC, the transitional T zone, which lies in discordance immediately above a layer formed by a finely structured and less dense network of interconnected/oriented trabeculae, consists of rather thick trabeculae, mostly parallel to the articular surface, forming a relatively dense network (Gosman and Ketcham, 2008). The structural organization and thickness variation of the Z complex, formed by CTC plus T, has been measured at regular intervals along various a-p and m-l sections. Beneath the Z complex of each condyle, the following textural properties have been assessed on standardized selected ROIs: mean trabecular thickness (Tb.Th.), % trabecular bone volume (BV/TV), and degree of anisotropy (DA). 3D analyses, including the isotropy index (I) the elongation index (E), trabecular spacing (Tb.Sp.), and bone surface area per unit volume (BS/TV), were also run on variably sized VOIs. Our preliminary results allow the identification of a modern human pattern characterized by a thinner CTC associated to an absolutely and relatively thicker T layer displaying a higher DA and higher Tb.Sp. values, notably beneath the medial condyle. Results from *Pan* and *Papio*, sharing a thicker shell, point to a much less contrasted structural arrangement between the two condyles. In no case, average Tb.Th. at this joint site distinguishes the three taxa.
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Podium Presentation

Upper Palaeolithic ritualistic cannibalism: Gough's Cave (Somerset, UK) from head to toe

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Evidence of prehistoric 'ritualistic cannibalism' is difficult to prove. Firstly, the exploitation of the human body for nutritional purposes needs to be demonstrated through osteological analyses, specifically the presence of cut-marks, percussion damage and human tooth-marks. However, whilst cut-marks on faunal remains are usually interpreted as a direct manifestation of butchery activities, cut-marks on human remains can be the product of ritual practices (such as defleshing, scalping, and trophy taking) without consumption of the body. Secondly, even when the modification on human remains have been shown to be related to cannibalism, the practice may not necessarily represent ritualistic behaviour, but rather the result of exceptional circumstances (e.g. survival during periods of starvation). Recent re-analysis of the Magdalenian human remains from Gough's Cave (Somerset, England, 14,700 cal BP) identified cut-marks, human tooth-marks and deliberate breakage on most of the post-cranial bones. The presence of tooth marks in particular, provides incontrovertible evidence for nutritional cannibalism. In contrast, the distribution of cut-marks and percussion features indicates that the skulls were modified to produce skull-cups (Bello et al. 2011). The absence of human tooth-marks on any of the cranial remains further supports the hypothesis for a distinctive ritualistic treatment of the skulls. We suggest that the combination of these two types of evidence unequivocally demonstrate the occurrence of cannibalism as part of a ritualistic practice within this population.

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Poster Presentation

Outline analyses of Neanderthal and modern human lower second deciduous molars

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Teeth are the most abundant hominin remains found in the fossil record, and hence numerous morphological and morphometric approaches have been developed for their description and analysis. Nevertheless, an outstanding imbalance characterizes the current state of the art in dental studies, where deciduous teeth have been poorly investigated compared to permanent dentition, and the study of heavily worn (or damaged) specimens is still very problematic. In fact, most of the computer-based methods currently in use are focused on permanent dentition and on unworn/slightly worn teeth, while only a few are based on deciduous teeth (i.e., Bayle et al., 2009a,b; 2010; Toussaint et al., 2010; Benazzi et al., 2011a,b; Zanolli et al., 2012) or deal with the issue of wear (i.e., Hillson et al., 2005; Benazzi et al., 2011a,b,c). In this study we address both issues by providing a taxonomic classification of Neanderthal and modern human lower second deciduous molars (dm2s) by analysing both crown and cervical outlines. Crown and cervical outlines were obtained from a three-dimensional (3D) digital sample of conveniently oriented dm2s. Both outlines were centered on the centroid of their area and represented by 16 pseudolandmarks obtained by equiangularly spaced radial vectors out of the centroid. We removed size information from the oriented and centered outlines with a uniform scaling of the pseudolandmark configurations to unit Centroid Size. Group shape variation was evaluated separately for the dm2 crown and cervical outlines through a shape–space principal component analysis (PCA). Finally, quadratic discriminant analysis (QDA) of a subset of principal components was used to classify the specimens. Our results demonstrate that both outlines successfully separate the two groups, with about 96% of the specimens correctly classified. Neanderthals showed a buccodistal expansion and convex lingual outline shape, whilst modern humans have buccodistal reduction and straight lingual outline shape. Therefore, we confirmed that the cervical outline represents a valid parameter for distinguishing between the two taxa when dealing with worn or damaged dm2s.
Acknowledgements: The authors would like to thank Priscilla Bayle and Jiří Svoboda for providing fossil and modern human specimens used in this work. We are grateful to the Portuguese Ministério da Cultura, the French Musée National de Préhistoire and the UMR 5199 Université Bordeaux 1. Access to the fossil specimens was made possible by the NESPOS (Neanderthal Studies Professional Online Service) Database 2011 (https://www.nespos.org/display/openspace/Home). We thank the Soprintendenza per i Beni Archeologici della Puglia which facilitated the excavation of Grotta Paglicci and Grotta del Cavallo over the years and encouraged the collaboration with the University of Siena for the study of the archaeological remains. We thank Caterina Minghetti for the surface scan of Paglicci dental sample. We acknowledge the Vienna micro-CT Lab (University of Vienna, Austria) where most of the μCT were performed, and the Laboratory of Anthropology of the Department of History and Methods for the Conservation of Cultural Heritage (University of Bologna, Italy) for providing the white-light scanning system ScanProbe ST. This work was supported by NSF 01-120 Hominid Grant 2007 and A.E.R.S. Dental Medicine Organisations GmbH, FA547013.

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Poster Presentation

Adaptation to Arctic climate in the native populations of North-East Asia: comparing body morphology and craniometric data

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The native population of the Chukchi Peninsula have lived in relative isolation in a very harsh environment from II-I millennia BC (Dikov, 1977) and have evolved a stable morpho-functional complex (Alekseeva et al., 2008). We assessed variability of a set of anthropometric characteristics in a sample of 170 male Chukchi and 58 Siberian Inuit aged between 18 and 59 years. The data were collected between 1970 and 1982 during expeditions led by V.P. and T.I. Alekseev. Our results have confirmed the traits attributed to an "arctic adaptive type" (Alekseeva, 1986) but have also provided some new insights. Both groups have high body mass, low stature, large circumferences and decreased skin fold thickness. They have a massive build, particularly in the upper part of the body, with a large cylindrical ribcage, large volume of the medullary cavities and a relatively thin compact layer in the long bones. Thus, there is a well-defined complex of skeletal features likely having an adaptive value. It is believed that the complex has formed due to specific respiratory needs: because of "Arctic hypoxia" both the bloodstream velocity and respiratory muscle tonus are increased. Change in size and shape of the ribcage might have been a consequence. Compared to populations from temperate climate zones, the degree of variation of anthropometric characteristics is decreased. In Siberian Inuit relative to Chuchki, this complex of adaptive features is more pronounced and there is even less variation, demonstrating a kind of "extreme" of Arctic adaptation. There are differences in body morphology between the samples depending on the how extreme the environment. In areas with milder conditions there is a decrease in body fat percentage, shoulder and buttock circumferences and chest index. Previous researches have demonstrated that among Arctic groups increasing environmental harshness is correlated with increases in head and face sizes, widening of the ribcage, decrease in stature and body fat percentage, changes in a number of physiological parameters. The very specific craniofacial morphology of Siberian Inuit already existed at the turn of the Common Era (Debets, 1975). One of the features contrasting them with continental Siberian groups is narrow piriform aperture. It has been demonstrated that this feature likely has an adaptive value (Wolpoff, 1968; Harvati, Weaver, 2006). A study by of one of the co-authors (AE) showed that Siberian Inuit share with other Northern Siberian groups the general pattern of a cold-adapted facial skeleton. But Inuit show significant narrowing of the anterior nasal cavity and nasal aperture. These morphological features are significantly correlated with increased precipitation during the winter months. Both narrowing-lengthening of the nasal cavity and narrowing of the piriform aperture lead to increase in turbulence of air inflow, slowing the airstream and it in turn increasing loading experienced by the respiratory muscles (Churchill et al., 2004). These two features are strongly pronounced in Siberian Inuit and, taking into account low oxygen partial pressure we suggest that the large size and peculiar shape of Inuit ribcages are to some extent related to the highly derived upper airway morphology.

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Poster Presentation

Evidence of neutral microevolution of human pelvic shape after the expansion out of Africa

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In recent years, the application of population genetic models to human cranial and dental morphometric traits has revealed a strong neutral component of global variation, related to evolutionary processes such as migration, expansion, and random genetic drift. In particular, cranial within-population variation has been shown to reflect the expansion of our species out of Africa, mirroring the decrease in population genetic diversity observed with increasing distance from our continent of origin. This distinctive pattern has been explained as the signature of the serial founder events that accompanied the expansion of *Homo sapiens* around the globe. Moreover, craniometric distance between populations has been shown to reflect neutral genetic distance, following an Isolation-by-Distance model. The results of these studies have been important for interpreting the significance of phenotypic variation between current and extinct human populations. While cranial variation can be largely explained by neutral processes, the post-cranial skeleton has frequently been considered to have been under strong selective pressures, as well as affected by plastic reactions to environmental conditions. Such assumptions have influenced the interpretation of postcranial differences in extant and extinct hominins. In this study, the preservation of neutral demographic patterns has been tested on the shape of the human os coxae explicitly. The pelvic region has often been described as under strong evolutionary constraints, due to the conflicting pressures for efficient bipedal locomotion and obstetrical requirements. In addition, climatic selection has been explicitly related to differences in pelvic form between populations from different climatic regions. Here, the shape of the innominate bone was defined by a series of 27 3D landmarks. The preservation of a signature of past population history and the presence of a neutral pattern of global variance apportionment were tested at a global level using a large female and male dataset (total n = 1433) representing 27 populations. The results showed a strong Out-of-Africa signal in pelvic within-population variation, and a pattern of variance apportionment very similar to neutral genetic markers and cranial morphometric traits. The preservation of neutral demographic patterns at a global level, and their importance in explaining pelvic variation in modern populations requires that neutral signatures be taken into consideration before interpreting pelvic shape differences as the effect of differential selective pressures or plasticity.

Poster Presentation

Neanderthal in Malthusian demographic trap

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Increasingly detailed reconstitutions of climate, layering multiple sequences of variations that range from very long to short periods (Sanchez-Goñi et al. 2008), and their connections to the Neanderthal population through geographically distributed primary and secondary biomass, raise new questions. It is as if the last 10,000 years of the Holocene, during which the *Homo sapiens sapiens* metapopulation will reach 9 billion people, were a temperate niche of stability, as the latest similar niches date back to IOS5 (Eemian: 114-130 ka) and IOS11 (core: 400-420 ka) (See also Richerson, Boyd and Bettinger 2009). Except in these three temperate niches outside the Mediterranean zone, the vegetation was mainly cold steppe tundra and regularly devastated by what would now be akin to catastrophic DO and H climate events. It can be hypothesized that the demography of the Neanderthal metapopulation, living under conditions where extreme environmental instability with short periods was the norm, was primarily stagnant, with frequent bottlenecks and episodes of decline. This demographic instability of a metapopulation that was small on average, and the variation of its geographical area of expansion and fragmentation, should help to understand why it stagnated technologically (Bocquet-Appel and Tuffreau 2009) and probably also socially (see the array of Hayden 2012), spending most of its evolutionary time mouldering in the depths of a Malthusian demographic trap.

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Poster Presentation

The Mid Pleistocene and early middle Palaeolithic site of Tourville-la-Rivière (Seine-Maritime, France): preliminary micro wear use analysis and first results

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Despite a very presence of a white patina in the entire lithic collection from the site of Tourville-la-Rivière, those artefacts are surprisingly fresh. Thus, under the good state condition of the lithic industry, a preliminary functional analysis was conducted on a sample of 25 artefacts, representing the lithic composition of the site. Two important facts emerged from those preliminary observations. The first one is the good state of conservation of the lithic assemblage. Indeed, the lack of post-depositional alteration reflects the very good conservation of the artefacts and witnesses the fact that those artefacts were not the subject of any fluvial action or of important post-depositional alterations. The second highlight is on the use of the lithic artefacts. The observations at low and high magnification allowed to show, on a dozen artefacts, different kind of macro traces of wear depending on the types of products in presence (blades, flakes, retouched tools or not,...) If, in the current state of research, it is pretty hard to know precisely the different kind of activities dealt on the archaeological site, this preliminary functional study demonstrates the use of the artefacts and supports the hypothesis of attendance and exploitation of the resource site by human groups.

Poster Presentation

Our quadrupedal origin recorded in the three-dimensional orientation of the hip joint

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Humans are characterized by a permanent bipedalism which entails a decrease of the base of support and a rise of the body centre of mass, both implying a loss of stability. To ensure a stable equilibrium configuration the skeleton of our ancestors was modified over the course of evolution in response to the constraints imposed by gravity. In this study we examine the evolution of the coxo-femoral joint which is the functional interface transmitting forces between the trunk and lower limbs. Using three-dimensional methods (Bonneau et al., 2012; Bonneau et al., submitted), variation in the three-dimensional orientations of both the acetabulum and the femoral neck in adult humans were quantified. Additionally, patterns of co-variation between these two orientations were analysed in order to evaluate the degree of morphological integration at the hip joint. A sample of 91 femora and 99 hip bones were used for this study. Results were interpreted using three-dimensional models of both the acetabular region, and the proximal femur. Our results show no significant patterns of co-variation between the three-dimensional orientation of the femoral neck and the orientation of the acetabulum. In addition, the mean orientations of the two opposing articulating components demonstrated a poor congruity in the normal joint. We suggest that this absence of co-variation and this poor congruity may be partly due to the phylogenetic history of the human species. Although natural selection optimizes performance of the human hip joint in function of locomotion, the adaptation is also dependent on, first, the constraints of the inherited structure and, second, the trade-off with other functions. To better understand the evolution of the human hip joint and the constraints acting thereupon, we are expanding our study on an extended sample of Hominoids. Interestingly, the best congruity in all the studied genera, i.e. *Homo*, *Pan*, *Gorilla* and *Pongo*, was obtained in a quadrupedal posture further suggesting that the shape of the human hip joint is constrained by its quadrupedal ancestry.

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Podium Presentation

Recent research into the North African Middle Stone Age in Morocco

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One of the debated issues in human evolutionary research concerns the African origins and dispersal of *Homo sapiens*. Until recently, Northwest Africa has been a much neglected region despite the occurrence of early *Homo sapiens* with the "Middle Palaeolithic" finds. In this region, several sites contain stratified sequences with exceptionally well preserved organic remains offering rich sources of multi-proxy data for palaeoenvironmental and chronological studies. The Northwest Africa is of key interest in the understanding of human evolution and behavioural development. Amongst the best evidence for early expansion of Aterian people in the Mediterranean is in Morocco, where sites abound of "Middle Palaeolithic" and "Upper Palaeolithic", ca. 10,000 to more than 160,000 yr ago. Unlike Europe, these cultural phases appeared to have occurred exclusively within *Homo sapiens* populations. Another distinctive characteristic is the abundance of symbolic artifacts and other behavioral indicators of cultural modernity that appear within the North African Middle Stone Age context. Significant uncertainty remains on the nature, timing, and associated paleoenvironments with cultural differentiation of the North African Middle Stone Age. Another area for discussion concerns the whole question of the term "Middle Palaeolithic". We believe that our combined knowledge and efforts in archaeology, geology, geochronology and palaeoenvironments will yield a new and robust record of the North African Middle Stone Age. In consequence, it is now clear that this technology has now come under renewed challenge after recent studies of finds from various sites in Morocco and it is urgently in need of review and redefinition. This paper provides an overview of new fieldwork on the North African Middle Stone Age in Morocco, and it concerns some of the survey and excavation work undertaken in some key sites like Taforalt and Dar es Soltane 1.

Poster Presentation

Understanding technological variability during the Gravettian in Northern Spain

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This paper introduces key data from a technological study of heterogenic Gravettian lithic assemblages from cave sites located between the regions of Asturias and Catalonia. Comparing and interpret the assemblages of these caves hold both advantages and disadvantages. In providing permanent shelter under a constant location factor, they serve as permanent post-depositional containers, but are also under constant external influences (e.g. rock fall, human movement, etc.), hiding number of untraceable Palimpsests or show only a redundant functional and/or seasonal use. (cf. Strauss 1979). The different dates of excavation (1920´s – 21st century) introduce additional problems, since the quality of excavation techniques changed considerably over time. With regard to the resulting differences in information quality concerning site formation processes, selection and preservation of artifacts, and others, a comparison of these inventories was from the beginning plagued with imponderability's. To overcome this problem, a detailed technological study of the chaîne opératoire (cf. Bar- Yosef & van Peer 2009) was conducted for each assemblage. Here, a major attempt was to create an analysis system to study operational sequences of the present tool types (e.g. Dibble 1984). Following the idea of a "stratigraphic" analysis of dorsal scar patterns on lithic artifacts (Boëda 1986) and the analysis of "operational chains" (Arbeitsschrittanalyse) (Weißmüller 1995, Richter 1997, Pastoors 2000) in order to reconstruct the internal history of surface shaped pieces, the proposed analysis system documents all visible modifications in hierarchical order. The method thus considers the principle of the so-called "frisson effect" (Jelinek 1976) which describes the flexibility of lithic systems within which every piece might be continuously re-modified, resulting in an ever-changing morphology during the process of use and rejuvenation (Roland & Dibble 1990). This view rejects the simple idea of target products which can be counted and statistically compared to reconstruct their stylistic or functional significance. The aim of the method is to detect specific modification sequences which can be encoded and used for statistical analysis. The outcome can then be counterchecked with the results of the traditional (and sometimes problematic) typological analysis (e.g. Clark & Riel- Salvatore 2005). In doing so, the common tool types are fractionated into their single modification stages. A Noailles burin, for instance, is documented as "truncation- lateral retouch- burin". To better understand the level of in-depth planning, e.g. to determine whether the truncation on a Noailles burin was only retouched to serve as the burin platform or whether it was in use before, the presence or absence of macroscopic use-wear was also documented for every modification. The preliminary results of this analysis show an altered picture as drawn from the classical typological comparison and highlight the variability, but also unexpected similarities between these assemblages. The presented analytical system might expand our understanding of the relationship between modification sequences, palaeolithic activities and site use even for the specialized Upper Palaeolithic toolkit. It thereby helps to reconstruct and compare the process of settlement activity, also when dealing with possible palimpsests, differences in artifact preservation or in the quality of available information.

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Podium Presentation

The bigger picture – a (mega)faunal approach to the site of Bilzingsleben

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Bilzingsleben (Thuringia/Germany) is one of the largest and best preserved Lower Palaeolithic sites in Europe. The publication of engraved bones, interpreted as early artwork, settlement structures including huts, hearths, bone and stone tools and an artificial pavement made Bilzingsleben famous (e.g. Mania 1997). However, those interpretations have been challenged by various scientists (most recently Müller and Pasda 2011). Late excavations suggest that the site was formed by natural processes (Beck et al. 2007). The key question at Bilzingsleben is therefore whether humans or natural processes were the main agents of site formation and to what extend humans where active at the site. The debate has to date mainly been based on arguments from lithic and geological studies. However, there are also several tons of faunal material that have never been analyzed zooarchaeologically before. This fauna plays an important role for the understanding of the whole complex and it is essential that this find category is included in the debate. Faunal analysis can give deeper insights into natural agents active at the site, but also indications for the presence of humans and their behavior. Bilzingsleben has been excavated since 1969 and yielded several human cranial remains as well as a great amount of faunal and lithic material. A large number of different animal species are known from the site, many of them typical for interglacial habitats. This talk presents the results of the analysis of the megafauna, the most important and abundant category of animals from Bilzingsleben. More than 6000 remains from *Elephas antiquus*, *Stephanorhinus kirchbergensis/hemitoechus* and *Bos/Bovis* were analyzed using zooarchaeological, taphonomic and archaeological methods. In order to exclude the possibility that certain processes only influenced smaller animals, all *Ursus* sp. remains were studied as a control group. The analysis of the fauna yielded several results. It became obvious, that human influence can indeed be seen at the site, however not to the extent previously believed. A small number of cut marks and other traces of bone modification induced by humans clearly indicate that. Apart from humans, carnivores played a major role. Bite marks are abundant. Large amounts of solitary living animals suggest that the site developed over a longer period of time than previously thought. No clear indications for settlement structures could be found in the dispersal of the fauna. Moreover, the frequencies of skeletal elements suggest that the animals were not brought into the site by humans but rather died of natural causes. These results indicate that Bilzingsleben was not a Lower Palaeolithic base camp but a natural water's edge location, which was influenced by different agents, including, but not limited to, humans.

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Poster Presentation

Frontal sinuses in Pleistocene hominins

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Homo heidelbergensis (here recognised as present in Europe and Africa) and *H. neanderthalensis* are reported to have distinctive paranasal sinuses; with increased lateral extension of frontal sinuses in *H. heidelbergensis* being one of very few hypothesized unique traits of this controversial taxon. Neanderthal frontal sinuses are also said to differ in height from those of *H. sapiens*. Investigating these assertions could illuminate the causes of craniofacial variation and clarify the alpha taxonomy of these taxa. The volume, extent and shape of the frontal sinuses were analysed in *H. heidelbergensis*, H. *neanderthalensis*, fossil *H. sapiens* and recent *H. sapiens*. Using CT data, virtual 3D reconstructions of crania were created, the frontal sinuses were segmented out and the volumes measured. 2D orthographic projections of the virtual reconstructions were used to measure sinus height and width relative to craniometric landmarks. The outline shape of frontal sinuses was captured using the same 2D projections and analysed using 2D semilandmarks and geometric morphometric methods. Data were analysed using PCA, modelling and non-parametric statistics. It was found that *H. heidelbergensis* has significantly larger relative frontal sinus volumes than any other group. There is a significant difference between sinus heights in different groups: *H. heidelbergensis* measurements are significantly greater than all other groups and *H. neanderthalensis* is larger than recent, but not fossil, *H. sapiens*. There is a significant positive correlation between orbital width (a proxy for cranial size) and standardised sinus height. Frontal sinus outline shape does not distinguish well between groups; the only separation found was between 2 groups of recent *H. sapiens*. The shape difference separating these groups appears to be related to measures of sinus and orbit size, but not population affiliation or cranial size. These results show that *H. heidelbergensis* has a hyperpneumatised frontal sinus. This may help to explain craniofacial form (or vice versa) and could prove a useful diagnostic character for this disputed taxon. Contrary to suggestions from previous research, Neanderthals sinuses do not differ from *H. sapiens* in frontal sinus height; therefore this is not a contributing factor in craniofacial differences between these two species. The results on sinus height suggest that cranial size is a factor in determining sinus extent; the relationship between shape changes and orbital width suggests that orbital growth may affect sinus development by shaping the area available for the sinus to expand into. These findings show a relationship between cranial form and sinus form, often assumed but not yet been adequately demonstrated, which supports the spandrel theory of sinus function. Outline shape does not differentiate successfully between taxa. The potential of using other sinus measurements, such as surface area and 3D landmark geometric morphometric methods, must be explored to test other possible correlates of sinus form and to determine whether paranasal sinuses can be used to differentiate between taxa.
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Podium Presentation

Bovid mortality profiles and early hominin meat-foraging capabilities at Olduvai Gorge, Tanzania

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Paleoanthropologists seeking to reconstruct the meat-foraging capabilities of early Pleistocene *Homo* have for the past several decades relied on two principal classes of evidence: bone surface modifications and skeletal element profiles. Bone surface modifications reveal some aspects of what happened to large mammal fossils at early archaeological sites from butchery by tool-using hominins, from carnivore feeding, and from other taphonomic processes. Skeletal element profiles indicate whether the nutritionally-best elements or lesser carcass parts were available, and based on abundance and proportions, whether bones accumulated in situ or from intentional, repeated transport to preferred locations. Debates over the behavioral meaning of particular archaeological patterns has inspired considerable actualistic research to establish cause and effect relationships with greater clarity, but lingering arguments of equifinality still yield interpretive impasse on aspects of hominin meat-foraging capabilities. A few researchers still allege that early *Homo* achieved no more than marginal passive scavenging of felid-killed carcass remnants, but there is now compelling evidence of much more sophisticated meat-foraging behavior by early *Homo*, including selective ambush hunting. We add a third, decisive class of evidence - mortality profiles of butchered prey animals from our studies of early Pleistocene African sites - to effectively falsify any remnants of passive scavenging hypotheses. One aspect of our team's current research at Olduvai Gorge involves expanded excavations of key Bed I/II sites dating from 1.85-1.2 Ma, to increase dental samples for combined mortality analysis with assemblages from the Leakey's prior work. We have documented age at death of diverse fossil mammals at each site using tooth eruption and occlusal wear and grouped those data into a percentage of juveniles, prime adults, and old adults at each site for plotting and analysis on modified triangular graphs. We develop testable hypotheses for different scavenging and hunting reconstructions for testing with mortality data. The FLK Zinj site, 1.84 Ma, provides the largest and most anthropogenic site known from Olduvai (possibly excepting BK). To test the passive scavenging hypothesis, or any scavenging hypothesis, we argue: If early *Homo* scavenged from felid kills, specifically of lions and leopards, then mortality profiles at FLK Zinj should match what lions and leopards are known to kill based on modern research. Our results, however, reveal statistically significant differences between the mortality profiles of smaller and larger bovid mortality profiles at FLK Zinj and the profiles of modern leopard and lion prey, respectively. Unlike leopard prey, smaller bovids at FLK Zinj are predominantly old adult males. Unlike lion prey, larger bovids at FLK Zinj are predominantly prime adults. This falsifies scavenging as a viable explanation at FLK Zinj. For larger bovids, the prime adult-dominated pattern is also inconsistent with first-access scavenging of natural, non-carnivore deaths, and with endurance running hunting. That leaves selective ambush hunting by early *Homo* as the most reasonable working hypothesis.

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Poster Presentation

Archaeological context of two cases of penetrating wounds of Upper Paleolithic persons from Sunghir, Russia

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The Upper Paleolithic Sunghir site is located near town Vladimir in northern European Russia. The settlement was discovered in 1955 by chance of works in brick plant clay quarry. For 16 field seasons an archaeological expedition successfully worked under the leadership of professor Otto Bader. The Sunghir site is characterized by an original flint assemblage with double-sided flat retouch triangle points. The closest analogous stone industry was discovered at the sites of Kostenki archaeological culture (Don River, southern Russia). Four burials in all were discovered at the settlement area. Two of them of the old adult (S1) and two immature individuals (S2 and S3) are from the most elaborate Paleolithic "red ochre" burials. There were different kinds of bracelets and rings, thousands of ivory beads in both burials. The position of the beads shows that they were the part of elements of the clothing. The bodies of children were joined by spears of straightened ivory. Near the left arm of juvenile of S2 was the ochre-filled femoral diaphysis of an adult human (S4). The latest direct AMS radiocarbon dates of the S1 and S3 using ultrafiltration sample preparation, provide ages of 27,050 ± 210 (KIA-27006) and 26,000 ± 410 (KIA-27007) 14C BP (Dobrovolskaya et al., 2011); and the method, using single amino acid radiocarbon dating of the S2 and S3, provides ages of 30,100 ± 550 (OxX-2395-6 and OxX-2395-7) 14C BP (Marom et al., 2012). Reanalysis of the skeletal remains of S1 and S2 by digital X-ray microfocus machine and micro-CT revealed perimortem trauma lesions. The adult male has a perimortem incision in the ventral-lateral first thoracic vertebra body (Trinkaus, Buzhilova, 2011). On the surface it is 10 mm long and about 2 mm wide. Under X-ray microfocus imaging and micro-CT scanning of the vertebra, there is no sign of trabecular rounding. The injury is at least 7 mm long in deep of the body vertebra, so it is a result of most likely lesions from a sharp blade or point tool. There is no indication of perimortem damage to other preserved bones. The anatomically position of vertebra lesion testify that besides wounding of fit muscles, weapon possible impinged on the internal jugular vein and/or the common carotid artery. Damage of an even minor incision into one or both of these blood vessels would be fatal. The early adolescent S2 has a possible perimortem lesion in the left ilium bone (Buzhilova, 2005). It is oval hole (about 10 mm long and 20 mm wide) on the anterior surface with additional postmortem defects. There are several cracks through the internal and external cortical bone, which converge on a hole. Under X-ray microfocus imaging there is no sign of sclerotisation. Context indicates possible perimortem trauma by prick tool. Like in the first case the wound would be fatal in result of rapid loss of the blood. Archaeological context of both burials indicates that the traumas were most likely from an one time accident or the result of ritual activity.

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Poster Presentation

The great fossil mine of the southern North Sea; exploring the potential of submerged Palaeolithic archaeology through forgotten finds

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The archaeological significance of now-submerged Palaeolithic landscapes has been recognised explicitly since the early twentieth century (Reid 1913; Clarke 1936), and yet the move from discussing the potential of these areas to actually engaging with the physical record is still only in its infancy. Recent advances in geophysical technologies have certainly played an integral role in the beginnings of this engagement, but the driving force behind the interest in these early landscapes is diverse. Commercial involvement has largely been instigated by serendipitous finds of features, deposits or artefacts (eg. Dix and Sturt 2011; Russell and Tizzard 2011) with academic interest sparked by the discovery of early Palaeolithic archaeological sites in the foreshore deposits along the East Anglian coastline (Parfitt et al 2005, 2010), as well as significant finds from the Dutch portion of the North Sea (Hublin et al 2009). However, regardless of the impetus, an extremely important aspect of these finds lies in their ability to falsify the assumption that successive trans- and regressions over these landscapes would have been entirely destructive to the Palaeolithic record. The exclusion of these offshore areas hinders our interpretations of early hominin life-ways, specifically the early migrations, occupation patterns and environmental preferences that are hinted at by the tantalising finds of Happisburgh 3 and Pakefield (Parfitt et al 2005, 2010). Terrestrial methods for interrogating derived lithic material from river terraces have been developed in recent years, which have had a significant impact on our understanding of hominin landscape use and occupation patterns (Hosfield and Chambers 2004; Ashton and Lewis 2002). Yet despite a stimulating discussion of the opportunities that these methods present offshore (Hosfield 2007), the fundamentals of this terrestrial work have yet to be applied. Can we therefore begin to utilise the prolific, derived record from the offshore zone to aid our interpretations of these landscapes and enhance the highly fragmentary terrestrial record, potentially providing information on non-analogous environments and allowing insight into early coastal interactions? Concentrating on the early Palaeolithic resource of the southern North Sea, this research aims to do two main things: · Firstly, collate and analyse the distribution of the vast, predominantly 19th century, trawled faunal resource from this area, as well as lithics from beach locations, using historical documents to acquire as much locational information as possible. · Secondly, through an investigation of emerging patterns in this data, define the potential of this resource to answer questions about early Palaeolithic hominins and their associated landscapes. Results from the patterning of the trawled faunal material show significant spatio-temporal trends, indicating areas of Palaeolithic potential on the seabed and implying that these faunal remains can yield vital information regarding these submerged areas. This poster will present these results and discuss their implications, applications and the various methods through which this research is being advanced.

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Poster Presentation

Gone with the wind. The Acheulean/MSA transition viewed from SW Libya (Central Sahara)

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The patchy Acheulean/MSA transition in North Africa is placed around 200 ka after the evidence from the Nile valley, some 80 ka later than Central and East Africa (Van Peer et al., 2003; Van Peer, 2004), consequence of MIS 7 population dispersals favored by successful adaptations to rapidly changing environments (Van Peer et al., 2008). Fine grained data on Acheulean/MSA transition from SW Libya are so far lacking. Here, two different archaeological data sets are currently available: two stratified MSA/Aterian sites and hundreds of surface lithic scatters rarely associated with palaeoenvironmental proxies (Cancellieri et al., in press). Nevertheless, the large scale research approach adopted since the early nineties (Cremaschi and di Lernia, 1998; Anag et al., 2002; Anag et al., 2007), recently improved by extensive surface surveys in the Messak (Gallinaro et al., 2012; Cancellieri and di Lernia, in press) helped to gain at least a cloudy glimpse of population dynamics of the late Mid/Late Pleistocene. This contribution presents a review of the current evidence, especially the one related to the Acheulean occupation, and provides the results of new analyses building on data collected during the most recent field seasons, aimed at the recognition of techno-typological variability within groups of surface assemblages, arbitrarily defined on the presence/absence/co-occurrence of hand-axes and Levallois artefacts. Globally speaking, Acheulean is well attested in the whole study area. Robust, intensely worn hand-axes, non-Levallois predetermination criteria and a "Large Flake" component, point to the existence of an early phase, but these elements are still scanty and sparsely recognized. Later Acheulean assemblages are more represented. Flat symmetrical bifaces and extensive use of Levallois technology are the main distinguishing features. Most of the Acheulean data suggest a somewhat reliance on extractive activities within possibly MIS 7 productive environments. Site distribution is capillary also in the sand seas, where a severe reduction of generalized MSA and Aterian contexts is strikingly evident. This trend can be related to progressive decreasing humidity through the Quaternary interglacials (Geyh and Thiedig, 2008), which could have increasingly modified the environmental productivity of areas once able to carry a diffuse Acheulean frequentation, more tied to riverine environments. It is within the chronological and palaeoenvironmental framework of the end of the Middle Pleistocene that pioneering movements from south-eastern regions can be cautiously inferred. The most likely actors of these dispersals were early modern humans equipped with complex "composite tool" technologies, present in the MSA from its very beginning (Barham, 2002). In particular, sparse MIS 6/5 early MSA frequentation is assumed after techno-typological similarities with sub-Saharan contexts, namely, Nubian Levallois, foliates and backed pieces (Cancellieri and di Lernia, in press).

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Podium Presentation

Earliest Porotic Hyperostosis on a 1.5-Million-Year-Old Hominin (Olduvai Gorge, Tanzania) and its Bearing on Meat Consumption by Early Humans

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Meat-eating was an important factor affecting early hominin brain expansion, social organization and geographic movement. Stone tool butchery marks on ungulate fossils in several African archaeological assemblages demonstrate a significant level of carnivory by Pleistocene hominins, but the discovery at Olduvai Gorge of a child's pathological cranial fragments indicates that some hominins probably experienced scarcity of animal foods during various stages of their life histories. The child's parietal fragments, excavated from 1.5-million-year-old sediments at SHK (Bed II) , show porotic hyperostosis, a pathology associated with anemia. Nutritional deficiencies, including anemia, are most common at weaning, when children lose passive immunity received through their mothers' milk. Our results indicate that the developmentally disruptive potential of weaning reached far beyond sedentary Holocene food-producing societies and into the early Pleistocene. This discovery also shows that by 1.5 Ma, hominins (probably within the *Homo* lineage) had already developed a physiology adapted to the regular intake of meat and that lack of its consumption led to pathological disorders. This interpretation will be presented in conjunction with an updated summary of taphonomic evidence for the consumption of bulk meat and primary access to small and medium-sized carcasses by hominins.

Poster Presentation

Lithic Assemblages Variability Of Middle Paleolithic In The Guadalquivir River Valley (Southern Spain) During Upper Pleistocene

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The industries of Middle Paleolithic in Guadalquivir River valley (South of Spain) are found in archaeological sites, which are in the next geomorphological units: in alluvial sediments (terraces and floodplains), sediments which fill karst or diaclases, colluvial and colluvial-alluvial deposits, lacustrine-palustrine sediments and, finally, edaphic horizons and soils (Caro Gómez, 1993; Caro Gómez et al., 2004; Díaz del Olmo et al., 1997; Vallespí et al., 2007). These are industries knapped in alluvial pebbles made mainly in two raw materials: quarzite (from the Sierra Morena Paleozoic) and flint (from the Subbetic Mesozoic). Stream network by the left Guadalquivir River basin, near Seville, dissect the Guadalquivir terraces (Corbones River) or link its terraces with Guadalquivir's (Guadaíra River). In the Pleistocene Sequence Guadalquivir (PSG) the Middle Paleolithic industries are from high, middle and lower terraces complex (T8, T9, T10, T11, T12 and T13). In Tarazona archaeological site (TAR T11) transit from Early Paleolithic to Middle Paleolithic occur between late Middle Pleistocene and beginning Upper Pleistocene (MIS 6/MIS 5)(>129 ky and <104 ky, OSL) (Caro et al., 2011). The aim of this paper is to analyze the lithic assemblages of Middle Paleolithic, specifically those ones of Upper Pleistocene from Guadalquivir and Guadaíra Rivers terraces. The results obtained show two industry series, with two different chronologies, which go from MIS5 to MIS3: 1) Lithic assemblages in quartzite with major predominance of notches and denticulates and absence of bifacial tools (>110 ky) (levels 4 and 5, TARIII; level 4, PIONNER J.A.). 2) Lithic assemblages of high diversity of tools on flake, with a Levallois technology weakly developed and a presence of bifacial tools (<110 ky) (level 1, TARII; level 3.3, SALTILLO; SANTISTEBAN CRACK), all these in quartzite and flint (in lacustrine-palustrine sediments) or in flint (in karst fillings). SEM analysis of characters of the industries on quartzite flakes, fluvial unrounded (R0), shows a few marked use-wear polishes and, frequently, with mechanical retouches superimposed onto those because of knapping or cracks from one same use (TAR3-89).

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Poster Presentation

Concretization and improvement of bifacial pieces in Lower and Early Middle Pleistocene. Contribution of the techno-evolutionary approach applied to Kokiselei 4 and Isenya sites in East Africa

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The evolutive nature of the bifacial phenomenon in Lower and Middle Pleistocene has been recognized since the 1930s. Cultural attributions such as « Abbevillian », « Early Acheulean », « Middle Acheulean » or « Upper Acheulean » have been widely accepted and used until today. However, this succession of « stages » is most of the time explained by morphological, metrical or aesthetic criteria: « handaxes » become thinner, more symmetric or even more « beautiful ». The current arguments are rarely technical, even though the lithic artifacts are tools. In the 1990s, some prehistorians used ideas from philosophy of technology which dealt, in the middle of last century, with the problem of technical evolution and its inherent laws. Specifically, the « law of concretization », demonstrated by G. Simondon (1958) for modern objects, refers to an increase, over time, of the synergy between the different components of a tool or a machine. Thus, unelaborated objects, also called « abstract objects », and elaborated objects, called « concrete objects », can be recognized. As regards Paleolithic, relevant technical criteria were searched to discuss technical evolution: on lithic pieces, a distinction has been proposed between transformative (or active) parts, in touch with the material to work, and prehensive parts, maintained by the user (Lepot, 1993; Boëda, 1997, 2005; Soriano, 2001). This global approach of tools – functional and productional – allows to define the structural link between the different parts and to assign a degree of elaboration to tool types: more or less « abstract », more or less « concrete ». This method was applied to East African Lower and Early Middle Pleistocene lithic assemblages, especially those of Kokiselei 4 and Isenya (Kenya). The results demonstrate a phenomenon of concretization, over a long period of time, and highlight the relevance and usefulness of the « simondonian » vision for the earliest periods. This new light, techno-evolutionary one, shed on the Lower Paleolithic tools allows to consider new perspectives for understanding the industries with shaped pieces.

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Poster Presentation

Population dynamics in the Late Glacial refugium of Southwest France

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The onset of the Last Glacial Maximum led to abandonment of northern latitudes and contraction of human populations into several refuge zones. Focusing on the Southwest France refugium we use radiocarbon dates and lithic data as proxy measures for population density and innovation respectively. The links between demographic density and human cultural innovation are subsequently explored. This paper presents the final results of my PhD thesis, in which the relationship between population density and cultural innovation is supported.
Acknowledgements: Andrew Chamberlain, Matt Grove, Pierre-Yves Demars

Poster Presentation

New Mousterian neonates from the South-West of France (Saint-Césaire, Charente-Maritime)

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The archaeological site of Saint-Césaire in Charente-Maritime, France, is well-known for the discovery in 1979 of a Neandertal adult skeleton in a Chatelperronian layer (Ejop sup ; Lévêque and Vandermeersch, 1980) and the debate about its stratigraphic position (Lévêque and Vandermeersch, 1981 ; Bordes, 1981 ; see also Bar-Yosef and Bordes, 2010). Here we present new human neonate remains from the base of the stratigraphy. They were found in the Egc level of Saint-Césaire which delivered a Mousterian of Acheulean tradition industry (Lévêque and al., 1993). The new remains were found in the site's faunal collection in 2001 and 2002 (non-coordinated pieces), more than 15 years after the end of the excavations. 114 human bones fragments and two dental germs representing at least two neonates have been isolated. Some of them are almost complete, thus indicating that before their delayed discovery, individuals were possibly well preserved. The newborns' external morphological features and metrics have been compared to samples of Neandertals and modern humans of similar age at death. Also, the petrous bone, dental germs, and long bones have been imaged using high-resolution microtomography (µCT) at the MRI platform, France (Skyscan 1076 X-ray micro-tomograph). Scans were performed according to the following parameters: 89 kV, 112 µA current, and a projection every 0.3°. The final volumes were reconstructed with isotropic voxel sizes of 17.93 μm^3 (dental germs and long bones) and 35.84 μm^3 (petrous bone) using the software NRecon v.1.6.5.2 (Skyscan). Semi-automatic threshold-based segmentation with manual corrections of the inner ear, enamel, and dentine was conducted using Avizo v.7 (VSG), and surface rendering was performed using triangulation and constrained smoothing from the volumetric data. Also, a 3D map of the topographic distribution of enamel thickness was derived from the segmented enamel and dentine components. The combination of dental traits, particularly the 3D enamel thickness topographic variation, and the external and internal morphology of the postcranial elements allow us to attribute the human remains to the Neandertal taxon. Furthermore, the morphometric analysis of the 3D virtual reconstruction of the bony labyrinth of the inner ear indicates that the specimen is included in the Neandertal variation (Spoor and Zonneveld, 1995, 1998 ; Spoor and al., 2003). The spatial data and taphonomic observations show that these human remains come from two different areas in the site. We hope that further studies of the faunal and lithic materials of the Egc level will provide more details on the spatial repartition of the basal Mousterian archaeological remains. These findings enlarge the small sample of Neandertal neonates and thus document our knowledge of newborn Mousterian morphological and metrical variability. It will contribute to the understanding of the still debated growth and development patterns in this archaic taxon.

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Podium Presentation

Mulhuli-Amo, a new late Early Pleistocene paleoanthropological site in the northern Danakil Depression, Eritrea

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Field work performed during the last ten years in a number of Early Pleistocene east African sites (e.g., Ileret, Konso, Daka, Olorgesailie) has significantly enlarged the quality and variety of the *H. erectus/ergaster* fossil record and re-launched the debate about its patterns of variation and evolutionary trends. Additional evidence comes from the northern part of the Danakil (Afar) depression of Eritrea, where geo-paleontological research carried out since mid-nineties resulted in the discovery of over 200 late Early Pleistocene sites within a 1,000 m-thick fluvio-lacustrine sedimentary succession outcropping in the Dandiero rift basin, south to the village of Buia (Abbate et al., 1998). The *Homo*-bearing layer of Uadi Aalad (UA), which consists of 5-6 m-thick deltaic and fluvial deposits radiometrically and biochronologically dated to ab. 1 Ma (Ghinassi et al., 2009), has delivered an adult cranium preserving the face (UA 31), two permanent teeth (UA 222 and UA 369), and three pelvic portions (UA 173, UA 405, UA 466) (Macchiarelli et al. 2004; Bondioli et al., 2006). Compared to the Indonesian and Chinese *H. erectus s.s.* sample, as well as to OH 9 and, to a minor extent, Daka and KNM-ER 42700, UA 31 displays a blend of *erectus*-like and progressive morpho-architectural features, the latter more commonly found in Middle Pleistocene specimens, which document extensive variation in late Early Pleistocene east African *Homo*. Since 2010, our systematic research action extended to Mulhuli-Amo (MA), a fossiliferous area 4.7 km apart from the Uadi Aalad outcrop preliminarily surveyed and mapped because of its extraordinary concentration of Acheulean stone tools (the so-called "handaxes esplanade" of site A006). The 30 m-thick sedimentary succession of Mulhuli-Amo consists of deltaic and fluvial sediments. The lower interval (20 m) records the progradation of a Gilbert-type sandy system, with a well-developed foreset bed overlain by a fluvial topset. The middle interval (4 m) consists of muddy deposits with sandy fluvial channels occasionally preserving isolated bones and stone tools. The upper interval of the succession(5 m) consists of gravelly sand containing abundant bones and Acheulean artefacts. Although definitive geochronological and physical correlations are currently missing, the sites of Mulhuli-Amo and Uadi Aalad are thought to belong to the same stratigraphic horizon. Following field research strategies commonly employed in other African Plio-Pleistocene study areas, fossil vertebrates from the MA upper interval were preliminarily investigated in situ. The mammal record, not from systematic excavations, mostly consists of *Elephas*, *Hippopotamus*, *Kolpochoerus*, *Kobus*, *Pelorovis*; reptile remains include crocodiles (*Crocodylus niloticus*), turtles (*Pelusios sinuatus*), and monitor lizards (*Varanus niloticus*). This assemblage intimately correlates with that from Uadi Aalad (Delfino et al., 2004; Martinez Navarro et al., 2004) and the combination of sedimentary depositional dynamics and fossil record points in both cases to a water-rich landscape with grassland- and savannah-dominated environments. Spread over an area of about 630 m2, nine additional cranial (frontal, parietal, temporal bones) and dental human remains, likely representing three individuals with features close to the morphology displayed by UA 31, have been recovered at Mulhuli-Amo during the last two field seasons.

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Poster Presentation

Interest of Virtual 3D Reconstruction and Printing (VIRCOPAL®) in Palaeoanthropology: example of Subalyuk immature skull (Hungary)

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Since the first reconstruction of human fossil skulls (Kalvin et al, 1995), the combination of more and more efficient medical imaging with increasingly accurate computing devices, allowed a dramatic development of a new field, that is now currently called virtual paleoanthropology. Moreover, an algorithm for precise length measurements has been implemented in anthropology (Spoor et al., 1993). This algorithm (Half Maximum Height algorithm) allows the precise determination of interface points on CT scan images. We have recently proposed a 3D HMH method to be applied on the original CT scan data to obtain the precise location of each interface point (Dutailly et al., 2009). By using this method, we ensure a high fidelity digital model of the CT acquired original fossil bone. In addition, among the most precise rapid prototyping methods, the 3D reproduction technique using liquid resin (such as Objet® Eden series) is providing a 40 microns resolution for a more precise rendering of the surface and thus a better texture reproduction. This has a real impact on the bio-fidelity of the prototyped 3D bone. These advances led us to develop dedicated resources for paleontological and paleopathological training and research, that are the core of the VIRCOPAL® project (Coqueugniot et al, 2011). The goal of this presentation is to illustrate, by taking as example the Neandertal immature skull of Subalyuk (Hungary), the interest of this approach for research, training and heritage preservation in the topic of human evolution study.

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Poster Presentation

A Genetic Theory of Hominin Evolution

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What genetic changes took place at the origin of the Australopithecines, and at the transitions to *H. erectus*, *H. neanderthalensis* and modern *H. sapiens*, and how did these changes account for the differences between these species? Here we present a theory that originates from Paul Broca's thesis that lateralization is the basis of the capacity for language in modern *Homo sapiens*, but predicting that the first change took place in the earlier transition to bi-pedalism in Australopithecines, followed by a series of at least three changes in cerebral anatomy and function in later hominins. Asymmetry of the cerebral hemispheres (identified by Gratiolet as faster gyrification in the left frontal and right occipital lobes relative to their counterparts in the contralateral hemispheres) is either specific to *H sapiens*, or arose at an earlier point in the hominin lineage. Observations on individuals with sex chromosome aneuploidies (XO, XXX, XXY, and XXY syndromes with a frequency of approximately 1 in 1000 in contemporary populations) suggest strongly that a genetic determinant of asymmetry is located on the X and Y chromosomes (Crow 1994; Rezaie, Daly et al. 2009). Such a locus in Man is consistent with interpretations of Haldane's rule across species imputing a locus for speciation on the X chromosome (Coyne and Orr 1989; Presgraves 2008). An additional role for the Y chromosome is predicted by theories (Kaneshiro 1980; Carson 1997) that a phase of sexual selection initiated by a change in males is selected by females, and is followed by selection on homologous sequences on the X chromosome (Crow 2002). In the context of the human genome this theory points to the Xq21.3 duplication to Yp11.2 at 6MYA as a correlate of the transition to Australopithecines, to Protocadherin11XY as the single gene pair that has been preserved subject to selective pressures, and to three subsequent deletions and a paracentric inversion on the Y as possible correlates of later transitions. In the hominin lineage *PCDH11Y* has been subject to 16 coding changes and *PCDH11X* to 5 such changes, of which one (an arginine to cysteine substitution in ectodomain 5) is likely to have been radical in its effects on the adhesive properties of the protein (Williams, Close et al. 2006). Genes present on the X and in homologous form in the non-recombining region of the Y chromosome can account for quantitative and qualitative differences between the sexes. Such sexual dimorphisms may differ between closely related taxa. The re-discovery of the *Prdm9* gene that is expressed in the XY body and plays a role in both speciation (Oliver, Goodstadt et al. 2009) and in selecting sites of recombination within species (Myers, Bowden et al. 2010) points to a mechanism. It is suggested that the *Prdm9* protein acts to stabilize the configuration of X and Y chromosomes arrived at through the events outlined in the preceding paragraph, and that the pattern encoded by "meiotic suppression of paired chromosomes" (MSUC(Turner 2007)) is transmitted to the early embryo as a species-defining signal at a time when gene expression in general is suppressed(Crow 2012).

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Poster Presentation

Neanderthal territoriality: an ecological approach

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In order to understand Neanderthals both as a taxon and a user and producer of sites, the population dynamics associated with geographic and group ranges are essential. At both of these scales of study Neanderthal population dynamics relies on assumptions or propositions about spatial behaviour: the organisation of individuals in time and space. A particularly important element of spatial behaviour is the existence and maintenance of exclusive home range boundaries. If Neanderthals were unable to move freely through their geographic range, this would have a number of important implications for their demography, genetics and behaviour (Roebroeks et al., 2011). Spatial behaviour is an important and well published topic in the behavioural ecology of all animals, including humans. This rich body of theory, methods and comparative studies provides a number of ways to approach territoriality in extinct populations. Although the causes are varied and can be unclear, a number of important factors can be identified. Firstly, the ability of Neanderthals to directly defend a range is assessed, using patterns observed among primates and archaeological data. An 'index of defendability', developed for primates by Lowen and Dunbar (1994) predicts when ranges are unable to be defended. Despite differences in physiology, diet and predation pressure this index is found to have some predictive power when applied to spatial data compiled for terrestrial carnivores. Using Middle Palaeolithic raw material data the index is applied to Neanderthals and suggests that a group would be highly unlikely to be able to defend a home range. However, there are some problems with this approach, primarily in the assumptions required to use archaeological data to reconstruct ranges. In order to test further the prediction that Neanderthals were not territorial, a new wider ecological approach is developed. This approach is purposely independent of interpretations of Neanderthal spatial behaviour based on the archaeological record. Amongst all vertebrates the degree of resource predictability, resource abundance and the density of the subject are of key importance in understanding the presence of territorial behaviour (Maher and Lott, 2000). These organising factors therefore provide a means of predicting the territorial behaviour of Neanderthals in particular habitats, based on knowledge of their subsistence and estimates of population density. Using the 'mammoth steppe' in north west Europe as a setting, data from Late Middle Palaeolithic archaeological settings are used to identify large and medium sized ungulates as important resources. The distribution in time and space of these resources is assessed using climatic and vegetative data. This reconstruction of a specific Neanderthal ecological setting is then used to further predict whether the population were territorial, and qualify why territoriality could not have been possible. Using the same principles multiple resources can be analysed, suggesting that instead of defence of a home range, some resources may have been unable to have been defended, whereas others were theoretically defendable. This pattern of resource use and defence provides hypotheses not only about Neanderthal mobility but also about the quality of interactions between communities.

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Poster Presentation

Mousterian workshops on a source of raw material in the Charente (France): the site of 'Le Chêne Vert' at Dirac

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Open-air sites play an important role in our understanding of Middle Palaeolithic raw material provisioning strategies and settlement models. Rarely do we come across Mousterian sites located directly on a source of raw material; the site of 'Chêne Vert' at Dirac in the Charente, just south of Angoulême, excavated in 2010 in a preventive archaeology context, provides the unique opportunity to investigate Neanderthal behaviour at a workshop situated on a Turonian flint outcrop. Geoarchaeological and taphonomic studies suggest complex site formation and post-depositional processes. While these unfavourable conditions did not preserve any spatial organisation of the abundant lithic remains (more than 24,000 pieces), the techno-economic analysis revealed the presence of at least two Mousterian facies at the site, one with a dominant Levallois component and the other a Quina debitage system, thus demonstrating the exploitation of this flint source by at least two Mousterian groups prior to MIS 3 (OSL date at 56.8 ka marking the deposition of the layer under consideration here). These workshops complement our growing understanding of Neanderthal landscape use and resource procurement patterns.

Poster Presentation

Sir Arthur Keith's Legacy: Shukbah Cave

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In 2001, a series of boxes with human material was transferred to the Natural History Museum, London (NHM), from the Royal College of Surgeons (RCS). These were part of the RCS collection in the care of Sir Arthur Keith FRS that was found during the closing down of Downe House and Buckston Browne Farm. This research facility of the RCS had been the home and place of work of Sir Arthur Keith from 1933 until his death in 1955. It was there that he studied and wrote several anthropological books and articles and contributed to the volumes on "The Stone Age of Mount Carmel". The fossil material described in "The Stone Age of Mount Carmel" together with Theodore McCown had been transferred to the NHM anthropology collection shortly before Sir Keith's death, and the transfer of further material mentioning the same site names was a logical move for the RCS. The human material was reboxed and cotton wool, newspaper and pests were removed. In 2011, the Palaeontology Department at the NHM made funding available for a more comprehensive study of the material. The aim of the study was to document and research the origin of the material, recurate it with conservation grade materials, and provide context and an inventory. After researching the RCS and Dorothy Garrod archives it was possible to identify the origin of the material. The majority comes from the original excavations by Dorothy Garrod at Shukbah Cave. This is the presumed lost collection of human skeletons from the Natufian levels, of which six crania are currently housed at the Peabody Museum, Harvard University. A full inventory of the Natufian material will be presented. In addition, the boxes contained Middle Palaeolithic fossil material from the Shukbah, El Wad and Skhul Caves. A dating analysis and morphological study of all this material is currently underway, and the results so far will be summarised.
Acknowledgements: We would like to thank the Natural History Museum for providing funding for the study. We are also indebted to Ms Christine Lorre (Musée des Antiquités Nationales), Dr Pamela Smith (Cambridge University), Mr David Kessler (Bancroft Library, UC Berkeley), Dr Michele Morgan (Peabody Museum, Harvard University), Ms Emily Weiss (Bedford Public Library) and Ms Barbara Dey (State Historical Society of Colorado) for help with historical and archival research.

Podium Presentation

Organic artefacts from Border Cave: earliest evidence of San material culture

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Recent archaeological discoveries have revealed that pigment use, beads, engravings and sophisticated stone and bone tools were already present in southern Africa 75,000 years ago. Many of these artefacts disappeared by 60,000 years ago, suggesting that modern behaviour appeared in the past and was subsequently lost before becoming firmly established. This pattern evidences major discontinuities in cultural transmission that appear to separate the earliest instances of "modernity" from those that we see associated with historically known hunter-gatherers in southern Africa, and their archaeological Later Stone Age (LSA) antecedents. Some technological innovations dating to the Still Bay and the Howiesons Poort may appear as behaviourally as complex as those associated with more recent LSA material culture, but may reflect quite distinct forms of social organization, ways of life and systems of belief. In light of this, making inferences about Middle Stone Age societies based on what we know about modern hunter-gatherers from southern Africa is problematic. Most archaeologists think that San hunter-gatherer cultural adaptation emerged 20,000 years ago, and that by 10,000 can we recognise that prehistoric groups in southern Africa had forms of social organisation similar to that of modern San. We have explored this issue by conducting a comprehensive interdisciplinary analysis of organic artefacts from the upper levels at Border Cave, directly dating a number of them, and reappraising the chronology of the sequence. Results indicate that the Early LSA inhabitants of this cave used curated notched bones for notational purposes, wooden digging sticks weighted with bored stones, bone awls, and bone points similar to those used by San as poisoned arrowheads. A point decorated with a spiral groove filled with red ochre closely parallels similar marks that San make to identify their arrowheads when hunting. A lump of beeswax mixed with poisonous Euphorbia resin and wrapped with vegetal twine was certainly used for hafting purposes. Direct dating of this piece to c. 40 ka makes it the oldest known example of the use of beeswax. A notched wooden stick similar to San poison applicators retains residues of a heated toxic compound made of ricinoleic acid, derived from poisonous castor beans. This piece, directly dated to 24 ka, represents the oldest known secure evidence of the use of poison for hunting purposes. Ornaments include marine shell beads and ostrich eggshell beads, directly dated to c. 42,000 BP. A digging stick, dated to c. 39,000 BP, is made of Flueggea virosa. Reappraisal of radiocarbon age estimates through Bayesian modelling, and the identification of key elements of San material culture at Border Cave, places the emergence of modern hunter-gatherer adaptation, as we know it, to c. 44,000 years ago. This supports the view that what we perceive today as "modern behaviour" is the result of non-linear trajectories that may be better understood when documented at a regional scale.

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Podium Presentation

What are Big Brains for?

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In what way is brain size related to brain function? Here we combine two approaches, comparative neuroanatomy and the perception of visual illusions, for the first time to address this question. We addressed this with reference to a brain component especially important in higher primates: the primary visual cortex (V1) which is the largest known visual cortical area. Specifically we examined the relationship between the volume of V1 and illusory size perception across anthropoid primates. V1 size differs within and between species in relation to overall visual sensation, however not much is known about the causes of V1 size variation between closely related species. Visual illusions provide an opportunity to assess how visual experience can diverge from a seemingly objective visual stimulus. Recently it has been shown that within humans V1 volume is negatively correlated with the perception of size illusions. Using a similar approach, we investigated the notion that anthropoid primate genera with larger V1 volume report size illusions of a lesser magnitude. The basis of V1 size variation is important in human evolutionary studies because V1 is the most dramatically reduced cortical area in modern humans, relative to brain size. Brain reorganization related to V1 size reduction could offset the metabolic costs incurred as a result of increased brain size and/or may be linked to changes in functional demands. Matching published data on V1 volume and illusory perception for the same genus, our preliminary data show that anthropoid genera with larger V1 volume have a weaker experience of size illusions. We consider the implications of these results for comparing particular functional brain regions, rather than overall brain size, for reconstructing human brain evolution and comparing perception in primate species.
Acknowledgements: Fundação para a Ciência e a Tecnologia.

Poster Presentation

Size and shape analysis of human and non-human third metatarsals: a geometric morphometric assessment of the Upper Pleistocene fossil from Callao cave (Luzon, Philippines)

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Excavations undertaken since 2003 in Callao cave (Cagayan Province, Luzon, Philippines) yielded several human occupation layers dated to the end of the Upper Pleistocene and Holocene. A third metatarsal (MT3) of human morphology and directly dated to c. 66,000 BP by U-series was also recovered from a breccia layer situated deeper in the stratigraphy. A first study based on morphological and linear morphometric comparisons allowed us to attribute this MT3 to the genus *Homo*, but also to underline several peculiarities – especially from its shape – for which it hardly enters the range of variability of *Homo sapiens* (Mijares et al., 2010). We aim at presenting here the first results obtained from a geometric morphometric study based on Procrustes analysis of human and non-human third metatarsals. The Callao MT3 was compared to the two Primates presently living on Luzon Island (*H. sapiens* and *Macaca fascicularis*), and also to a series of Asian non-human taxa which are morphologically close to humans for this particular bone (*Pongo*, Hylobatids, Cercopithecids, Ursids and *Ailurus*). In a first step, the Procrustes approach was tested for a set of 20 3D landmarks mainly located on the limits of articular facets and maxima of curvatures of the proximal and distal extremities of complete MT3 (thus excluding at this stage the Callao fossil for which the distal head is broken). The results show a strong morphometric signal related to dominant locomotor behaviours and preferential supports of the different taxa. Shape differences structuring the two first axis of the PCA clearly separate arboreal from terrestrial species and in the latter group plantigrade quadrupeds (Ursids) from plantigrade bipeds (*H. sapiens*). A discriminant analysis (CVA) confirms that the shape of human MT3 can be easily and significantly distinguished from the shape of the MT3 of other taxa, thus validating our analytical design. In a second step, a new set of analyses restricted to landmarks located on the proximal part of MT3 was undertaken, including the Callao specimen. The morphometric signal present in PCA and CVA is weaker than the one obtained for complete MT3, but the results clearly assign the Callao fossil to a strictly bipedal individual. The results also underline the Callao specimen is really at the margin of the size and shape range of variability of *H. sapiens*. The results are important, confirming a human presence on Luzon Island more than 60, 000 years ago but also highlighting several peculiar morphological characteristics for the Callao fossil. This work will be pursued with larger samples of non-human taxa, as well as including the few fossil specimens known for the genus *Homo*.

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Podium Presentation

Evidence for Economization of Lithic Resources Over the Last 2.0 Ma

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While stone tool technologies offered prehistoric hominins the benefit of a sharp and durable cutting edge, there are significant costs related to the acquisition and transport of suitable materials. Here we present the results of a new set of controlled experiments that demonstrate production strategies that significantly improve the efficiency of lithic materials by increasing the ratio of usable edge to overall mass in unretouched flakes through manipulation of two variables: exterior platform angle and platform depth. These experimental results are then verified through the analysis of archaeological lithic assemblages. Finally, examination of several archaeological assemblages from the Oldowan through the Upper Paleolithic reveals that the use of these strategies increased through time, suggesting that hominins either became more adept at controlling these variables, perhaps through improved learning mechanisms, or that there was an increased need for more economization of materials.

Poster Presentation

Aurignacian occupation of the British peninsula

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Aurignacian occupation of Britain is known only from relatively scarce lithic and osseous artefacts within mixed 19th and early 20th century cave collections. Despite this, careful typological selection of material allows several aspects of this occupation to be determined. First, all Aurignacian sites lie in the hilly west/north of the country. This is apparently a true reflection of the deposition of archaeological remains: Early Upper Palaeolithic Lincombian-Ranisian-Jerzmanowician material and Mid Upper Palaeolithic Gravettian material are known from lowland central, southern and eastern regions. The British Aurignacian is characterised by several well-known artefact types, including burin busqué bladelet cores and lozangic osseous points. Well-dated sites in France and Belgium and 14C dates on British osseous artefacts demonstrate that this occupation took place 33-31,000 14C BP. It seems likely that this occupation coincided with the most prolonged warm period of the European Aurignacian: Greenland Interstadial 8. Environmental response to this climatic warming may have brought favoured environments to the west of Britain at this time. Despite their presence in immediately neighbouring regions, no characteristically Early Aurignacian artefacts have been found in British collections. A third distinguishing artefact type is the bladelet-core Paviland burin. A relative abundance of this artefact type in Britain and Belgium demonstrates an east-west cultural connection, and therefore an eastern origin for Aurignacian occupation of Britain. This confirms the importance to humans of the huge Channel River during the Late Pleistocene, which during the Aurignacian apparently acted as a conduit for east-west movement, allowing access to favoured Aurignacian terrain in the far west. Bladelets deriving from Paviland burins were seemingly morphologically similar to those from burins busqués, although the two bladelet-core types are technologically distinct. They therefore probably represent two different but broadly contemporary phases of occupation.

Poster Presentation

Shaping the language faculty. Functional asymmetry of the inferior frontal gyrus in the evolution of the genus *Homo*

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Language and social learning are closely related biological phenomena. The cortical areas around the Sylvian fissure (or lateral sulcus) are functionally associated to social learning, including emulation and imitation, in apes as well as in humans. These cortical areas of the left hemisphere are the same that are in close relationship with the faculty of language in our species. We suggest that social learning, associated to the production of Paleolithic artefacts, exhibits a functional combination of both semantic and syntactic aspects that anticipate the origin of language, intended as the representational and communicative system with hierarchical and recursive structure expressed in modern humans. The asymmetrical development of left perisylvian cortical areas (including the emergence of the Broca's cup, BA 47) observable in the endocasts of "early *Homo*" representatives, more than 2 millions years ago, should be viewed in connection with the advantage of possessing a non-verbal system for learning by imitation, much more efficient than in their ancestors or in extant apes. This, in turn, is crucial for the acquisition of both knowledge and technical skills required to have access to food resources, as far as it implies the production of Paleolithic artefacts. According to our hypothesis and from a strictly-controlled Darwinian perspective, the increased capabilities of social learning in Plio-Pleistocene hominins provided the key adaptation to obtain nutrients (essential to support the development of the brain) as well as – co-opted by exaptation – to the evolution of language. In this scenario, we expect to observe, with the emergence of the language faculty, the occurrence of a discontinuity from the patterns of frontal lobe growth and asymmetries shared among the genus *Homo*. A 3D geometric morphometric approach, applied on a sample of fossil and recent human endocasts, was used to test this hypothesis and investigate the patterns of covariance between the left pre-frontal cortical districts (Broca's area) and those on the right hemisphere. The shape variables were used to quantify the pattern of covariance and asymmetry using 2 blocks partial least-square analysis and multivariate analysis of variance.

Poster Presentation

δ13C/12C and 15N/14N ratio in bone collagen from individuals of Kostenki VIII and Kostenki XIV (to problems of diets and landscapes reconstruction)

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Skeletal remains from Upper Paleolithic sites of the Middle Don region (Kostenki I-XVIII) have the crucial position for the European peopling dynamics and adaptation investigation. The stable isotopic data can be used to study paleodiets as well as environmental reconstruction Kostenki-Borschevo complex located on the west bank of Don River (Russia) .The bone fragments were obtained from collections of the Institute of Ethnology and Anthropology RAS (Kunstkamera, St-Petersburg). We sampled 2 fragments of partly burned human cranial vault from Kostenki VIII (Tel'manovskaya site, western dwelling, excavated by A.N. Rogarev in 1959), (II layer, 21900±450 (GrA-9283) and 23020±320 OxA-7109) (Vermeersch, 2011) and 1 fragment of the human postcranial skeleton (tibia) from Kostenki XIV (burial, Markina Gora, excavated by A.N. Rogarev in 1954) (33250±500 OxA -X-2395-15, Marom, et al., 2012) . The collagen was extracted from the bone samples in the Laboratory for Biocenology and Historical Ecology of A.N. Severtsov Institute of Ecology and Evolution RAS (Moscow) using conventional method (Jørkov, et al., 2007). Dissolved phase was lyophilized without special filtration. Stable isotope analysis of bone collagen was conducted using a Thermo-Finnigan Delta V Plus continuous-flow IRMS coupled with an elemental analyzer (Thermo Flash 1112) located at the Institute of Ecology and Evolution RAS. Samples were analyzed with reference gas calibrated against IAEA reference materials USGS 40 and USGS 41 (glutamic acid). The drift was corrected using internal laboratory standard (acetanilide).The samples were analyzed in duplicate, the variation in δ13C and δ15N values among replicated samples did not exceed 0.1 and 0.2‰, The samples have δ13C values about -18.3‰ to -18.2‰ which indicate that their food come from terrestrial ecosystems with the plants of moderate climate (C3) The high values of the δ15N (10,9‰ and 13,5‰) indicate high protein diet. Unfortunately we have no faunal bones and can't do direct paleodiet reconstruction. These high values could come from a few hypothetical reasons: 1. Using freshwater food sources; 2. Large mammals of arid landscapes hunting; 3. Significant part of the cub's meat. Further isotopic study of the animal bone samples from Upper Paleolithic sites from Middle Don region will clarify the observed patterns.

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Poster Presentation

Single Grain OSL-dating of Palaeolithic sediments from the Rhafas cave site (NE Morocco)

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North Africa is a region of considerable importance particularly in the context of current debates about Out of Africa events. However, the timing and nature of Palaeolithic human behaviour and human dispersals across northwest Africa are presently still poorly understood. The Rhafas cave site is situated in northeastern Morocco near the city of Oujda, approximately 900 metres above sea level, and was first excavated to a depth of 4.5 m in the 1980/90s by Wengler (1993, 1997). The stratigraphic profile comprises 71 individual layers; both Aterian and so-called Mousterian lithic artifacts have been identified in 39 of these layers. These Middle Palaeolithic technocomplexes are present in many other sites across North Africa. However, the chronostratigraphic position and precise age of deposition of these technocomplexes, as well as their characteristics, function and relationship to other assemblages further afield, remain poorly understood. Recent work has been undertaken with the aim of refining the chronology of Middle Palaeolithic cultures, especially in northwest Africa (Jacobs et al. 2011, 2012; Richter et al. 2010). However, in this region, there are relatively few stratified sites which contain more than one Palaeolithic technocomplex. Furthermore, most of the recently dated sites focus on coastal areas where the sequences rarely exceed MIS 5e (Jacobs et al. 2011, 2012), although inland sites appear to provide much older ages for the Aterian (Richter et al. 2010). In this study we dated another stratified inland site with the intention of further refining the chronostratigraphy of Moroccan Middle Palaeolithic technocomplexes. The direct dating of sediments by single grain optically stimulated luminescence (OSL) techniques offers the potential to substantially improve our understanding of the depositional age of occupation horizons which contain Middle Paleolithic technocomplexes. New excavations were begun at Rhafas in 2007 in part to attempt a new program of radiometric dating of the sequence. Here we apply OSL dating at a high resolution to the stratigraphic profile at Rhafas, with the aim of producing a comprehensive chronostratigraphy for the Palaeolithic occupation of the site, with an emphasis on the transition from the Mousterian to the Aterian technocomplexes. The levels will also be placed in the context of paleoenvironmental change in the region by correlation with palaeoclimatic archives and through sedimentological and geomorphological investigations. This study provides the first single grain quartz OSL ages for the Rhafas site. We present single grain OSL dating results from newly cleaned profiles with redefined stratigraphic descriptions within the cave, as well as from a recently excavated section in front of the cave entrance.

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Podium Presentation

Earliest Porotic Hyperostosis on a 1.5-Million-Year-Old Hominin (Olduvai Gorge, Tanzania) and its Bearing on Meat Consumption by Early Humans

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Meat-eating was an important factor affecting early hominin brain expansion, social organization and geographic movement. Stone tool butchery marks on ungulate fossils in several African archaeological assemblages demonstrate a significant level of carnivory by Pleistocene hominins, but the discovery at Olduvai Gorge of a child's pathological cranial fragments indicates that some hominins probably experienced scarcity of animal foods during various stages of their life histories. The child's parietal fragments, excavated from 1.5-million-year-old sediments at SHK (Bed II) , show porotic hyperostosis, a pathology associated with anemia. Nutritional deficiencies, including anemia, are most common at weaning, when children lose passive immunity received through their mothers' milk. Our results indicate that the developmentally disruptive potential of weaning reached far beyond sedentary Holocene food-producing societies and into the early Pleistocene. This discovery also shows that by 1.5 Ma, hominins (probably within the *Homo* lineage) had already developed a physiology adapted to the regular intake of meat and that lack of its consumption led to pathological disorders. This interpretation will be presented in conjunction with an updated summary of taphonomic evidence for the consumption of bulk meat and primary access to small and medium-sized carcasses by hominins.

Poster Presentation

Handedness on 11 Neanderthals from the El Sidrón cave (Asturias, Spain): Evidence from the non-dietary dental wear

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Handedness is the tendency to display left- or right-hand task preference (sensu CDHE), and it is entirely widespread in *Homo sapiens*. Handedness in humans has been related to brain hemispheric specialization and to linguistic functions. The studies regarding its emergence and development during the course of the human evolution offer information about the evolution of human cognitive capacities (Mosquera et al., 2012). Lower and Middle Pleistocene tools found at Koobi Fora (1.4-1.9 Mya), Zhoukoudian and Ambrona (Toth, 1985), as well as Atapuerca (Ollé, 2003) suggest a right hand preference by the hominids there represented when doing such tasks. Besides, it is well established that during Middle and Late Pleistocene, fossil hominids present a right-hand preference (Uomini, 2009). Traditionally, the skeletal study of manual laterality has been focused on the humeral asymmetry (i. e. Trinkaus et al., 1994, on Neanderthals), and also on the analysis of non-dietary or instrumental scratches on the labial sur¬face of anterior teeth, i. e. Bermúdez de Castro and collaborators (1988) on *Homo heidelbergensis*, and Lalueza-Fox and Frayer (1997) on *Homo neanderthalensis*. Here we present the study of those instrumental scratches on the anterior dentition of 11 Neanderthals from the El Sidrón cave in Northern Spain (Rosas et al., 2006; 2012). The sample comprises 67 permanent and 4 deciduous maxillary and mandibular teeth, belonging to 7 adults, 3 adolescents and one juvenile. All teeth were inspected under an ESEM, and the orientation of the striae to the occlusal plane was measured directly on digital images (NIH Image J). X2 was performed to test the distribution of the striations. Our results show a predominantly right-oblique of the instrumental striations, typically addressed to right-handers (Lalueza-Fox and Frayer, 1997). The results match with the modern human handedness pattern, and provide additional indirect evidence for Neanderthal brain lateralization, a fact that, together with the asymmetries on cranial dural sinuses and blood drainage (Peña-Melián et al., 2011), could improve the actual knowledge about the brain asymmetry on this species. In addition, the individual Adult 2 presents almost the same number of right and left-oblique striae, but the left ones covering the right oriented striations. The presence of a severe oral pathology on the left side on his mandible plus dental calculus deposits on the occlusal molar surface, suggest that this individual changed his manual motion in order to avoid the pain on his mouth. Moreover, the individual identified as Juvenile 1, displays the same striation pattern as the other Neanderthals from the sample. Since the estimated age for this individual is about 6 years old (see Lalueza-Fox et al., 2011), it seems that the ontogenic development of manual laterality in that Neanderthal population is similar to that of actual modern humans in which manual laterality is completely established around seven years of age (Fennell, 1986). According to (Abrams and Panaggio, in press), the high prevalence of the same manual laterality pattern at the populational level, i. e. right-handedness in Neanderthals in general, and Sidrón in particular, may suggest a collaborative society with low level of intra-society violence.

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Poster Presentation

Climatic adaptation vs. neutral evolution: what clues from craniofacial form in native Northern Asiatics?

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Most studies concerned with facial adaptations to climate have sampled widely the global population (Thompson, Buxton, 1923; Carey, Steegmann, 1987; Franciscus, 1995; Noback et al., 2011). As such it is difficult to assess the causes of differences; adaptation or genetic drift, since the study groups not only live in different climates but may also have been isolated to some degree for tens of thousands of years. An alternative approach has been to compare different samples of the same ethnic group dispersed through different habitats (Wolpoff, 1968; Shea, 1977; Hernandez, 1997). Such samples are closely genetically related so the differences are more likely adaptive. However, the extent to which findings apply more widely is unclear. Indeed, while differences between tropical and non-tropical groups are well-established (Hubbe et al., 2009), how extreme cold impacts on facial form remains controversial. We present a study that aims to combine those two approaches. Thus, we compared samples of 7 native Siberian, Central and North-East Asian peoples: Evenks, Eastern Buryats, Yakuts, Siberian Inuits, Ulch, Khanty and Mongols, with Northern Chinese and Koreans representing a temperate climatic zone. No tropical populations were included in the analysis. All represent the same general (Mongoloid) craniofacial pattern, live in neighbouring regions and are related in terms of origin and genetics. 37 linear measurements (including several on nasal bones, the piriform aperture, maxilla, choanae and the internal nasal cavity) were taken by the same person on 139 adult male skulls. The set of measurements was designed to take into account both developmental and functional sub-divisions of the mid facial skeleton. . Winter and summer -average annual temperature, vapour pressure and precipitation were used as environmental covariates. The genetic background was estimated from a matrix of pair-wise between-group distances based on frequencies of the 20 main Eurasian mtDNA haplogroups. A two-block partial least squares (PLS) analysis showed highly significant covariation between craniofacial form and climate. Northern groups, compared to populations from temperate climates, shared a very specific craniofacial pattern characterized by: a decrease in nasal bone breadth, an increase in maxillary size as well as in the height of the nasal aperture (without reduction in breadth), and a concomitant lengthening and narrowing of the nasal cavity. This pattern was largely independent of genetic ancestry, more pronounced in Yakuts and Evenks, whose distribution range is further inland, and related to the very cold and dry winter conditions of those regions. Siberian Inuits, Khanty and Ulch, who also live in the north but occupy coastal areas and do not share a most recent common ancestor, had a somewhat modified version of the craniofacial traits observed in Yakuts and Evenks with a substantial narrowing of the nasal aperture, anterior part of the maxilla and the nasal cavity. Since genetic relatedness does not explain the morphological-environmental correlates we have found, differences and similarities in traits most likely represent adaptations to cold/dry versus cold/wet climates.
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Podium Presentation

The Mid Pleistocene and early Middle Palaeolithic site of Tourville-la-Rivière, Seine-Maritime, France: technology and techno-economic behaviors

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Situated in a bend of the Seine valley, the site of Tourville-la-Rivière is located in a quarry operating (extracting) fine alluvium and gravel. In operation since 1967, this context has been followed by surveys and several excavations have yielded mammalian faunal remains and lithic assemblages related to the early phase of Middle Paleolithic. The salvage excavation of over an area of c. one hectare led by INRAP in 2010 focused on the interstadial fluvial deposits contemporary end of MIS 7. Faunal remains have been found in isolated situation or grouped in accumulations from a dozen to several hundred remains frequently in anatomical connection. The lithic artifacts show a disparate spatial distribution with the exception of a knapping area. This small concentration provides valuable data about technical and techno-economic behaviors implemented at the site. Raw material procurement is strictly local (flint nodules from chalk cliff or Seine gravels). Levallois debitage is the dominant flaking system and mainly produces elongated flakes. This assemblage also yields elements from a different technology called "Rocourt-type" knapping method producing laminar flakes and real blades. While most elements of the reduction sequences are represented, several refits clearly indicate that cores, large cortical flakes and whole end-products were exported outside of the knapping area. At the level of the whole excavated area this observation is matched by the high frequency of isolated unretouched removals and retouched tools, without a spatial association with faunal remains or other flint artefacts. The excavated area provides us with a window on a various hectares large part of a late Middle Pleistocene river valley, where Neandertals were constantly carrying around stone artefacts, discarding them at locations where new ones were produced for use elsewhere in the local landscape, or at locations where they briefly used them. Techno-economic data indicate a strong fragmentation of the reduction sequences and a high mobility of the artefacts within the local environment of the Seine river valley. The small number of artefacts might reflect the short duration of such occupations which in particular aimed obtaining the animal resources.

Podium Presentation

Using bulk and laser ablation isotope sampling to understand the paleoecology and development of *Homo heidelbergensis* from the Sima de los Huesos in northern Spain

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The *Homo heidelbergensis* specimens recovered from the Sima de los Huesos in the Sierra de Atapuerca, Spain represent a majority of the global fossil record for this species in the middle Pleistocene. At least 28 human individuals have been recovered at this locality, and particular characteristics of these fossils point to the beginnings of the Neanderthal lineage (Hublin, 2009; Arsuaga, 2010; Garcia and Arsuaga, 2011). The abundance of human specimens at this locality provides an opportunity to examine particular aspects of human ecology and development during the middle Pleistocene. This study focuses on two main topics. First, we will make an assessment of the paleodiet of *H. heidelbergensis*. Second, we will attempt to ascertain times of potential significant physiological changes that occur during development. To address these topics we analyze stable carbon and oxygen isotope values from the tooth enamel of specimens of *H. heidelbergensis* and associated fauna from the Sima de los Huesos as well as fauna from nearby and roughly contemporaneous sites. To gather data we obtained samples using the more traditional technique of taking bulk samples from individual teeth as well as analyzing multiple samples from a single tooth by laser ablation. Bulk sampling provides an average value for resource use during the time spanned by the development of the analyzed tooth, while laser ablation provides much finer temporal detail, generally on the order of days to months rather than the months to years obtained from bulk sampling (Kohn, 2004; Passey and Cerling, 2006). The bulk isotope values show that a C3 dominated ecosystem surrounded the area around the Sima de los Huesos during the middle Pleistocene. The herbivores, *Cervus elaphus* and *Equus sp.*, displayed the most positive isotope values, while *Ursus deningeri* displayed the most negative values. The bulk sampled hominin isotope values fall nearest the values of the lion, *Panthera leo*, occurring between the herbivores and *U. deningeri*. These data being isotopically similar to a contemporaneous large carnivore are comparable to results observed for Neanderthals (Richards et al., 2000; Bocherens et al., 2001). Laser ablation on the teeth of humans, red deer, and bears shows that most of the specimens were found to have minimal intra-tooth variation in carbon isotopes (< 2.3‰), suggesting relatively uniform diets through time, and revealing no obvious periods of physiological change. However, one of two sampled human teeth displayed a temporal carbon isotope shift (3.2‰) that was significantly greater than observed for co-occurring specimens. The δ13C value of this individual averaged about -16‰ early in life, and -13‰ later in life. This isotopic change occurred on the canine crown about 4.2 mm from the root, which corresponds to an approximate age of two to four years old in modern humans. Based on this age, the observed shift in isotope value may relate to dietary changes associated with weaning. These data demonstrate the utility of bulk and laser ablation isotope analysis for better understanding paleoecology and development in ancient humans.

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Podium Presentation

Masticatory loading and craniofacial adaptations in robust *Australopithecus boisei* vs. gracile *Australopithecus africanus*

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Considerable variation exists between the craniofacial form of the robust and gracile australopiths. Many of the craniofacial features associated with the robust australopiths are suggested to be related to increased bite force capabilities. However, further dietary evidence e.g. microwear patterns and isotope data in some cases contradict morphological interpretations. Using finite element analysis (FEA) and warping methods, this study examines the way in which strain is distributed throughout the skull of the gracile *A. africanus* (Sts 5) and robust *A. boisei* (OH 5) and investigates the biomechanical significance of morphological features that vary between them. The first stage of the study required an extensive CT-based virtual reconstruction of Sts 5 and OH 5. Finite element models of both specimens were created and loaded under incisal and molar biting conditions. In order to test the mechanical effect of morphological differences between the specimens, the zygoma of Sts 5 were warped to reflect the form present in the robust OH 5. Muscle loads were also swapped between specimens in order to isolate and identify adaptations to load. These hypothetical Sts 5 models with various robust traits were loaded and the mechanical significance of the features identified. The results of this study indicate that OH 5 and Sts 5 display a similar pattern and magnitude of strain distribution when loaded with their own muscle forces, however, bite force was 50% less in Sts 5 for both incisal and molar bites. When identical muscle loadings are applied, strains recorded in the zygoma region are significantly lower in OH 5 than Sts 5 yet bite force does not differ. However, following modification of the zygoma in the hypothetical Sts 5 strain reduced and bite force increased by over 200 N. Our findings suggest that while the flared zygoma of OH 5 may increase bite force, it is mainly the larger musculature, rather than masticatory system geometry that is responsible for greater bite forces, and this increased force can be resisted by the flared and enlarged zygoma in OH 5. The results of this study support prior hypotheses about functional adaptations within the masticatory apparatus of robust australopiths.

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Poster Presentation

Loess archives as contextual records of prehistoric human migration and environmental change in the Lower Danube loess steppe

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Eastern Europe holds a geographically important position as a potential crossroads for hominin migration. However, the quality and quantity of data from the Balkans and the eastern European steppe has thus far been insufficient to reliably evaluate dispersal models for the Middle through to Late Pleistocene. The substantial loess deposits of the middle and lower Danube basin in south-eastern Europe represent one of the thickest and most comprehensive terrestrial palaeoenvironmental records on the continent, yet are also the least well understood. Environmental conditions over the last million years have resulted in relatively continuous deposits uninterrupted by glaciation and tundra conditions, which nevertheless reflect oscillations between relatively warm-humid (interglacial) and cold-dry (glacial) intervals. This relative environmental stability may have proven important for hominins migrating into and through the region. Here we provide an overview of the palaeoenvironmental information provided by the thick loess-paleosol sequences of the middle and lower Danube basin (Fitzsimmons et al. 2012), combined with early results from an intensive study of the Urluia loess profile in southeastern Romania. This work forms part of a multi-disciplinary project aimed at systematically surveying the Lower Danube catchment to elucidate hominin migration patterns and adaptation to changing climate conditions. The Urluia loess profile, investigated by means of environmental magnetism, grain size analysis, and directly dated using luminescence techniques, tephrachronology and cosmogenic nuclide burial dating, provides a high resolution archive of palaeoenvironmental change for the region, extending beyond marine isotope stage (MIS) 11. Its location nearby the recently discovered Lower and Upper Palaeolithic site of Dealul Guran (Iovita et al. in press) enables an integrated reconstruction of the environmental context of hominin occupation in the region over long timescales. We focus on the palaeoenvironmental conditions prevailing in the region during the known phases of occupation of the Dealul Guran site, around MIS 11, MIS 3 and MIS 2. The earliest occupation phase was characterized by increasingly open steppic environments in the region, and experienced relatively milder climates than areas further north and west within Europe. Occupation of the upper layers of Dealul Guran during MIS 3 and MIS 2 saw relatively mild, humid conditions shifting to the cold, dry, windy climates of the Last Glacial Maximum. The initial occupation of Dealul Guran took place after a major transition to more steppic, arid environments and increased loess accumulation following relatively humid, forested conditions around 500 ka.

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Poster Presentation

Investigation of 2D dental tissue proportions in deciduous first and second upper molars of modern humans and Neanderthals

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The enamel thickness and the dental tissue proportions are of biological interest in the study of hominins (e.g., Smith et al., 2012). Lately, these variables have been recognized as effective taxonomical discriminators between Neanderthal and modern human teeth (e.g., Smith and Zilberman, 1994; Olejniczak et al., 2008). The same methodologies conceived for the study of dental tissue proportions in permanent teeth can be applied to investigate deciduous teeth (Bayle et al., 2010; Benazzi et al., 2011). In spite of it, the anthropological literature lacks information on the variability of dental tissue proportions in human milk teeth due to the paucity of deciduous teeth in the fossil record. With the present work, we contribute to this issue with a sample of unworn to moderately worn deciduous first and second upper molars (dm1, n=22; dm2, n=29) belonging to anatomically modern humans and Neanderthals from which we extract information on 2D enamel thickness and dental tissue proportions. In particular, we investigate the mesial section for dm1s and both buccal and mesial sections for dm2s. The data are acquired from 3D μCT scans of the teeth, which are oriented and sectioned at the level of the cervical margin to focus on the crown. The crowns are further sectioned by a plane passing through two dentine horn tips (Protocone/Paracone for dm1s, Protocone/Paracone and Paracone/Metacone for dm2s) to identify the section of interest. Form the section enamel area, dentine (plus pulp chamber) area and enamel-dentine junction (EDJ) length are measured. These values serve as the basis for the computation of the average enamel thickness (AET: the enamel area divided by the EDJ length; in millimetres) and the relative enamel thickness (RET: the average enamel thickness divided by the square root of the dentine area multiplied by 100; scale free). The differences between the AET and RET indexes of Neanderthals and modern humans were tested via a permutation test (n=1,000) on group mean and variance. We used leave-one-out cross-validation quadratic discriminant analysis (QDA) for the taxonomic classification of the specimens. Our results show that the 2D RET most effectively discriminates between modern humans and Neanderthals respect to the 2D AET, the first being a measure of the enamel thickness regressed on crown size and ultimately on body size. The Neanderthal dm1' and dm2' RET indexes are significantly lower than those of modern humans at similar wear stages ($P<0.001$). The cross-validation QDA shows that, using mesial sections, 100% of dm1s and 96% of dm2s are correctly classified, whilst 90% of dm2s are correctly classified using buccal sections. Accordingly, the dm2 mesial section is preferable in terms of accuracy, but the dm2 buccal section might be chosen when the dental sample is affected by wear (where the Protocone wears down faster relative to the Metacone). In conclusion, the enamel thickness and dental tissue proportions are confirmed as suitable for the taxonomical investigation of modern human and Neanderthal deciduous first and second upper molars.

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Poster Presentation

Estimating fetal-pelvic disproportion in our ancestors, with special reference to the MH2 and Tabun pelvis

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Fetal-pelvic disproportion, whereby the fetal head is too large to pass through the maternal pelvis, remains a key indication for cesarean section today. In a previous work exploring multiple combinations of pelvis and juvenile cranial fossils, we assessed eutocic (without disproportion) labor in most hominins, especially Australopithecines. This estimate is useful in understanding the evolution of fetal-pelvic constraint. Here, our goal is to include to our previous analysis the newly described MH2 pelvis (*A. sediba*) (Kibii et al., 2011) and the Tabun reconstruction proposed by Weaver & Hublin (2009) and to compare them to fetal-pelvic combinations we formerly assessed for Australopithecines and Neandertals. M&M: Firstly, a modern obstetrical sample constituted by pelvis and neonates measurements enables us to determine in which way fetal-pelvic configuration is associated with c-section, operative vaginal delivery, or spontaneous vaginal delivery. Secondly, we estimate fetal cranial dimensions of Australopithecines with chimpanzee cranial growth curve that we reversely use and apply on Taung and Dikika. The same methodology is applied for Neandertals on Pech de l'Azé and Roc de Marsal with a modified human growth curve. We also used original data from Mezmaiskaya without growth hypothesis since it is very close to birth. Those estimates, combined with MH2 and Tabun pelvis measurements, provide us an assessment of fetal-pelvic constraint for the five combinations available with these specimens. We also add neonatal cranial capacity for Australopithecine and Middle Pleistocene *Homo* proposed by Desilva et al. (2008) as an additional source of information to estimate fetal cranial dimensions. The MH2 bispinous diameter, the smaller diameter of the birth canal, was evaluated in one hand with correlation between bispinous and transverses diameters of 7 others reconstructions of australopithecine pelvis, and in a second hand with measurements taken on the picture of original reconstruction. A Linear Discriminant Analysis (LDA) was performed using the modern obstetrical sample. Fossil combinations were subsequently added as a "supplementary sample" without effect on LDA. Results: Analyze of LDA shows that MH2 pelvis, like others Australopithecines, belong to eutocic configuration. Combination of MH2 pelvis with fetal measurements based and Taung, Dikika and Desilva estimation, are associated with a probability of 99,6 % (+/- 0,3) with eutocic labor. This was 76,1% (+/-15,4) for Tabun described by Weaver & Hublin (2009). Discussion: We previously demonstrated that Australopithecines belong to eutocic configuration, with a probability of 99,7(+/- 0,3) for AL 288-1 and 99,1 (+/- 0,5) for Sts-14. In this work, MH2 pelvis combined with multiple fetal estimations is systematically associated with eutocic labor. This is consistent with the hypothesis we already proposed that early hominins delivery was eutocic. We also previously estimated that Tabun belongs to eutocic configuration with a probability of 88,6% (+/-7,5).for the reconstruction proposed by Ponce de Léon et al. This reconstruction is more eutocic than the one proposed by Weaver and Hublin. This difference should be explained by the methodological choice followed by these two authors.

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Poster Presentation

Population dynamics of the Early Upper Palaeolithic (Aurignacian and Perigordian) hunter-gatherers of South-Western France

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Demographic change has re-emerged as a prominent research agenda in archaeology for understanding both hominid biological and cultural evolution (e.g. Shennan 2001). This paper presents the results of a palaeodemographic study of the earliest *Homo sapiens* hunter-gatherer populations in South-Western France during the Aurignacian and Perigordian/Gravettian chrono-typological stages (35-21 000 uncal BP). This is achieved through a multiproxy approach (pioneered in Mellars & French 2011) which utilises quantitative information from 3 broad categories of archaeological data; 1) total numbers of occupied sites in the study region; 2) the overall spatial extent of archaeological occupation levels, as a potential reflection of the sizes of the human groups who occupied the sites; and, 3) the overall intensity and duration of human occupation at each site as reflected by the accumulation rates of two different forms of cultural residues (stone tools and faunal remains). The data are studied in conjunction with the ethnographic record of hunter-gatherer demographic and mobility patterns to generate a model of relative population fluctuations both between and within, the chrono-typological sub-divisions of the Aurignacian and Perigordian. These demographic patterns are linked into both the large body of research already conducted on the Aurignacian and Perigordian hunter-gatherers in the region and wider archaeological research into the causes and consequences of demographic variations. I aim to identify the factors which may be responsible for the documented population fluctuations (with a particular emphasis on concurrent climatic and environmental changes) and examine the impact of these changes on other aspects of human socio-cultural activity. Specifically, I explore; 1) the transition between the 'Early' and 'Recent' Aurignacian stages (37,500 cal BP) considering the potential impact of the 'Arcy interstadial' on Aurignacian populations, and; 2) whether the Perigordian Vc sub-phase presents a distinctive demographic signature and how this links into wider debates regarding the validity and interpretation of the 'Noaillan' culture in the region (e.g. David & Bricker 1987; Klaric 2007).

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Poster Presentation

Brain size and parietal shape in the genus *Homo*

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Major trends in hominin cranial evolution, such as basicranial flexion and globularity, have been related to changes in brain size. Increased globularity is expressed, among others, by parietal expansion, a trend that has been closely associated with the emergence of *H. sapiens*. The question addressed here is whether this character can be quantified on isolated parietals, and if so, at what point it appears in the genus *Homo*. For this purpose, a geometric morphometric study has been conducted on 40 specimens ranging from *H. habilis* to early *H. sapiens*. In addition, geographically diverse sample of modern humans was also included. Given that the parietal bones lack type I landmarks except along its sutures, while presumably bearing a large portion of the changes induced by increased encephalization, a set of 147 equidistant semilandmarks was recorded using landmark editor. Shape variation was assessed through PCA, while allometric effects were examined by regressing Procrustes residuals on centroid size and endocranial volume. The overall results are consistent with the notion that parietal shape reflects increased encephalization in the genus *Homo*. This trend can be observed not only in early anatomically modern humans, but also in some members of the Neandertal lineage. However, variation among Middle Pleistocene hominins shows marked deviations both from the among- and between-group pattern. This phenotypic heterogeneity can be seen as indicative of taxonomic diversity in the Middle Pleistocene, or as the result of mosaic evolution. Pending further clarification of the Middle Pleistocene hominin phylogeny, this analysis demonstrates the usefulness of parietal shape as a quantitative character for at least broad taxonomic assessments.

Poster Presentation

A refined chronology of the Mousterian reindeer hunting camp of Les Pradelles (Marillac-le-Franc, France)

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The site of Les Pradelles is located at Marillac-le-Franc, a few kilometers east of La Rochefoucauld, in the department of Charente. It is currently constituted of the filling of a collapsed karstic network, dug in Jurassic limestone. The integrated study of lithostratigraphy and different archaeostratigraphies (faunal mammals, micromammals, lithics and human remains) has recently allowed us to address questions related to the nature and function of the site during the various phases of prehistoric life. The site must have been an aven used by Neanderthal groups like a hunting reindeer camp during the MIS3 (Debénath, 1974), and the Quina Mousterian techno-complex is recognizable throughout the sequence (Meignen and Vandermeersch, 1987; Bourguignon, 1997; Costamagno et al., 2006; Meignen et al., 2007). This site offers two traits that distinguish it from contemporary western European Middle Palaeolithic sites. On one hand, this site yields only very few burnt remains, which is confirmed by the lack of hearths or combustion zones. On the other hand, it yields a large quantity of fragmented human remains (almost 80) interpreted as a consequence of dietary consumption or cannibalism (Maureille et al., 2010). In order to specify the context in which this behaviour developed among Neanderthals in southwestern France, an absolute chronological framework was established using luminescence dating methods. Luminescence dating allows the dating of Pleistocene sediments from different environmental settings by estimating the amount of time elapsed since sedimentary grains were last exposed to daylight before burial. To improve our dating efficiency and evaluate the reliability of the dates, two types of minerals having different luminescence characteristics have been investigated independently: quartz, which is the most common occurrence in sediments and has a high resistance to weathering, and feldspars which appear as an alternative dosimeter. In terms of age-range, the former has a limit around 100-150 ka, whilst the latter allows dating up to 350-500 ka. Feldspars also have the advantage of being less sensitive to radioactive heterogeneities due to their internal dose, but suffer from the problem of anomalous fading which is currently the most important challenge in IRSL dating In this paper, we present preliminary results of OSL dating on quartz and IRSL dating on feldspars with anomalous fading correction and independent age control. At the symposium, we will discuss the refined chronology for the Mousterian reindeer hunting camp of Les Pradelles, where recent discoveries are significant for the Middle Palaeolithic period.

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Poster Presentation

Subadult shoulder girdle and long bones from Sima de los Huesos site (Sierra de Atapuerca, Spain)

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The Sima de los Huesos (SH) is an exceptional Middle Pleistocene site in Northern Spain which has yielded more than 6,500 human fossils assigned to *Homo heidelbergensis* species, that in our point of view is an exclusively European species, ancestral to Neandertals (Arsuaga et al., 1997; Carretero et al., 1997; Martínez and Arsuaga, 1997). These remains belong to a minimum number of 28 individuals based on dental evidence and comprise both sexes (Bermúdez de Castro et al., 2004). 19 of these individuals died between the ages of 11 and 20 years, but there is only one individual under 10. To date, among the postcranial long bones from SH more than 300 fragments belonging to subadult individuals. The minimum number of individuals established varies depending on the skeletal bone studied: scapula (6), clavicle (9), humerus (7), radius (8), ulna (5), femur (14), tibia (7), fibula (3). This large fossil record provides us with significant information about phylogenetic and paleobiological aspects of these humans. For this reason we present here an inventory of the immature scapular girdle and long bone sample from the SH site and explore some of the new insights drawn from their study. Like the adult long bones, subadult ones show some traits that are primitive features within the genus *Homo*, some others display a wide range of variation among the SH sample itself and some other present the derived condition in some traits, relating them to the European phyletic lineage of *Homo neanderthalensis* (Carretero et al, 2005). The variability shown among different traits in subadult specimens can be a clue to understand the morphological variability that it is present in the adult specimens of different species. In this sense, another goal of this study is to explore the most plausible developmental scenario for *Homo heidelbergensis* and its relation to *H. neanderthalensis* and *H. sapiens*. To achieve that purpose, we have estimated very accurately the age at death of the largest number of immature long bones from SH and explored the best-fit association with dental individuals (Bermúdez de Castro et al., 2004). We have taken into account the possible growth and development trajectories and the anatomical pattern of the species under study (García-González et al., 2009) to determine growth and development of the SH population.

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Poster Presentation

The trunk remains from Sima de los Huesos (Sierra de Atapuerca, Spain)

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The site of Sima de los Huesos (Sierra de Atapuerca, Spain) offers a unique glimpse into the anatomy of the Middle Pleistocene hominins due to both the quality and quantity of human fossil remains discovered at this site (Arsuaga et al., 1997). The trunk remains (vertebrae, sternum and ribs) from this site are of particular interest for several reasons. First, these elements are all but nonexistent in the Middle Pleistocene human fossil record, outside of what has been excavated from Sima de los Huesos. Therefore analyses of this material could illuminate evolutionary patterns concerning the spine and thorax within the genus *Homo*. Second, the representation of these anatomical elements (or lack thereof) has been used to propose hypotheses to explain the origin of the human bone accummulation. In fact, compared to other more dense elements such as femora teeth or mandibles, the infra-representation of the vertebral and costal elements are primarily attributed to canid scavenging activity (Andrews and Fernández-Jalvo, 1997). Here we present a revised inventory of the ribs, vertebrae and sternum and the percentage of these elements expected for an MNI of 28 (calculated from dental evidence). Vertebrae from SH number at least 203 (30.21% of the expected; 70 out of the 203 are complete) from 13 different individuals. Seven manubria and 14 sternebrae are also available, and belongs to a minimum of four individuals. Finally, the costal skeleton is represented by at least 114 ribs (16.96% of the expected; only two of 114 are complete) belonging to seven individuals. Preliminary analyses indicate that the SH vertebrae are morphologically different from both Neandertals and modern humans. The size of the two complete ribs from SH (a first rib and an eleventh rib) and the preserved dorsoventral dimensions of a second rib are higher than in modern humans. This finding suggests that the thorax size in the SH hominins was larger than *H. sapiens* and hence, similar to *Homo neanderthalensis* - however, complete mid-thoracic ribs from SH are required to confirm this hypothesis. The number of available vertebrae and ribs (30.21% and 16.96% of expected) are low compared to other postcranial elements, but are five-folded greater in number compared to the vertebrae (6.3%) and ribs (3.1%) that were present at the moment of the study by Andrews and Fernández-Jalvo (1997). Thus, a sampling bias and inherent fragility of vertebrae and ribs is the likely explanation for the representation bias detected by Andrews and Fernández-Jalvo (1997). There is still a large surface to be excavated at SH and the ongoing excavation will likely diminish the bias against trunk elements and will allow to complete more vertebral, costal and sternal elements in the near future.

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Podium Presentation

No longer Acheulian, not yet Mousterian: Cultural and biological transformations at Middle Pleistocene Qesem Cave, Israel

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No longer Acheulian, not yet Mousterian: Cultural and biological transformations at Middle Pleistocene Qesem Cave, Israel Gopher Avi and Barkai Ran Qesem Cave is a Middle Pleistocene site in Israel dated to 420,000-200,000 kya (Gopher et al. 2010) and assigned to the Acheulo-Yabrudian Cultural Complex (AYCC) of the late Lower Paleolithic. The cave reveals a rich and well-preserved array of lithic and faunal remains as well as human teeth. It provides a good context in which to test hypotheses concerning the intriguing liaison between the environment, culture, and biology. Here we summarize a decade of research suggesting that the unique cultural transformation seen at Qesem Cave might actually be related to local human evolutionary processes and the appearance of a new hominin lineage. The 7.5 m stratigraphy of Qesem Cave offers a detailed background of sediment deposition that occurred as the karstic chamber cave was aging. Various environmental proxies correlate with global climatic timelines (stages 11-7) and more specific data reveal the dynamics of a changing ecology within generally Mediterranean regimes of forest vegetation zones. The AYCC is a unique, local cultural entity clearly differing from the preceding Acheulian and the proceeding Mousterian. It shows a suite of innovative behaviors including: the habitual use of fire; hearth-centered activities and functionally distinct activity areas; sophisticated raw material acquisition (flint quarrying); intensive and systematic blade production employing an efficient, innovative, and thoughtful technology; a noticeable presence of 'ahead of their time' Quina scrapers; and intensive flint recycling activities. The faunal chain operatoire indicates cooperative hunting targeted mainly at prime age fallow deer followed by transportation of selected body parts to the cave after which was conducted on-site butchering by use of a tool kit comprising blades and small recycled flakes before eventual consumption. Patterns of cut marks seem to indicate unique habits of on-site butchering and meat sharing. The study of human dental remains concluded that these mostly resemble the Skhul-Qafzeh samples of the Middle Paleolithic Levant while a *Homo erectus* assignment is clearly not tenable (Hershkovitz et al. 2011). Assuming this is the case, two questions arise – why did this evolution occur in the Levant, and why ca. 400 kya ago? Based on a newly developed bio-energetic model conjoined with the cultural transformations demonstrated at Qesem Cave, we offer an explanation accounting for the demise of *Homo erectus* and the appearance of a new hominin lineage some 400 kya (Ben Dor et al. 2011). The model suggests that the disappearance of elephants from the human diet around this time triggered selection in favor of those who were better adapted to the hunting of larger numbers of smaller, faster animals. Consistent with a recent evolutionary model concerning Pleistocene human populations of Europe, the Levant appears to be a Central Area of Dispersals of Eurasia, an "origin region" for human species biodiversity (Bermúdez de Castro and Martinón-Torres 2012). Acknowledging we are challenging a well-established paradigm, our (as yet) insufficiently comprehensive hypothesis is offered with the intention of opening new vistas for discussion.

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Podium Presentation

A new ending for the Mousterian in South-western France? A revision of the Final Middle Palaeolithic record in South-western France and its implications

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The extremely rich archaeological record of south-western France has served as a basis for various models concerning the end the Mousterian and the beginning of the Upper Palaeolithic. In this region, it is generally accepted that the final phase of the Middle Palaeolithic is represented by the Mousterian of Acheulean Tradition (MTA) given both its stratigraphic position and the presence of certain technological traits suggesting a link with the ensuing Châtelperronian (Pelegrin 1995; Pelegrin and Soressi 2007). Here we propose a new perspective on the final Middle Palaeolithic chrono-cultural succession in this key region based on a systematic revision of major archaeological sequences, together with the results of new excavations, taphonomic analyses and a consideration of recently published radiometric dates. There now appears at least one, perhaps two, techno-complexes situated stratigraphically between the MTA and layers containing initial Upper Palaeolithic assemblages: Discoid-Denticulate Mousterian (Thiébaut, 2005, 2007) followed chronologically by a 'Levallois Mousterian with large scrapers'. Apart from further questioning the MTA-Châtelperronian techno-cultural connection, these techno-complexes, estimated to date between 45 and 39 ka BP, significantly nuance the traditional Mousterian succession in south-western France (Mellars 1988, 1996) and suggest a more complex cultural scenario for the final Neanderthal occupation of the region than is normally admitted, especially in the light of recently developed paleo-ecological models (Discamps, 2011). We discuss the ramifications of this newly updated archeo-sequence (Jaubert, 2010), not only in terms relative to the disappearance of the Neanderthals, but for our general chronological, technological and behavioural understanding of the end of the Mousterian sequence in the southwest of France.

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Podium Presentation

Comparative morphological and morphometric description of the hominin calvaria from Bukuran (Sangiran, Central Java, Indonesia)

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The fossil hominin calvaria, Bukuran, was discovered on the lower part of fluviatile sand of Kabuh formation, few meters above the Grenzbank-Kabuh boundary, in association with faunal remains near Sendangbusik in 1997 in the Sangiran Dome (Central Java, Indonesia). The specimen will be described, followed by morphometrical study including cranial capacity estimation. Comparison with a large Asiatic and African sample of *Homo ergaster/erectus* (n=26), archaic *Homo sapiens* (n=11) and extinct *Homo sapiens* (n=20) will be supported with a Procrustes analysis performed on 3D cranial landmarks (Generalized Procrustes Analysis) selected according the preservation of Bukuran specimen. Corresponding to a partial skullcap with the frontal area including nasion and the supraorbital torus, the left temporal and parieto-occipital portion extending to behind the foramen magnum area, Bukuran shows pathologic depressions on the external surface of the bone which don't affect the endocranial surface. Attributed to a young adult male, Bukuran shows clear affinities with fossil hominids from the Kabuh levels (Sangiran dome) by sharing of diagnostic *Homo erectus* morphological features and results of metrical analysis.

Poster Presentation

Bone artifacts from Bulgarian Initial Upper Paleolithic (42-36 Ky)

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The bone artifacts from the Upper Paleolithic of Bulgaria are not well known. The Middle / Upper Paleolithic transition is represented in Temnata dupka- the upper layer VI (TD-II), layer 11 of Bacho Kiro and probably layer 6/7 of Kozarnika. Chronologically these sites are between 42 and 36 ka BP. The artifacts from Temnata Dupka are retouched bones and retouchers. We can add the ornaments of the same period in Bacho Kiro, which were prepared on teeth with perforation by rotation or grooves. In Kozarnika data are scarce, due to the small amount of diagnostic forms which are represented by small awls on fragments of ribs and ornaments of teeth with grooves. The more advanced phase of the early Upper Paleolithic (39-36 ka BP) is the initial phase of Kozarnikien and we observed in Kozarnika and Redaka II. The awls are mainly economic, on fragments of ribs, with only distal fragments of similar size preserved. Their fabrication is simple, easy to apply and does not require large investments of time and work. The ornament consists of pierced shells and beards bone tubes. Our analyze shows similar development during the first phase of the Upper Paleolithic in North-West part of Bulgaria and differences with Temnata dupka and Bacho Kiro that are confirmed by the stone assemblages.

Acknowledgements: The analysis of the artifact was undertaken within my thesis and completed with spatial analyses thanks to a post PhD grant from Region Aquitaine. The research of Kozarnika and Redaka II was undertaken within the framework of an international cooperation between the National Institute of Archaeology of the Bulgarian Academy of Sciences (N. Sirakov) and the UMR5199 CNRS PACEA/PPP (J.-L. Guadelli), the works of the Franco-Bulgarian Prehistoric Mission in Northern Bulgaria is financially supported by the Advisory Committee of the Archaeological Researches abroad (MAEE, France), by the CNRS, by the Region Aquitaine, by the University Bordeaux 1 (exceptional funding in 2004), by the Max Planck Institute for Evolutionary Anthropology, Department of Human Evolution (2004) and by the Bulgarian Academy of Sciences. To all of them we send our deepest thanks.

Podium Presentation

Archaeological levels from Lower, Middle and Upper Pleistocene of Pradayrol (Caniac-du-Causse, Lot, France): preliminary studies

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Pradayrol is located in the southern part of the Causse de Gramat (Caniac-du-Causse, Lot, France) on the edge of a sinkhole. This is a complex karst today extended by a rock shelter. Discovered and excavated between 1998 and 2005 by M.-R. Séronie-Vivien, Pradayrol delivered a Middle Pleistocene sequence of more than 2 m thick dated between 420 and 335 ky. He has founded a fauna which include *Canis etruscus*, *Ursus deningeri* and *Hystrix cristata*, an Early Middle Palaeolithic lithic industry on quartzite and a human tooth (upper central incisor) in layer 2 (dated 335 ky). The resumption of excavations in 2010 by Jean-Luc Guadelli and Alain Turq taking into account all of the deposit showed the complexity of the site. The exploration of the shelter and terrace showed from one hand a more recent sequence (Upper Pleistocene) on the terrace containing a Mousterian in the context of a hyena den and from another hand an older sequence in breccias preserved on the roof of the rock shelter, in some pillars (inside and outside) and on the terrace. Only partially explored this layer contains a lithic industry on quartzite and an abundant fauna (including *Xenocyon*, *Ursus cf. etruscus*, *Dicerorhinus cf. etruscus*, *Equus sp.*, ...), which allows us to hypothesize that they could be dated between the late Lower Pleistocene and the early Middle Pleistocene i.e. between MNQ 19 and MNQ 20; it is at least older than 900 ka. Even if part of the lithic and bone found today in the breccias is in a derived position (geological observations and the presence of a blunt or a polish on some pieces), Pradayrol, should quickly reach the rare French sites set delivering so old industry and fauna in stratigraphic context.
Acknowledgements: The research in Pradayrol are financially supported by the Ministère de la Culture et de la Communication (France) which is gratefully acknowledged.

Poster Presentation

Gönnersdorf goes 3D - Palaeolithic art from a different angle

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The poster presents the first results of a pilot study. The reinvestigation of selected engravings on slate plaquettes from the Late Upper Palaeolithic site of Gönnersdorf (Rhineland/Germany) was undertaken for the first time by the application of 3D scanning methods. In addition new options of 3D photography are tested as a further visual support of investigation and documentation. The subjective assessment and interpretation of an engraving applied so far will be supplemented by a metric and objective approach. The main goal of this project was to record not only the size of the engravings, but also the engraved lines, in order to compare them in a more objective manner. Lines forming representations can be measured enabling differences and similarities, as well as details and special features in terms of reconstruction of shape to be determined, thus permitting a comparison of the representations and their details. The aim is to obtain further information about stylistic aspects of the depictions, as well as to identify inner chronologies and the interrelationship of the engraved lines. More objective results may allow better comparisons of the engravings, their characteristic details and features. In the course of the pilot study it was possible to decipher further components of representations, to classify and to illuminate features, as well as to provide new insights into relationships between different representations. The perspective is to discern different artists as well as to obtain a better understanding of the art of former hunter- gatherer societies.

Podium Presentation

Chronostratigraphic background of the early Upper Palaeolithic site Markina Gora (Kostenki 14): a reference sequence for Central Russia

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Located along the western slope of the Don Valley, south of Voronezh, the Upper Palaeolithic site of Markina Gora (Kostenki 14) provides one of the best documented Middle to Late Pleniglacial pedosedimentary successions in Central Russia. The record encompasses several cultural layers, from Early Upper Palaeolithic to Gravettian, as well as two independently dated markers: the Campanian ash, related to an Aurignacian assemblage, and the Laschamp palaeomagnetic event recorded in between the cultural layers IVb and IVa (Sinitsyn, 1996; Velichko et al, 2009). The chronological background of the Markina Gora sequence is based on a long series of radiocarbon dates on charcoal ranging from ca. 38 to 23 ka uncal BP (Haesaerts et al., 2004; Sinitsyn, Hoffecker, 2006) reinforced by paired datings produced in the Oxford laboratory, applying ABA and ABOx-SC methods (Douka et al., 2010, Wood et al. in press). Here we will show how the conjunction of this record with these of the adjacent sites of Kostenki 1, Kostenki 12 and Kostenki 17, allows the establishment of a high-resolution regional sequence, which could be used as a key for long distance correlation between the Russian Plain, the East Carpathian Area and the Middle Danube Basin. This approach also represents a major contribution to the understanding of the development in a global perspective, of a large set of Palaeolithic occurrences, including Early Upper Palaeolithic, Spitsynian, Gorodtsovian, Streletskian, Aurignacian and Gravettian.
Acknowledgements: The loess research in Kostenki is a contribution to the Sc-09 and MO/36/021 research projects of the Belgian Science Policy, with complementary funding from the INTAS 2000-879 research project. The Oxford dates were funded by a NRCF-NERC grant (NF/2009/1/19). Fieldwork and laboratory analysis 2012 is funded by the McDonald Institute for Archaeological Research, University of Cambridge, and the Max-Planck-Society.

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Poster Presentation

Evolutionary adaptations of the hominid vertebral column

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The vertebral column of AL 288-1 ("Lucy", *Australopithecus afarensis*) has been described to show Scheuermann's disease. Today, this pathology is mainly restricted to bipedal humans. It develops around puberty and is the most common spinal disorder in adolescents, affecting 4-7% of the general population. Clinically, it results in a thoracic or thoracolumbar hyperkyphosis and is associated with back pain. Here, we present five additional early hominid fossils that show vertebral alterations typical of Scheuermann's kyphosis. Due to the scarcity of fossil vertebrae, this may reflect a considerably higher prevalence of this disorder in the Plio-Pleistocene than today. Hereditary and mechanical factors are suspected to be mainly responsible for the pathogenesis of this disorder. Yet, other early hominid vertebral columns such as that of KNM-WT 15000 (*Homo erectus*) also show signs of mechanical overloading. This might testify to the massive mechanical strains placed on the axial skeleton of our ancestors. Because stress is directly proportional to the force over the loaded area, we suggest that the relatively smaller vertebral cross-section of early hominids compared to modern humans is an important factor contributing to the frequent biomechanical failures of the early hominid spine. Our results thus corroborate the hypothesis that the vertebral column of modern humans has been shaped by a long process of natural selection and cannot be viewed as a maladaptation to habitual upright bipedalism.
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Podium Presentation

New Neanderthal remains from Mani peninsula, S. Greece

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The Kalamakia Middle Paleolithic site, a karstic cave formed in the limestone cliffside on the western coast of the Mani peninsula, Greece, was excavated by an interdisciplinary team from the Ephoreia of Paleoanthropology and Speleology (Greek Ministry of Culture) and the Muséum National d'Histoire Naturelle (Paris) from 1993 until 2006. The site is dated to between ca. 100,000 (U / Th) and >39,000 (AMS 14C) years B.P. and has yielded Mousterian lithics with Levallois elements. A rich fauna has been recovered, dominated by fallow deer and comprising seventeen large mammal taxa, of which several species of carnivores. Fifty nine microvertebrate taxa, including three species of tortoise, and abundant marine shells have also been recovered. The site has yielded fourteen human remains from several layers. These include 10 isolated teeth, a cranial fragment and three postcranial elements. The remains represent at least eight individuals, two of them subadults. One of the specimens shows clear carnivore modification, suggesting that some of the remains could have been scavenged by carnivores. Additional, anthropogenic, modifications in the form of interproximal grooves, are present on two of the isolated teeth. The Kalamakia remains can be identified as Neanderthal on the basis of diagnostic morphology on most of the dental remains and one of the postcranial elements. Furthermore, diagnostic Neanderthal elements originate from all levels of the excavation, indicating a persistent Neanderthal presence through time. A diet similar to that of Neanderthals from mixed habitat is suggested by our analysis of dental wear (Occlusal Fingerprint Analysis) and microwear (Occlusal Texture Microwear Analysis), in agreement with the faunal and palynological analyses of the site. These new fossils significantly expand the Neanderthal sample known from Greece. Together with the human specimens form Lakonis and Apidima, the Kalamakia human remains add to the growing evidence of a strong Neanderthal presence in the Mani region during the late Pleistocene.

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Podium Presentation

Evaluating recent evolution, migration and Neandertal ancestry in the Tyrolean Iceman

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Paleogenetic evidence from Neandertals, the Neolithic and other eras has the potential to transform our knowledge of human population dynamics. Previous work has established the level of contribution of Neandertals to living human populations. Here, I consider data from the Tyrolean Iceman. The genome of this Neolithic-era individual shows a substantially higher degree of Neandertal ancestry than living Europeans. This comparison suggests that early Upper Paleolithic Europeans may have mixed with Neandertals to a greater degree than other modern human populations. I also use this genome to evaluate the pattern of selection in post-Neolithic Europeans. In large part, the evidence of selection from living people's genetic data is confirmed by this specimen, but in some cases selection may be disproved by the Iceman's genotypes. Neolithic-living human comparisons provide information about migration and diffusion of genes into Europe. I compare these data to the situation within Neandertals, and the transition of Neandertals to Upper Paleolithic populations – three demographic transitions in Europe that generated strong genetic disequilibria in successive populations.

Podium Presentation

Preliminary anthropological results from Cussac Cave (Gravettian)

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Cussac Cave (Dordogne, France) was discovered in September 2000. The main striking features of the site are its impressive length (1.7 km of galleries) and the unique combination of wall art (including rare themes like birds or "monsters") and deposits of human remains in disused bear's nests. Both the style of the art and a direct radiocarbon date of 25120 ± 120 BP indicate a Gravettian age (Aujoulat et al., 2001). The cave may have been intentionally sealed during the Gravettian and has stayed protected until its discovery: preservation is exceptional. Cussac was designated as a scheduled site in November 2000, to maintain its integrity. Thus, only very limited access to and direct interventions on the Gravettian human remains are possible. Since 2009, the scientific study of the cave has been conducted by an interdisciplinary team under the supervision of Pr. Jaubert (Bordeaux 1 University, France). The goal of this paper is to present the main results obtained so far by the anthropological team. These results concern the Minimum Number of Individuals, the biological characteristics of these subjects, and the nature of the deposits. The human remains lie exposed on the cave floor, in three different loci. Locus 1 is mainly composed of long bone shaft fragments and complete or fragmented small bones (two individuals at least, one immature and one adult). The remains from locus 2 represent a virtually complete adult individual. More than 80 bones, from at least three individuals, have been identified for locus 3. Unlike locus 1, the majority from locus 3 are complete or subcomplete (e.g. 3 complete radii and 3 complete humeri were recognised). The spatial distribution of the bones, the representation of the skeletal elements, and areas of red pigment near or on the bones allow us to discuss the ritualised nature of these deposits and the possible existence of secondary deposits - largely unknown for the Gravettian - in this unique site, considered the "Lascaux of engraving".

Poster Presentation

The disappearance of the Neandertals in the Central Mediterranean region of Iberia. New integrated and multidisciplinary data from El Salt (Alicante, España)

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We present new paleoanthropological and geoarchaeological data as well as TL and OSL datings from the Middle Palaeolithic sequence of El Salt (Alcoy, Spain), which is currently undergoing high resolution multidisciplinary archaeological investigation. The research project is framed within the context of debate on the disappearance of the Neanderthals and the earliest Upper Palaeolithic in Europe and has a regional scope, restricted to the Iberian Mediterranean. At present, the processes that led to the disappearance of the Neandertals - the earliest human population documented in the Alicante region and to the subsequent arrival of anatomically modern humans are unknown. Besides El Salt, which is chronostratigraphically framed within MIS 3, our current work also involves the study of a nearby pre-MIS3 sequence (Abric del Pastor, Alicante). Preliminary results from El Salt (presented here) point to an inflexion in Neandertal presence around 50 ka BP coinciding with a paleoenvironmental shift towards dry conditions. The effects of such shift on human dynamics need to be further investigated. Our multidisciplinary approach involves a close integration of geoarchaeological techniques (chronostratigraphy, geomorphology, paleobotany, geochemistry and micromorphology) and the study of the lithic and faunal record in order to obtain contextualized reconstructions of the Neandertal occupations documented at the site.
Acknowledgements: This research was funded by Spanish I+D Project HAR2008-06117/HIST, under the direction of Professor Bertila Galván

Poster Presentation

New insights for the chronology of Grotte Vaufrey through TT-OSL dating on sedimentary quartz

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The Grotte Vaufrey (Dordogne, SW France) is famous since the 1980's for its outstanding sequence of Acheulian and Mousterian occupations. In such a context, the establishment of a chronological framework for the lithic and faunal remains distributed across 12 depositional units has for a long time been one of the major issues of the site understanding. In this prospect, numerous researches based on paleontology, geology and palynology - presented in a monograph (Rigaud et al., 1988) - focused on locating in a common timescale the main events that have affected the sequence. However, despite an interdisciplinary approach aimed at integrating all the data, some inconsistencies between the different hypotheses persisted (Delpech & Laville, In Rigaud et al., 1988). A recent review dedicated to the geology of the site concluded to two possible scenarii, supporting either a "short" or "long" chronology for the infilling of the cave (Texier, 2009). In parallel, two dating methods had been applied in order to get geochronological data: TL on burnt flints and U-series on stalagmitic floors and calcite fragments embedded in the sediment deposits. However, because of the scarcity of suitable material for TL and the poor representativeness of most U-Th datings, those results did not allow to enlight the chronological question. Nevertheless, since the implementation of those works, many methodological advances have been made in luminescence; in particular, the Optically Stimulated Luminescence (OSL) dating method is now widely used to date sedimentary quartz deposition. Here, we report the application of this method to eight sediment samples distributed all along the stratigraphy. Due to the magnitude of the radiation doses measured on site, the classical approach (e.g. based on the analysis of the fast component of the OSL signal) was not applicable. In consequence, a recently developed procedure based on the use of a thermally transferred OSL signal (TT-OSL), which saturation dose level allows to date samples of Middle Pleistocene age, was implemented. The TT-OSL dating results allowed to establish a chronological framework in which the relative chronological data previously acquired can be integrated. From an archaeological perspective, the results show the high antiquity of the lithic industries suggesting that Acheulian occupations can be attributed to periods contemporary to OIS 10 and 8, and that Typical Mousterian is attested from OIS 7 to OIS 5. The chronological data obtained in this study shed a new light on the comparison of the lithic industries of the Grotte Vaufrey with other Lower and Middle Palaeolithic sites from SW France and bring also precision for the biochronological regional framework.

Acknowledgements: This work was supported by a PhD scholarship awarded by the region Aquitaine (France). We want to thank the SRA Aquitaine for field sampling permission.

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Podium Presentation

A New Framework for the Upper Paleolithic of Eastern Europe

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The results of field and laboratory research during the past decade require a new classificatory framework for the Upper Paleolithic in Eastern Europe. It is now apparent that people making artifacts assigned to the Ahmarian industry occupied both the southern and northern slopes of the Caucasus Mountains (i.e., Ortvale Klde, Layer 4d; Mezmaiskaya Cave, Layer 1C). Their sites probably indicate a separate movement of anatomically modern humans (AMH) from the Near East directly into Eastern Europe, establishing an independent line of development during the earlier Upper Paleolithic that parallels the Proto-Aurignacian and Aurignacian sequence in Western and Central Europe. This East European industry is most fully represented at the Kostenki-Borshchevo sites on the Don River before 40,000 cal BP (e.g., Kostenki 14, Layer IVb). It is followed by a closely related industry, also characterized by bladelet production, that is dated to the interval between 40,000 and 30,000 cal BP in Crimea and the East European Plain. The proposed new framework reflects recognition of these distinctive East European entities and of two environmental events that had significant impacts on human settlement in Eastern Europe: (1) the Campanian Ignimbrite (CI) volcanic eruption (40,000 cal BP); and (2) the Last Glacial Maximum (LGM) (25,000 cal BP). It has been suggested that the early Upper Paleolithic (EUP) industry present in Eastern Europe before 40,000 cal BP should be labeled an eastern variant of the contemporaneous Proto-Aurignacian of Mediterranean Europe. However, given the separate movement of people from the Near East via the Caucasus Mountains, and independent development of the East European EUP, this industry is more appropriately termed "Proto-Gravettian." The younger bladelet industry, which includes assemblages at Buran-Kaya III (Layer 6-1), Mira (Layer II/2), Kostenki 8 (Layer II), and probably Shlyakh (Layers 4C, 6), may be termed "Early Gravettian" to distinguish it from the classic Gravettian industry that dates to less than 30,000 cal BP (e.g., Avdeevo, Zaraisk). The upper temporal boundary of the Proto-Gravettian corresponds to the CI eruption (40,000 cal BP), while the classic Gravettian of the East European Plain appears to have been effectively terminated by the LGM (25,000 cal BP). Several sites that date to the 40,000–30,000 cal BP interval (e.g., Kostenki 1, Layer III) contain elements that suggest a connection with the Aurignacian technocomplex of Western-Central Europe. These assemblages may be placed into the category of "Eastern Aurignacian," which reflects differences in content with the West and Central European sites. The apparent spread of this industry into Eastern Europe from Central Europe may be related to the impact of the CI eruption on portions of the East European Plain.

Poster Presentation

Locomotor Convergence and other Homoplasies: the *Homo* and *Hylobates* Example

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Selection is the only evolutionary force thought to bring about convergence, the phenomenon in which two or more taxa independently evolve similar morphology. The longer in evolutionary time two taxa have been separated, the easier it should be to distinguish such convergent characters from characters that are identical by descent (homologous characters). For this reason, the hominoid genera *Hylobates* (here taken sensu lato to include *Symphalangus*) and *Homo*, having separated phylogenetically ca. 25 million years ago, should provide relatively easy detection of convergent features. This paper examines the postcranial skeleton of these two taxa in search of convergent characters. Characters related to locomotion were preferentially chosen since locomotor features tend to be under strong selection, and because likely the most striking derived behavioral feature shared by *Homo* and *Hylobates* is long-distance travel and wide ranging behavior. Also, since this wide ranging / long-distance traveling behavior is not observed in other hominoids, parsimony dictates that it was probably not present in their last common ancestor. One major difference between *Hylobates* and *Homo* with regard to their long-distance travel, however, is that *Hylobates* accomplishes it via nearly exclusive use of the upper limb (brachiation), whereas in *Homo* it is accomplished via exclusive use of the lower limb (bipedalism). Since effective limb length explains 98% of locomotor efficiency (Pontzer 2007), it is not surprising that *Hylobates*' upper limb, and *Homo*'s lower limb are elongated. A second homoplasy not found in other hominoids is that both *Homo* and *Hylobates* are characterized by barrel-shaped chests, primarily achieved via an expansion of the upper thorax. This is likely a means of increasing vital capacity for long-distance locomotion, but also, since both *Homo* and *Hylobates* hold the trunk upright during locomotion, gravity and the weight of the lungs act such that the capillaries in the inferior portion of the lungs are more distended, and while total ventilation and blood flow are greater at the base of the lungs, the lung's base also has lower ventilation : perfusion ratios than its apex. Likewise, the resistance to blood flow is much lower at the apex vs. the base of the lungs (Fung 1990). Therefore, expansion of the upper thorax may "pay" more dividends than would an expansion of the inferior portion of the lungs. Finally, while humeral morphology is quite distinct between *Homo* and *Hylobates* (the former have humeri of moderate length with relatively broad cross-sections, while the latter have very long humeri that are comparatively narrow in cross-section), 3D morphometric analysis reveals that there is one interesting similarity between the humeri of these two genera. While most hominoids have slightly antero-posteriorly bowed humeral shafts, in *Hylobates* and *Homo*, the shafts are relatively straight. This is thought to be due to the fact that unlike the "great" apes, the upper limbs of *Homo* and *Hylobates* are almost exclusively loaded in tension, and not compression.

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Poster Presentation

Whats modern in modern human spatial behaviour? Spatial analyses as a guide book to Palaeolithic and Mesolithic socioeconomic organisation

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The use of space is the most prominent manifestation of the innovations characterizing modern human socio-economic behaviour. Spatially differentiated units seem to reflect an organization of space beyond ephemeral activities. On-site activities as well as land-use strategies delimited and structured space following an underlying set of conventions, habits and economic constraints. This new form of structuring of sites and territories is interpreted as a modern human invention: Modern humans make themselves at home. Until today our lives are governed by this spatiality. Nevertheless, the consequences of this "revolution of spatial behaviour" have yet not been fully explored. In a diachronic perspective, spatial analysis of archaeological finds, structures and features reveals common traits of modern human behaviour that distinguish the archaeological record since the beginning of the European Upper Palaeolithic. Research undertaken during the last decades at the Monrepos Archaeological Research Centre and Museum for the Evolution of Human Behaviour (formerly "Forschungsbereich Altsteinzeit - Department of Palaeolithic Research" of the Römisch-Germanisches Zentralmuseum Mainz) has been aiming to a large degree at understanding the parameters involved in the evolution of spatial behaviour. Precisely dated and well-documented sites that form the basis of our studies provide spatial data of finds and features at high resolution. The sites addressed span the period from the Lower Palaeolithic until the Mesolithic with the majority of sites being open-air localities in Central Europe (e.g. Miesenheim I, Bilzingsleben, Neumark-Nord, Breitenbach, Gönnersdorf, Andernach, Ölknitz, Niederbieber, Duvensee). All these have revealed well-defined in-situ situations of living-floor character with excellent preservation of organic matter, allowing for the integration of results from specific sub-disciplines within Palaeolithic and Mesolithic research (e.g. lithic and archaeozoological analyses). Together with the application of geo-statistical methods, experiments, refitting and microwear analyses they allow the reconstruction of past hominin daily-life activities in their spatial context. Here, we will report the major results of our research established thus far, outlining the principal changes underlying the modern human "revolution" of spatial behaviour. We will try to present an agenda for future research.

Podium Presentation

Language origin, language contacts and linguistic diversity: the case of Hunter-gatherers in Africa

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Today, more than 6000 languages are spoken by *Homo sapiens*. The time and place of origin of these languages is a hotly debated issue. Was there a single place of origin (monogenesis hypothesis) or several places of origin at different time periods (polygenesis hypothesis)? By which process did we get to the current linguistic diversity? Based on linguistic data collected from languages spoken today, historical linguists are able to reconstruct proto-languages spoken before today's languages started to diversify. Unfortunately, the comparative method used to reconstruct languages does not permit tracing back to very early periods. The speed of linguistic change present in all languages obscures linguistic comparisons between languages separated from each other for more than 8 to 10.000 years. This time barrier is far from the time range of the emergence of the sophisticated language spoken by *Homo sapiens* generally evaluated in the 60- to 100.000-year time range. In the last 30 years, research in population genetics has presented a general scenario for human population movements for the last 100.000 years. During the last decade, human population movements have been described in more detail (male vs. female migrations, approximate population size, evaluation of separation dates between different groups), thus allowing for a better understanding of human occupation of different geographical areas. The scientific challenge is to connect population movements and languages spoken by these populations. Languages spoken today can be language "descendants" of languages spoken by ancestors or languages spoken by other populations with which there was contact. In this paper we propose to look at the evolution of linguistic diversity by considering the languages spoken by two large groups of hunter-gatherers in Africa: the Pygmies and the Khoisan on which a very significant number of papers have been published recently in genetics and in linguistics (see references). These two Hunter–gatherer groups have been in contact with non hunter-gatherers (farmers and cattle herders) and in some cases, they "borrowed" the languages of the "contact" group (Pygmy situation) but in other cases, they kept their own language and even in some cases, they influenced the language of the contact group (Khoisan case). Although the situation we are describing is fairly recent (the last 4000 years) it provides an interesting scenario (linguistic inheritance vs. linguistic contact) for a better understanding of the evolution of linguistic diversity. In our conclusion we explain that the apparent "paradox" between these two situations: "loss" of "original language (Pygmy case) vs. preservation of the language in the Khoisan case is the time of contact with the "invading" populations.

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Poster Presentation

Iberomaurusian Funerary Behaviour at Grotte des Pigeons

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Iberomaurusian burials representing a shared cultural tradition that began in the Late Palaeolithic have been recorded at numerous locations in North West Africa, typically in caves or rock shelters close to the Atlantic or Mediterranean coasts. Grotte des Pigeons at Taforalt in north-east Morocco is particularly well known for a large assemblage of Iberomaurusian skeletons recovered during excavations directed by Abbé Roche during the 1950s. Archaeological excavations carried out between 2005 and 2010 revealed additional burials in relatively undisturbed deposits in an alcove at the back of the cave, designated Sector 10. These burials have provided new insights into mortuary activity at Grotte des Pigeons and into the lives of those who were buried. The newly excavated burials from Sector 10 reveal a pattern of funerary behaviour that incorporates several features previously reported at Grotte des Pigeons or at other Iberomaurusian sites but is not identical in detail to any of them. The burials were primary inhumations, but the intensive re-use of the deposits over a short period of time and the close spatial proximity of the burials had resulted in the truncation of existing burials and secondary re-deposition of disturbed skeletal elements. Recurring features within the burials include a seated or semi-reclining body position, the occasional use of ochre, placement of bodies beneath stones, and the inclusion of multiple horn cores from Barbary sheep and a large bovid; but none of the burials incorporate all of these features. There is no unambiguous evidence for intentional recovery of skeletal elements for ritual purposes and no evidence for post mortem manipulation or direct application of ochre to defleshed bones. This may imply an elaboration of funerary behaviour over time at Grotte des Pigeons, since there is clear evidence of post mortem modification and secondary re-deposition within some of the burials excavated by Roche.

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Poster Presentation

Palaeolithic Landscapes and Archaeology of the Southwestern Arabian Peninsula: Preliminary Reconnaissance in Jizan Region, Saudi Arabia

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The archaeology of the Arabian Peninsula is pivotal to the understanding of the timing and mode of the earliest dispersals of modern human populations from Africa into Eurasia. Traditional emphasis on the Nile-Levant dispersal route has been challenged by growing evidence supporting a Southern Route, through the Bab al Mandab Straits (e.g. Beyin 2006; Petraglia and Alsharekh 2003). Yet, despite recent key developments in our knowledge of hominin occupation in Arabia (e.g. Armitage et al. 2011; Rose et al. 2011), the Palaeolithic archaeology of the peninsula remains patchy. This situation is particularly marked in the coastal region of Southwestern Saudi Arabia, where little work has been carried out since the Comprehensive Archaeological Survey Program in the 1980s (Zarins et al. 1980, 1981). This region is particularly key in dispersal debates given its proximity to the Bab al Mandab Straits and a now-submerged landscape in the southern Red Sea potentially utilised by populations to move between Africa and Arabia. Identification of possible routes and conditions of hominin dispersals from Africa has focussed on reconstructing broad-scale climatic and vegetation zones. Dispersals into, and across, Arabia were probably controlled by global climatic and sea level fluctuations, with low sea stands allowing dispersals across water bodies, and periods of humidity allowing expansion of occupation ranges into present-day deserts. Yet within broad-scale reconstructions, the physical morphology of the landscape is also critical to palaeoenvironmental reconstruction at the scale experienced by hominin populations. Topographical features, e.g. mountains, springs and coastlines, can moderate or amplify the influence of climate at the regional and local scale. They can shape patterns of erosion and sedimentation, impose or alleviate physical barriers to movement, and modify the distribution and accessibility of plant and animal resources in ways critical to human ecological and evolutionary success. Tectonically-active landscapes and coastal regions in particular, such as the Red Sea basin, produce dynamic landscapes that may have created potentially attractive conditions for settlement and dispersal. The DISPERSE project, an ERC-funded collaboration between the University of York and the Institut de Physique du Globe, Paris, aims to develop systematic methods for reconstructing landscapes associated with active tectonics and sea level change at a variety of geographical scales, and their impact on patterns of human evolution and dispersal. These approaches will utilise remote sensing techniques combined with archaeological and geomorphological field survey on land and underwater, to reconstruct landscapes around the western Arabian escarpment and the now-submerged territory of the southern Red Sea. This poster presents the preliminary results from reconnaissance by DISPERSE in the Jizan region during May-June 2012. This developed a preliminary characterisation of the landscape extending inland from the coastline to the watershed of the Arabian escarpment; potentially a major zone of settlement and movement between the coast and the hinterland. Such characterisations will be used to identify areas of archaeological potential and interest ahead of detailed archaeological survey. Ultimately, such characterisation will allow these sites to be placed within their landscape context to test models of the factors controlling human occupation and dispersal.

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Poster Presentation

Investigating Paleolithic projectile armatures and delivery systems: results from a new controlled ballistic experimental protocol

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Identifying the existence and type of stone-tipped projectile weapons in prehistory is important for understanding hominin strategic behavior and cognitive capacities. Of particular interest is the question of when and where complex projectiles, i.e., weapons launched with a mechanical propulsion device, such as the bow-and-arrow or spearthrower were first used. Interpretations are often justified based on the similarity of archaeological fractures with fractures obtained from experimental hunting situations. These, especially if they can be distinguished from taphonomic damage or damage associated with other tasks, are called "diagnostic impact fractures" (DIFs). However, despite the many advantages of realistic hunting experiments, the variability in the target materials and the ability to correctly measure launching speeds results in causal ambiguity in the obtained experimental fractures, especially with respect to the method of delivery of the weapon. We present a new experimental design aimed at isolating the key element of weapon delivery, namely speed and kinetic energy, while also controlling for projectile tip shape, angle of incidence, and target materials. We employed near-identical copies of a single Levallois point cast in soda-lime glass, slot-hafted into interchangeable foreshafts and attached to a spear. The spear was fired from a calibrated air-gun, hitting a target made of 20% ballistic gelatin and polyurethane plates. The angle of incidence (AI) was varied in 15°-increments. The speed (7 – 22 m/s) was measured at target entry by two laser light curtains and photodiodes linked to a transient-recorder (0.1 μ resolution). The experiments show that increasing frequencies of DIFs, as well as increasing size of the resulting fracture scars can be obtained either by increasing the kinetic energy of the delivery or by reducing the AI, i.e., hitting the target obliquely. These results echo those of previous flintknapping experiments (e.g., Speth, 1975, Dibble and Rezek, 2009). At the low end of the speed range, these impacts cannot be distinguished from accidental ones, such as typically result from dropping. We therefore exclude using fracture size and type as a criterion for inferring use as a weapon per se. Moreover, given the difficulty of reconstructing the AI in archaeological situations, a different method is required in order to determine launching mode. We test and confirm the usefulness of the method proposed by Hutchings (2011) for identifying the impact loading rate on the basis of the corresponding tip fracture velocity as calculated using Wallner Lines (Kerkhof, 1975). Wallner Lines can be used successfully to reconstruct broad impact loading rate regimes (quasi-static, rapid, dynamic), and, in principle, distinguish between armature launching mechanisms. However, the fracture velocity distributions overlap, resulting in the need for large samples, and only extremely high-speed impacts (above 18 m/s at target entry) result in sufficiently high fracture velocities to warrant the inference of a complex projectile system. We discuss the implications of this for the successful identification of bow-and-arrow or spearthrower launching systems in the Paleolithic.

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Poster Presentation

Does metatarsal torsion in African apes reflect use of arboreal versus terrestrial settings?

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Mountain gorillas are more dedicated to terrestrialism than bonobos (Hunt 1991). Here we investigate the relationship of metatarsal torsion in different African apes that use arboreal and terrestrial settings with different frequencies (Carlson 2005). Morton (Morton 1922, 1924) initially described metatarsal torsion as a functional by-product of foot locomotion. Metatarsal torsion is less marked in terrestrial gorillas and suspensory orangutans compared to chimpanzees (Morton 1922, 1924), but for different functional reasons. In gorillas it supply to advance plantigrady compared to chimpanzees, and in orangutans, it provides support for changing the direction of applied force during grasping (Morton 1924, Tuttle 1970). Unfortunately, few data on morphological variation in hominoid metatarsal torsion exist. Since hominoids exhibit external and internal rotation patterns in metatarsals, distinguishing "less marked torsion" in these terms is important. The comparative sample comprises two species of *Gorilla* (*G.gorilla* and *G.beringei*, including both eastern lowland and mountain gorillas), and *Pan troglodytes* and *P. paniscus*. Complete sets of metatarsals were sampled from 15 *G.g.*, 14 *G.b.*, 21 *P.t.*, and 14 *P.p.* All individuals are adult and wild shot. Samples were CT-scanned from which 3D triangular meshes were produced and positioned according to a published protocol (Marchi 2005). The 2D torsion angle for all five metatarsals was calculated as an angle between the proximal line passing between two dorso-plantar landmarks on the proximal articulation and the line along the longest dorsoplantar axis of the metatarsal head. An analysis of variance (ANOVA) was used to test the significance of group differences. Preliminary results indicate that *G. gorilla* has significantly different metatarsal torsion in third and fourth metatarsals compared to *G. beringei*. In the same respect, metatarsal 4 and 5 of *P. paniscus* are significantly different from *P. troglodytes*. When comparing *P. troglodytes* to *G. gorilla* a significant difference was found in metatarsal 3. Therefore, from *P. paniscus* to *G. beringei*, metatarsals gradually change in torsion patterns from 5th to 3rd metatarsals. Metatarsal 5 exhibits external rotation across all species. Metatarsal 4 in *P. paniscus* is internally rotated, which makes it stand out from all other species. Only *G. beringei* exhibits external rotation in metatarsal 3. Since *P. paniscus* is the most arboreal African ape and *G. beringei* is the most terrestrial, external torsion of metatarsals appears to decrease and internal torsion increase from the fifth metatarsal to the third metatarsal with increasing terrestriality.

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Podium Presentation

Coudoulous I in Quercy (SW France): from marginal scavenging to a kill-butchery site for Preneandertal

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The site of Coudoulous I (Lot) excavated between 1978-80 and 1993-2003 is one of the most important late Middle Pleistocene sequence in Southwestern France. Since a preliminary publication, several multidisciplinary studies have been conducted which greatly completed our knowledge about Preneandertal populations in this middle hilly region (Quercy). Interdisciplinary objectives, based on geochronology, paleoecology and archaeology, seek to precise the socio-economic status of the hominid occupations. The geomorphology of the site, defined as a sinkhole resulting from the gradual collapse of the ceiling roof, constitutes a key-factor to explain occasional or more permanent occupations by carnivores and humans during Middle Pleistocene. With ca. 8 m of thickness, the stratigraphical sequence is divided into 10 main units bracketed between two carbonated flowstones, the upper one (top of unit 3) which developed during MIS 5 (TIMS, U-series dating). The first outside influences (bottom of unit 8) were followed by the collapse of the limestone roof accompanied by first evidences of animal and human activities. As the sinkhole became larger, making detrital sedimentation easier, units 8g to 2 developed until the complete filling of the cavity. Luminescence dating on quartz provided a maximum age of 260 ka for the upper part of unit 8, and allowed correlating units 7 and 4 to MIS 7 and 6, respectively. Basal and middle units: Faunal spectrum is diversified, with large microvertebrates components and various species of carnivores and herbivores. The presence and evolutive stages of some species (ex. *Panthera spelaea intermedia*, *Cuon priscus fossilis*, *Canis lupus lunellensis*, *Elephas antiquus*, *Hemitragus cedrensis*), ichthyofaunas (*Alosa alosa*) and rodents agree with attribution of levels to MIS 7. Predator's den and/or natural deaths are responsible for bioaccumulation. A few of cut-marked bones reveal an opportunistic and discrete intervention of humans. The lithic industry is poor, dispersed (hammers, cores, choppers, flakes) with some large cutting tools made in local raw materials. It falls into the variability of the Acheulean. The site is then interpreted as a natural ungulate trap with marginal scavenging. 'Bed bone' layer 4: this unit dated to MIS 6, is a ca.40 cm thick layer mainly composed of steppe bison (NMI >200) with all skeletal elements present. Both tooth age mortality profile and cementochronology indicate acquisition during summer time. The stacked oxygen isotope signal obtained by combining 9 bison teeth shows sinusoidal variations of seasonal origin over 2.5 yr. The corresponding computed MAT of 9±3°C is about 4°C lower than at present. The lithic industry, dominated by quartz (96%), shows three technological reduction strategies: Discoid, bipolar-on-anvil flaking, Levallois (only on flint), typical of the Early Middle Palaeolithic. The recent use-wear analysis on a quartz sample confirmed that butchering prevails at the site while few cases of wood and dry skin processing were also present. Some pointed flakes show tip breakage and localized meat related use-wear that suggest a use as spearheads, consistent with microscopic use patterns experimentally observed. Such high-density layer constitutes a good indicator of repeated human occupations targeted toward hunting events within a frame of organized planned activities of structured human groups.

Poster Presentation

A biogeographical model for hominin evolution in Africa between 5 and 2.5 Ma

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Climatic and tectonic change strongly influenced hominin evolution in Africa between 5 and 2.5 million years, but exactly how, when and where is still not clear. Based on patterns of hominin fossil distribution, Joordens et al (2011) proposed a new model for hominin evolution forced by long-periodic (every 400 ky) wet-dry climate cyclicity and onset of Northern Hemisphere Glaciation (NHG). The model holds that between 5 and 2.8 Ma the humid Indian Ocean coastal forest strip provided an isolated aridity refugium, conducive to evolution, during recurrent long-periodic dry episodes. From this refugium, evolved hominin species could disperse far inland to rift basins (e.g. Turkana Basin, Chad Basin) via fluvial corridors, whenever onset of long-periodic wet episodes allowed expansion from the coastal enclave. It is hypothesized that from 2.8 Ma onwards, the NHG caused latitudinal contraction and break-up of the Indian Ocean coastal forest, geographically isolating hominin populations then present in the coastal forest strip. This dramatic climatic and environmental change likely led to a major cladogenetic split in the hominin lineage, with one line leading to the genus *Homo*, and two others to the genus *Paranthropus* and *Australopithecus africanus* respectively. We will present the biogeographical model, with reference to the temporal and geographical distribution of hominin taxa, and report on ongoing work on its paleoclimatic and paleogeographic underpinnings. For instance, we focus on analyzing global climate records to elucidate the possible role of minima in Earth' eccentricity in sustaining (through low seasonality) the existence every 400 kyr of fluvial/vegetated corridors that facilitate hominin dispersal. Also, to consider the Chad basin and its hominin sites located particularly far inland, we pioneer a fish phylogeographic approach to study the timing of fluvial connections and disconnections between the eastern African coast, the Turkana Basin and the Chad Basin.

References: Joordens, J.C.A., Feibel, C.S., Vonhof, H.B., Schulp, A.S., Kroon, D., 2011. The power of place: hominin evolution and dispersal driven by climate change between 5 and 2.5 Ma. PhD thesis chapter, VU University Amsterdam, p. 87-112.

Podium Presentation

Out of Africa and Into Europe. Hominin Ecology, Faunal Change and Pleistocene "Dark Ages"

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The dynamics of the earliest regular colonization of Northern Europe is one of the most intriguing questions in Pleistocene Archaeology. Various disciplines have contributed here and hominin niche reconstruction, resource competition as well as coevolution between carnivores and hominins are of major importance in many models which has been brought forward from palaeontological and ecological expertise. Based on a diachronous and contextualising research perspective which we have developed in our institute at Monrepos to retrace our behavioural history, we will here contribute revised time slices and a further model for the earliest occupations of Europe from an archaeological perspective. We argue that during the time of the earliest occupation approximately 1 Ma years ago, ecological conditions in northern Europe permitted the dispersal of a hunter, specialized in medium to large sized ungulates, a niche that probably gave rise to the development of the behavioural repertoire which is so characteristic for endemic European hominins since the late Middle Pleistocene. This observation sheds new light on the process of the early colonisation of Europe and has tremendous consequences for our understanding of the relationship between hominins, their prey and competing carnivores. In an ecological perspective it is often assumed that major turnovers in the predator guild during the late Lower/early Middle Pleistocene facilitated the permanent hominin occupation of Europe. Hominins had to compete for vacant predator niches as a precondition for subsistence in more northerly latitudes. Faunal data from outside Europe, e.g., Olduvai (Africa), 'Ubeidiya and Gesher Benot Ya'aqov (both Israel) indicate that already well adapted hunters dispersed in the northerly latitudes of the continent during the Early Middle Pleistocene. Therefore the northern part of Pleistocene Europe provides a unique opportunity to address questions concerning hominin-carnivore relationships and the hominin predator niche. However, Central and Northern Europe passes through archaeological "Dark Ages" during this critical period and the few sites uncovered so far, e.g., Pakefield and Happisburgh (UK) prevent a comprehensive insight into the reorganisation of the carnivore guild and associated hominin adaptations. In contrast, before the advent of hominins in northern Europe rich faunal assemblages from the late Lower Pleistocene, e.g., Untermaßfeld (Germany) permitted detailed niche reconstruction of the predator guild and the herbivore community. On this basis we extract potential and vacant niches, which could be occupied by hominins and their role in the establishment of hominin subsistence and land use in Central and Northern Europe.

Poster Presentation

Exploring cave use among hominins and carnivores in the Swabian Jura, Germany

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Exploring cave use among hominins and carnivores in the Swabian Jura, Germany The presence of carnivores and hominin in natural shelters allows us to assess the use of sheltered area among animals which were potential competitors. Here, we present the preliminary result of the faunal analysis of the assemblage from Hohlenstein-Stadel in the Swabian Jura, southwestern Germany. Among identified fauna, cave bears and hyenas are most commonly found in the Middle Paleolithic layers, followed by a decrease of hyenas and increase of wolves in the early Upper Paleolithic, a trend recognized by previous studies of the fauna by Gamble (1979). Relatively low artifact density attests to ephemeral occupation of the cave by hominins and further points to frequent visits of the site by cave bears as well as other carnivores. When compared with other sites in the vicinity, a general trend suggests changing abundances of carnivores in the region. In addition, there is an inverse correlation between the frequency of anthropogenic modification and carnivore modification of animal remains across sites. This pattern has implications for understanding the use of cave by hominins and carnivores over a period of Middle and early Upper Paleolithic period in the region of the Swabian Jura.
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Poster Presentation

Modelling the spread of Aurignacian material culture: Were the first modern humans in Europe ethno-linguistically structured?

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Ethnic identity and structure are universals in the modern world and are frequently assumed for peoples in the past. However, archaeologists and anthropologists have questioned such assumptions over the last 30 years. This study aims to determine whether anatomically modern humans inhabiting the European territory following initial colonization some 45000 years ago were ethnically differentiated. Identifying ethnic structure at such an early stage in the human past has implications for the emergence of languages, states and nations, and may inform on evolutionary dynamics of human populations and the role of identity construction in people today. A high degree of structuring is seen in the spatial distribution of symbolic artefact types associated with the Aurignacian culture in Upper Paleolithic Europe, c. 45-40000 years ago, particularly the degree of sharing of ornament forms (Vanhaeren and d'Errico, 2006) across archaeological sites. Multivariate analyses of these distributions have been interpreted as indicating ethno-linguistic differentiation, although simpler explanations such as isolation-by-distance have not been formally discounted. In this study we have developed a spatiotemporally explicit simulation model to explore how human demographic, cultural transmission, and group interaction processes have shaped geographic patterns of material culture variation, as evidenced in the archaeological record. The model developed generates expectations of a range of spatial statistics describing the distribution of shared ornament types. Using Approximate Bayesian Computation (Beaumont et al. 2002), we compare these simulated descriptive spatial statistics to those observed from archaeological data for Aurignacian Europe, in order to test and compare a range of hypotheses concerning group interaction dynamics for the period. Among the set of hypotheses examined, we include ones where inter-group similarities or differences in material culture do or do not drive inter-group sharing or conflict, respectively.

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Podium Presentation

The "Vale da Pedra Furada", Serra da Capivara (Brazil), case study: human occupation in South-America more than 20 kyears ago

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Within the last 30 years several studies have reported evidence of human beings in America earlier than initially admitted (see the "Clovis-first" paradigm) (Haynes 2005, Waters and Stafford 2007). Some of these examples of evidence have been questioned, and the chronology of the first peopling of the American continent remains unclear. Intense archaeological activity exists in the Serra da Capivara National Park, near São Raimundo Nonato in Brazil, since the discovery and the study of the Boqueirão da Pedra Furada (Guidon, 1989) archaeological site. Our team has already reported human occupations as early as 20 kyears BC in this region, in the Toca da Tira Peia rockshelter, dated by luminescence techniques. We present here a new case study, the "Vale da Pedra Furada" site. The site is close to the famous Boqueirão da Pedra Furada, but doesn't risk facing the same criticisms: in fact it is constituted of a succession of open air occupation sites, leaning against arenite blocks, at the foot of the cliff, and close to an intermittent brook. In this context, at least three archaeological ensembles have been identified. The artifacts are made on flakes and cores, the major part of them are scrapers and small convergent pieces. Radiocarbon measurements on charcoals found in huge abundance in the archaeological levels, as well as luminescence dating (OSL : Optically Stimulated Luminescence) on sediments are in good agreement and confirm that the two lower archaeological ensembles have to be attributed to the Pleistocene, the lower level being more than 20,000 years old. The present paper will discuss the results obtained in "Toca da Tira Peia" and "Vale da Pedra Furada" sites, and their consequences for our knowledge of the first human occupations in South America.

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Podium Presentation

New early *Homo* fossils from Koobi Fora, northern Kenya

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Since its discovery in 1972, the cranium KNM-ER 1470 has been at the centre of the debate over the number of species of early *Homo* present in the early Pleistocene of eastern Africa. KNM-ER 1470 stands out among other specimens attributed to early *Homo* by its larger size, and a flat and subnasally orthognathic face with anteriorly-placed maxillary zygomatic roots. This singular morphology and the incomplete preservation of the fossil have led to different views as to whether KNM-ER 1470 can be accommodated within a single species of early *Homo*, which is highly variable because of sexual, geographical and temporal factors, or evinces species diversity marked by differences in cranial size and facial/masticatory adaptation. We will report on three hominin fossils, newly discovered at Koobi Fora, Kenya, that help clarify the anatomy and taxonomic status of KNM-ER 1470.
Acknowledgements: We thank the Governments of Kenya and Tanzania for permission to carry out this research, the Kenya Wildlife Service for permission to work in the Sibiloi National Park, the National Museums of Kenya and the National Museum of Tanzania for access to specimens in their care, and the Turkana Basin Institute for support. The National Geographic Society, The Leakey Foundation and the Max Planck Society funded fieldwork or laboratory studies. We are grateful to the numerous people who helped us with this research.

Poster Presentation

Dental tissue proportions and enamel thickness in European Late Pleistocene and Early Holocene humans

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Enamel thickness (ET) and dental tissue proportions have been studied to understand taxonomic and phylogenetic relationships, tooth function and developmental patterns in extinct or extant hominoids (e.g., Olejniczak et al., 2008; Suwa et al. 2009). However, little work has been done to quantify variation in internal structure of human teeth at the Pleistocene/Holocene transition. Based on mesiodistal and buccolingual dimensions of the crown, Post-Pleistocene reduction in dental size and morphological complexity has been proposed and associated with environmental and cultural changes (e.g., Brace and Malher, 1971; Frayer, 1977). Here we employ a microtomographic-based record to virtually assess ET and dental tissue proportions in European Late Pleistocene hunter-gatherers and Early Holocene farmers. A sample (n=30) of first upper permanent incisors (UI1), second upper permanent molars (UM2) and second lower deciduous molars (Ldm2) dated from Upper Paleolithic, Epipaleolithic, Mesolithic, Neolithic, and Bronze Age has been imaged using high-resolution microtomography. Specimens come from the sites of Lagar Velho in Portugal (Bayle et al., 2010), La Madeleine (Bayle et al., 2009), La Vergne, Gurgy and Barbuise, in France. Original scans were performed at the MRI platform, France (Skyscan 1076 X-ray microtomograph) according to the following parameters: 100 kV, 100 µA current and a projection every 0.2°. The final volumes were reconstructed with an isotropic voxel size of 17.93 µm3 using the software NRecon v.1.6.5.2 (Skyscan). Semi-automatic threshold-based segmentation with manual corrections was conducted using Avizo v.7 (VSG). Crowns were digitally isolated from roots (Olejniczak et al., 2008). For each crown, 15 linear, surface, and volumetric variables describing tissue proportions were digitally measured or calculated, including the 2D and 3D average (AET) and relative enamel thickness (RET) values (Martin, 1985; Olejniczak et al., 2008). A 3D map of the topographic distribution of ET was derived from the segmented enamel and crown dentine components (Macchiarelli et al., 2008). Results show an increase in AET and RET for UI1s and UM2s from Upper Paleolithic to Neolithic and a decrease between Neolithic and Bronze Age. Mesolithic UI1 shows the lowest volume of enamel and dentine and the highest volume of pulp. Mesolithic UM2 shows the lowest volumes of enamel, dentine and pulp. Ldm2s show a decrease in AET and RET and a decrease of crown, enamel dentine and pulp volumes and areas from Upper Paleolithic to Neolithic. Proximity is highlighted for the Ldm2s of the Upper Paleolithic child from Lagar Velho and the Epipaleolithic child from La Madeleine. 3D maps of ET topographic distribution show systematically higher values on the distal aspect of the labial face for UI1s. Maximal ET is revealed for UM2s from the Gurgy Neolithic site. Ldm2s from Lagar Velho and La Madeleine show higher ET than those of Gurgy, but all have a maximal ET on the distobuccal face. These preliminary results show differences in deciduous and permanent tooth internal structure between Late Pleistocene and Early Holocene humans. Additional studies are needed to clarify the possible implications of cultural and environmental changes on tooth internal morphology variations during this key-period of human evolutionary history.

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Podium Presentation

A Middle to Later Stone Age shift in eastern Ethiopia?

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The Middle Stone Age (MSA) is characterized by the emergence of *Homo sapiens* and the appearance of a modern behaviour (Mcbrearty and Brooks 2000). Its lithic typo-technology is generally composed of Levallois and discoïd products, retouched points and a blade component. It differs from the Later Stone Age (LSA) which is traditionally defined by the overwhelming presence of microliths and a volumetric blade technology, as well as strong evidence of a symbolic and modern behaviour (ornaments, better knowledge of the environment). The findings of evidence for a modern behaviour within the MSA (including microliths) has led some authors to reject the hypothesis of an abrupt change between the MSA and the LSA as it might be observed in Europe between the Middle and the Upper Palaeolithic (McBrearty 2007). The boundaries between the MSA and the LSA have thus become unclear. What is the nature of the behavioural changes between the MSA and the LSA? When should an assemblage be labelled MSA or LSA, especially with regard to the « transitional industries »? With the beginnings of the LSA dated as early as around 56kaBP (Gliganic et al. 2012), the shift from the MSA to the LSA would correspond to the key-period, pointed by some genetic studies, of major migration waves of *Homo sapiens* out of Africa and into the other continents (85-55kaBP, see Macaulay et al. 2005). The main goal of the research presented here is to try to apprehend the shift from the MSA to the LSA through the study of two sites in eastern Ethiopia (Goda Buticha and Porc-Epic). Porc-Epic cave was first discovered and excavated in 1933 by Abbé Breuil and P. Wernert and in the 1970's by J.D. Clark and K.D. Williamson (Clark and Williamson 1984). Buticha cave has been excavated since 2008 by the Southeast Ethiopia Cave Survey Project, led by Z. Assefa (Assefa et al. 2008; Assefa et al. 2009; Pearson et al. 2012). The two caves are 35 kms apart and both have yielded long stratigraphical sequences including the beginning of the Late MSA. Materials found from both sites are composed of faunal and human remains, ostrich eggshell beads and rich lithic assemblages showing MSA and LSA affinities. Following previous studies of the lithic assemblages of the sites (David Pleurdeau 2004 ; Assefa et al., submitted), the methodology applied here relies on unpublished material from Porc-Epic and a detailed analysis of the assemblages from Buticha. It focuses on the features generally stressed to define either the MSA or the LSA (i.e. Blade production, retouched points, relative frequence of obsidian). If products of planimetric conception (related to Levallois, Discoïd methods and from multi-platform cores), as well as retouched points constitute a high percentage of the assemblages throughout the sequences, backed blades/bladelets and volumetric blade cores are also present. In the present study, these features, with a special focus on the blade component are described in detail. In so doing, the significance of technological differences between the MSA and the LSA will be discussed.

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Poster Presentation

Reconstructing Howiesons Poort mobility and territoriality in the Western Cape, South Africa

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The Howiesons Poort occurs 65-60 ka and is one of Africa's best known late Pleistocene industries. While known from many sites, understanding of patterns of mobility and territorial organisation in the Howiesons Poort is hampered by a focus on deep-sequence sites which are often isolated from one another, and by a lack of identifiable, geographically-restricted material source areas. This paper considers evidence for mobility and territorial organisation from five Howiesons Poort sites occurring within an area 90 km x 90 km in the Western Cape of South Africa. Restricted distribution of the rock type hornfels allows patterns of source access to be identified, while distinct tool-making traditions can be differentiated through morphological variation in microliths. The data suggest (1) that three different and presumably socially-defined groups existed in the study area during the Howiesons Poort, (2) that group areas broadly correspond to different environmental settings, and (3) that patterns of movement across the landscape at this time were in some cases quite restricted. There is also evidence for striking but short-lived variation in mobility patterns within the Howiesons Poort, suggesting complex and on-going adaptation during the period.
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Poster Presentation

The Central European Magdalenian – regional diversity and internal variability

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The Central European Magdalenian (CEM) was not a homogeneous unit. Neither were CEM hunter-gatherers living in an undiversified environment with uniform fauna and plant cover; nor was the CEM a cultural system within which all hunter-gatherer groups were equally strongly interconnected and used the same technological, typological and representational concepts in similar proportions. On the contrary, the evaluation of archaeological data from 651 assemblages in the Netherlands, Belgium, eastern France, Switzerland, Germany, Austria, Czech Republic and Poland as well as data from 59 palynological sites shows that the cultural and natural space of the Late Upper Palaeolithic was heterogeneous in composition and was divided into three larger biomes and two larger social communities. The extent of the three biomes corresponds to the distribution of horse and reindeer remains in CEM assemblages. Reindeer-dominated inventories occur in environments which were mainly characterised by tundra elements, whereas horse-dominated assemblages prevail in those areas where steppic elements are dominantly present. Interestingly, the distribution of horse- and reindeer-dominated faunal assemblages is virtually identical with the distribution of horse and reindeer representations. Taking raw material procurement as a starting point for estimating the minimum catchment area of a site, the joint consideration of different catchment areas can give information on the intensity of interaction between the hunter-gatherers that settled at these sites. Extensive overlapping and collective exploitation of raw material sources point to a common usage of the same area, whereas mutually exclusive catchment areas suggest a comparatively low level of interaction. On that assumption, the analysis of the CEM raw material procurement pattern indicates the existence of five regional groups, located (1) around the French and Swiss Jura, (2) in the Swabian and Franconian Alb, (3) in the Meuse-Rhine region, (4) in Eastern Germany and Bohemia, and (5) in Moravia and Poland. With regard to the transportation pattern of mollusc shells and to the distribution of typological concepts, these five regional groups can be separated into two larger communities in the eastern and western part of the investigated area. In light of the observations made during the analysis of the CEM Magdalenian, several inconsistencies and contradictions render the current hypothesis of a unidirectional expansion of Magdalenian hunter-gatherers from the Franco-Cantabrian region up the Vistula river largely untenable. A growing body of consistent radiometric measurements of Magdalenian sites from Poland, Moravia and Thuringia provide 14C-dates that are older than the oldest dates from sites in the Rhineland and the Danube region. Furthermore, in the case of a unidirectional expansion, the resulting interaction pattern should rather be continuous. The observed distribution patterns of items and concepts, however, show a clear separation of the CEM into a western and an eastern group. All in all, the results speak in favor of a bidirectional recolonisation of Central Europe. In the course of the post-LGM climatic amelioration, one branch of hunter-gatherers expanded from the Franco-Cantabrian region towards the east while another one headed from the Carpathian region towards the west.

Podium Presentation

First Evidence Of Late Neanderthals And Anatomically Modern Humans In Serbia

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The Palaeolithic in the Balkans is still poorly documented and dated, above all concerning the central part of the Peninsula, currently occupied by Serbia. However, due to its strategic location, the importance of this region for understanding the migration of modern humans into Europe and for verifying the impact of a possible Neanderthal withdrawal towards the southern mountainous area after a potential encounter is clearly evident. Here, we present the preliminary results of the zooarchaeological analysis of Salitrena Pecina (central Serbia). It is the only Serbian site to the south of the Danube where a stable and continuous sequence of the Middle to Upper Palaeolithic transition has been recorded so far. The modern excavations carried out since 2004 have revealed a rich deposit of lithic and bone tools as well as an interesting faunal assemblage dated to the late Mousterian (38 millennium BP) and Aurignacian (32 millenium BP) periods (Mihailovic et al 2011). The palaeoconomic behaviour derived from the macromammals remains has allowed reconstructing an interesting pattern in terms of subsistence and human mobility, with implications for continuity and discontinuity between both periods.

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Poster Presentation

The functional morphology of the early hominid scapula

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The shoulder girdle is involved in nearly every act of locomotion. Several features of the scapula can be identified that differ among different primate species. This allows to classify primates according to their mode of locomotion and to reconstruct that of extinct forms. For this study the scapula of *Papio hamadryas* (n=27), *Hylobates lar* (n=53), *Pongo sp.* (n=19), *Gorilla gorilla* (n=39), *Pan troglodytes* (n=41) and *Homo sapiens* (n=81) of the collection of the Anthropological Institute in Zurich was analyzed and compared to that of DIK 1-1 (*A. afarensis*, pictures) and to casts of the scapula of Sts 7 (*A. africanus*), MH2 (*A. sediba*) and KNM WT 15000 (*H. erectus*). A number of landmarks were defined on the scapula corresponding to the standard measurements of Martin and Saller (1957) and digitized with a MicroScribe-3DX. Based on these data the scapular index, supra- and infraspinous indices and the axilloglenoid angle have been calculated in order to enable comparison with older studies. Our results show that the upwards pointing glenoid of *Australopithecus sediba* is significantly different from that of humans, which points more laterally. Therefore, its axilloglenoid angle rather resembles that of other *Australopithecus* species and falls into the range of great apes, suggesting an adaptation to climbing. But the scapula is also wider than long with a very broad infraspinous fossa and an intermediate breadth of the supraspinous fossa as adaptation to a very wide range of movements that we also find in *Homo* and *Pongo*. In comparison with *Homo erectus* we again see a scapula that is wider than long with a high axilloglenoid angle resembling that of modern humans. In conclusion, the scapula of *A. sediba* shows a mosaic of functional characteristics shared with great apes and later *Homo*.
Acknowledgements: Prof. Steven E. Churchill, Evolutionary Anthropology, Duke University, North Carolina Dr. Martin Häusler, Centre for Evolutionary Medicine, Institute for Anatomy, University of Zurich, Switzerland A.H. Schultz-Foundation, Switzerland Swiss Society of Anthropology, Switzerland

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Poster Presentation

Subsistence strategies during the Early Upper Palaeolithic of northern Central Europe: A re-analysis of the faunal remains from Lommersum (Germany)

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The current view of Early Upper Palaeolithic (EUP) subsistence and land use in Central Europe is based largely on the faunal inventories of a small number of cave sites (e.g. Vogelherd). For the northern parts of Central Europe, currently there are almost no sites with adequate quantities of well-preserved faunal remains dating to the EUP. A rare exception is the open-air site Lommersum in North Rhine-Westphalia, Germany. Compared with caves, archaeological open-air sites, such as Lommersum, can provide an alternative (and complementary) view of EUP subsistence practices. In addition, open-air localities have a greater potential for preserving evidence of spatially mediated behaviours and their genesis appears to be less affected by carnivore interference. Lommersum was excavated by Joachim Hahn between 1969 and 1978. Latest radiocarbon dates indicate an (14C) age between 33,250 ±500 and 35,100±650ka BP (Street et al, 2011). Situated at the foot of the central German uplands (Mittelgebirge), the faunal assemblage is dominated by reindeer (90% of NISP), whilst horse is the only other taxon with notable representation. The lithic inventory, hearths and absence of carnivore gnawing indicate an anthropogenic origin of the accumulation. This poster presents the preliminary results of a re-analysis of the faunal remains from Lommersum. Even though the faunal inventory has already been described (in Hahn, 1989), a re-analysis was deemed necessary as the original publication provided little information on the taphonomic history of the faunal remains. Here an archaeozoological approach is used to glean a better understanding of the taphonomic processes affecting the assemblage, as well as the human role in the site formation process. Analysis of the reindeer and horse age structures as well as butchering patterns provides new data on hominin exploitative strategies at the northern boundary of the Aurignacian oikumene. This research contributes to a better resolution of EUP subsistence strategies and will widen our understanding of the range and diversity of EUP adaptive behaviours.

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Street, M., O. Jöris, T. Higham and H. Löhr, H. 2011. New Oxford AMS dates from the northern boundary of the Aurignacian oikumene. Presentation at the Hugo Obermaier Society. 53 Annual Symposium. 26-30 April 2011, Herne, Germany.

Poster Presentation

New Excavations at the Mousterian Acheulian Site of Abri Peyrony (France)

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The Mousterian of Acheulian Tradition (MTA) site of Abri Peyrony (also Haut de Combe-Capelle) is part of the Combe-Capelle sites. It is known primarily from a brief publication by Peyrony (1925), from a small test excavation published by Lenoir and Dibble (1995), and from large handaxe collections made at various times since the 19th century. In 2009 we reopened the site to determine whether intact deposits remained and their extent. This work was followed by two seasons of excavation to collect new samples from the preserved sequence. The rich layers are relatively thin (less than a meter) and only 10s of centimeters below the modern surface. Despite their shallow situation, the layers are relatively undisturbed by post-depositional alteration and represent sealed contexts. The excellent preservation of a shallow, open-air Middle Paleolithic site is due to the unusual geological situation of Abri Peyrony. Tufa deposits, formed from groundwater seeps at the cliff base, have sealed the archaeological layers, preventing extensive bioturbation or other post-depositional disturbance. The industries are all clearly Middle Paleolithic. One level on the lower terrace is rich in typical MTA bifaces; however, while the remaining levels present a consistent technology of discoidal and Levallois blank production, elements which link these assemblages to the MTA are still rare to absent. The faunal analysis is still on-going but large bovids and horses are dominant in the upper levels of the lower terrace while reindeer are dominant in the lowest level. There is very little evidence of carnivore activity. The deposits also include many examples of manganese dioxide, some pieces of which preserve traces of being worked. Finally, a radiocarbon dating program is underway with initial results indicating that the MTA dates towards the very end of the Middle Paleolithic in this region of France.
Acknowledgements: Funding and authorizations provided by le Service régional d'Archéologie Aquitaine-Poitou Charente, the Max Planck Society, the Conseil Général de la Dordogne.

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Poster Presentation

Differentiating between archaic and anatomically modern morphology: evidence by microfocus X-ray use

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Microfocus X-ray is a perspective approach to evaluation of bone condition in pathological and destructive processes, which helps to describe small and low-contrasting details of images with magnification and in good quality. We used the method to study inner structure of small tubular bones (mainly, manual phalanges) from representatives of Middle Pleistocene, Upper Palaeolithic and living *Homo*. Humans with so called "archaic" features originated from 12th level of Denisova Cave, from Okladnikov and Chagyrskaya Caves in highland Altai, from Kiik-Koba shelter in Crimea. At least majority of them were Neanderthals. Anatomically modern humans in our study were presented by mature man Sunghir 1 and modern males in age from 20 to 55 years. In addition to common anatomical criteria, we discovered clear differences between "archaic" and "modern" samples in degree of trabecular system development and mineral density. Although the Upper Palaeolithic Sunghir male shows visible bony change under mechanical load, he remains to be entirely anatomically modern. Our method can be proposed for simple recognizing of "archaic morphology bearers" in fragmentary and strongly destroyed fossil remains.
Acknowledgements: We express deeply thanks to Academician Anatoli P.Derevianko, Prof. Mikhail V.Shunkov, Prof. Sergey V.Markin for possibility to study unique bones from Denisova, Okladnikov and Chagyrskaya caves; to Dr. Tatiana S.Balueva – for permission to study Sunghir 1 male. The study was supported by grant of RFBR 11-06-12009 "Transformation of biological features of Pleistocene *Homo* in trend of Eurasian migrations".

Poster Presentation

3D reconstruction of Regourdou 1 pelvis: estimation of missing parts and first functionnal analysis

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The Regourdou 1 pelvis, discovered in 2008 and newly described, bears us new opportunities to discuss numerous aspects of the morphology of the neandertal pelvic belt, especially obstetrical functions. Because of the state of preservation of the rests, with missing parts and damaged structures, the Regourdou 1 pelvis has to be reconstructed to allow further studies. As we wanted it the most accurate possible, the reconstruction of the pelvis of Regourdou 1 required the implementation of a precise methodology. The acquisition of Regourdou 1 pelvis CT-scan was performed with helical computed tomography and the seven fragments of ilium, ischium, pubis and sacrum were adjusted virtually before estimating the missing data. We defined 54 landmarks on the bony pelvis to be used in the reconstruction as in further obstetrical analysis. These landmarks have been collected using the software TIVMI from a comparative sample of 100 modern and one neandertal (Kebara 2) virtual pelvises; then, the landmarks available were taken on Regourdou 1 pelvis. Three missing data estimate methods (EM algorithm, Thin-Plate Spline and multiple regressions) have been compared, thanks to a large statistical study. We tested the influence of different parameters: e.g. amount of missing data or size and sex of the reference sample. We finally used the multiple regression method, which seems to be the most appropriate. The statistical comparison of these three methods and the estimation of Regourdou 1 missing parts were performed using R software. This mathematical reconstruction is a first step to a triangular mesh generation and finally a stereolithografic replication. Our precise and rigorous protocol leads us to an accurate reconstruction of Regourdou 1 pelvis and birth canal, but can also be applied to other rests, fossil or modern. This reconstruction allows the first estimations of Regourdou 1 obstetrical dimensions and a comparison to the variability of Neandertal and modern human.

Poster Presentation

The Functional Morphology of the Hominid Fibula

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In the past, the fibula has often been neglected in comparative studies due to the scarcity in the fossil hominid record. In fact, only two early hominid fibulae shafts are known, Stw 356 (*Australopithecus africanus*) from Sterkfontein, South Africa, and OH 35 (*Homo habilis*) from Olduvai Gorge, Tanzania. Functionally, the fibula is little involved in weight support. Yet, it serves as an important origin for muscles of the lower leg. The aim of this study was to analyze differences in the origin and insertion of m. peroneus longus in primates to obtain new insights into the evolution of the hominid foot. We compared the morphology of the Stw 356 fibula and of a cast of OH 35 to the fibulae of *Homo sapiens*, *Pan troglodytes*, *Pongo pygmaeus* and *Macaca mulatta* from the Collection of the Anthropological Institute of the University of Zurich. In addition, the lower leg and foot of one chimpanzee, one orangutan and one macaque were dissected and the dry weight and functional anatomy of the muscles were studied. Our results show no significant differences in origin, insertion, gross morphology and weight proportion of m. peroneus longus in the analyzed non-human primate specimens. The end tendon of m. flexor digitorum fibularis was lacking in *Pongo*. This might be related to the reduction of the hallux in orangutans and needs further study. The morphology of the fibular shafts of Stw 356 and OH 35 falls within the human range. The results of this study will add to the ongoing debate whether australopithecines and early *Homo* possessed human-like feet with adducted great toes or ape-like feet with medially diverged, mobile halluces.

Podium Presentation

A 700-years-old Acheulean occupation in the Center of France. Data on the lithic assemblage and technical behaviors

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The current geochronological data place the first European Acheulean assemblages (with handaxes and sometimes cleavers) around 600 ka in the Southern area and 500 ka in the Northern area. The fossil alluvial outcrops of the Creuse, Cher and Loir Valleys located in the Centre of France have been systematically studied by means of surveys and excavations for more than 20 years (Despriée et al., 2011). Approximately 300 sediment samples across the different valleys were taken for ESR analysis which has permitted the establishment of a regional chronological framework. A global coherence is observed for the ages obtained on the different terraces, within each fluvial system and follows the model proposed by Antoine et al. (2010) for the Somme river system, where each terrace corresponds to a glacial-interglacial cycle. Among the archaeological deposits, the site of La Noira (Brinay, Cher Valley) has yielded an archaeological level discovered within the slope deposit at the base of the stratigraphic sequence and including handaxes. Artefacts are associated with worn flint nodules, quartz pebbles, silicified oolithic limestone, and numerous millstone slabs. Some of them were used for shaping handaxes and cores. The presence of cryoturbation features indicates that the archaeological level, along with the underlying sediment and bedrock, were strongly frozen and reworked after the human occupation and before the fluvial deposition. Overlying fluvial sands are dated to 680 ± 30 ka by ESR. The lithic assemblage provides behavioral data on an old evidence of Acheulean in Europe documenting the context of diffusion of this tradition. It is composed by 174 flakes, 30 cores and 50 bifacial tools. The slab shape has been used for cores and bifacial tools. The flaking has been performed by a hard hammer and several types may be described: partial or total bifacial, unifacial and multifacial cores. Cores provided few removals. Bifacial tools may be described as handaxes. They are for a part of them cortical (crude bifaces) and the level can be described as a workshop. Three groups exist: tools with a pointed tip, an ovate tip or with a transversal edge. A first phase of shaping is made by deep removals, face by face or in an alternating way. Then flat and invasive removals follow the shaping, associated to final retouches on some lateral edges and tip. Some evidence of use of soft hammer is observed on handaxes. Tools are symetrical or plano-convex. The assemblages can be attributed to a classical Acheulean, close to what is described in Cagny-la-Garenne (MIS 12) or Caune-de-l'Arago (levels P and Q between 500 and 600 ka) in France.

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Poster Presentation

Late Aurignacian and early Gravettian technological strategies: Intensity of raw material use as an indication of mobility in stone artifact assemblages from Breitenbach, Germany, and Maisières-Canal, Belgium

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Stone artifact assemblages are a major source of information on past human behavior. Yet, the transformation of lithic artifact variability into patterns of behavior is less explicit in comparison with faunal studies, partly because lithic analytical methods are diverse and not always complementary, and partly because, as far as the Upper Palaeolithic record is concerned, issues of culture history - questions of culture origin and typology - are foremost. Thus, variability in Upper Palaeolithic assemblage composition is typically seen as having cultural significance (e.g. Djindjian & Bosselin 1994, but see Rigaud 2008). The formal variability of Aurignacian and Gravettian industries is a case in point where, according to the culture history paradigm, differences in past human manufacturing activities are considered to reflect technological traditions to a far greater degree than they reflect adaptive strategies to environmental constraints. Thus, models of cultural change from Aurignacian to Gravettian traditionally support the replacement scenario, according to which Gravettian industries arose first in a region outside Europe and subsequently spread out and replaced existing Aurignacian populations, without archaeological continuity (e.g. Garrod, 1938; Sonneville-Bordes, 1960; Svoboda, 2007; Otte, 2011). However, data published so far provide only equivocal support for an extra-European origin of the Gravettian (Moreau, 2010, 2012). In an effort to overcome some of the shortcomings in the way variability of Aurignacian and Gravettian industries has been approached, I use artifacts from Breitenbach, Germany, and Maisières-Canal, Belgium, to investigate the interaction between raw material availability and hunter-gatherer technological organization in late Aurignacian and early Gravettian contexts, respectively. Both sites present a series of contextual similarities forming the base line of the analysis: 1) open air location; 2) a single archaeological component related to the Paleolithic recovered under satisfactory stratigraphic control; 3) rough contemporaneity within the late Interpleniglacial; 4) a geographical setting in periglacial environments at 51st degree of latitude north; 5) large numbers of artifacts with a primary emphasis on exploitation of locally available good quality cretaceous flint for the production of tools; 6) an assemblage structure and character that does not conform to pre-existing chrono-cultural categories. The analysis indicates that in both assemblages blade blanks were retouched more frequently than flakes (carinates included), and larger blanks were preferentially selected for retouch. However, on the one hand lithics of Maisières-Canal were more heavily retouched than those from Breitenbach, as is testified by the presence in the former industry of blades showing unifacial retouch "retouche plate" and even "Aurignacian" retouch. On the other hand, comparison of the intensity of raw material reduction between both assemblages indicates higher reduction intensity in the later Aurignacian of Breitenbach than in the early Gravettian of Maisières-Canal. These behavioral variations in lithic raw material economy between the assemblages suggest subtle differences in the occupational history of each location, possibly relating to specific mobility strategies during the late Aurignacian and the early Gravettian, respectively.

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Poster Presentation

New radiometric dates on the archaeological Early Pleistocene levels (TD1-TD6) of Gran Dolina (Atapuerca, Spain)

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Gran Dolina, one of the most famous Pleistocene prehistoric European sites, shows the most complete stratigraphic sequence on the Sierra de Atapuerca documenting more than one million years. It's characterized by a 18 m thick sedimentary infilling divided into 11 stratigraphic units, named, from bottom to top, TD1 to TD11 in which more than 130 human remains associated to a number of lithic artefacts and numerous faunal assemblages were unearthed. A chronostratigraphical framework based on independent methods, such as combined US-ESR, TL and IRSL and magnetostratigraphic analyses, in particular for the upper stratigraphical section (TD6 to TD11) has been established. In these levels, the radiometric and magnetostratigraphic results suggest a human occupation during 900 to around 200 ka (Berger et al. 2008; Falguères et al. 1999; Parés and Pérez-González 1999). The lowest stratigraphical sequence of Gran Dolina could be coeval with the Sima del Elefante (TE) in which the oldest European human remains have been found recently (Carbonell et al. 2008). In this study, we present the ESR results obtained on bleached quartz deposits sampled in the lowest part of Gran Dolina sequence. The ESR ages are coherent with the previous chronostratigraphical framework and confirm the potential of ESR dating method applied on optical quartz in karstic context. The age estimate of *Homo antecessor* from TD6 layer is ranging between 800 and 900 ka, in agreement with the previous mentionned dating results. The data show also that the lowest layers attributed to endogenous sediments (TD1) could be contemporaneous with the TE9 human bearing layer dated 1.2 Ma (Carbonell et al. 2008) suggesting a human occupation of possibly more than 1 Ma in this area.

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Poster Presentation

Does temperature make the difference? Experimental heating of flint from the Baltic and Meuse regions

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As part of the PhD-project "Use of fire in the late Upper Palaeolithic" range of indicators for the presence of fire played an important role, including burned flint artefacts. Among the characteristic traces of heat modifications on this material are reticular crazing, characteristic fracture planes and so-called pot lid fracturing. In addition, colour changes can occur, e.g. reddening or white discolouration, which are due to chemical processes within the material (cf. Richter, 2007b). During the examination of flint artefacts from the Magdalenian site of Gönnersdorf (D) with a view to identifying burnt pieces, the question arose whether it would be possible to obtain information about the heating temperature based on the nature of the particular modifications. For this purpose a number of flint-heating experiments were carried out under controlled conditions in the thermo-laboratory of Institute of Geosciences at the University of Mainz (D). On the one hand the aim of the experiments was to replicate the modifications described above, on the other hand to examine whether these alterations are associated with a particular temperature. In several test series flakes of different varieties from the Baltic coast (D) and the Meuse region (NL) were heated in a muffle furnace (Nabertherm L9/SH) under controlled temperatures between 100 and 700 degrees Celsius. For each new temperature a new flake of the same core was used in order that each sample was heated only once. After each heating cycle the modifications were documented and described. The experimental studies show that characteristic discolourations correlate with a particular temperature as well as different kinds of damage. For example, first damage, in the form of crazing, occured at temperatures between 300 and 350 degrees Celsius. Reddening which is due to temperature-dependent transformation processes of the different kinds of iron minerals contained in some varieties of flint, appeared from 300 degrees Celsius. On the one hand this is the oxidation of divalent iron minerals (e.g. silicates) to trivalent iron oxide haematite, on the other hand there is the dehydration of trivalent iron hydroxides like goethite or limonite. When heated from about 300 degrees, these minerals lose their water content and the red iron(III)-oxide haematite remains. The experiments succeeded in generating the known heat modifications and in establishing a link between alteration and temperature. All produced changes were found in the burned material from the site of Gönnersdorf. Besides specifying the position of hearths (Leesch et al., 2010) and age determinations of sites (cf. Richter, 2007a) burned flint artefacts can therefore provide information about their minimum heating temperature.

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Poster Presentation

Cutmarks on Neandertal remains from Les Pradelles: preliminary results using 3D microscopy (Alicona InfiniteFocus®)

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The Middle Paleolithic site of Les Pradelles, also known as Marillac (Charente, France) was excavated by B. Vandermeersch between 1967 and 1980 and by Bruno Maureille and Alan Mann since 2001. This site is interpreted as a specialized reindeer butchery camp (Costamagno et al., 2006) that was occupied by Neandertals hunter during Marine Isotopic Stage 4. To date, the excavation has yielded 95 human remains, corresponding to at least seven individuals: three adults, two adolescents and two children. These were found mixed with other large mammal remains, mainly reindeers (more than 95% of the NISP), and of lithic tools belonging to the Quina industry. The remains of at least three adult Neandertals and one immature individuals appear to have been treated in the same way as the other large mammals, having been discarded in the same 'wasted area', and exhibiting a similar pattern of cutmarks and impact damages. These modifications indicate thorough defleshing and dismembering of skulls and long bones, as well as processing to extract bone marrow and brain. We suggested that the removal of the muscular masses and the extraction of the brain and bone marrow indicate that the Neandertals were cannibalized (Mussini, 2011). We present here preliminary results of a three-dimensional analysis of cutmarks on the Neandertal remains. Each cutmark was captured using an Alicona 3D InfiniteFocus® imaging microscope (AIFM) housed at the Natural History Museum, London. This new technology combines a small depth of focus with vertical scanning to produce a true-color rendering of the surface in three dimensions (Bello and Soligo, 2008). This analysis allows us to differentiate between humanly-induced modifications and sediment scratches; this distinction was particularly difficult at Les Pradelles as the bones were extensively marked by non-human taphonomic processes. We also present data on sharpness, shape, and depth cutmarks, which provide n indication of the type of tool use to butcher the cadaver. Our morphometric analysis of the humanly-induced modifications leads to new insights into patterns of carcass-processing and the behavior of the Neandertals at Les Pradelles.

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Poster Presentation

The Final Gravettian occupation at the Abri Pataud (Dordogne France). Results of recent excavations and cultural implications

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More than 50 years after the excavations of Professor Hallam L. Movius at the Abri Pataud, a new research program in the level 2 (final Gravettian) has fully renewed our understanding the last Gravettian occupation of this key site. Known only on four sites in France (Laugerie- Haute, Les Peyrugues, Le Blot and Abri Pataud) the final Gravettian is characterized by a real cultural originality, which justifies the use by some authors of the historical term "Protomagdalenian". The Abri Pataud has also delivered the largest series of human remains known for this period. The status of those human remains (MNI=6) and their relationship with the other evidence of domestic activities in the level 2 (reindeer hunter non-permanent settlements) was reviewed in three issues: new excavations, studies of Movius's collections and critical analysis of Movius's original archives. Our results demonstrate the existence of several occupations in level 2. The human remains deposit is situated at the end of those occupations, in the rear part of the rockshelter. So, during the final Gravettian, the Abri Pataud has changed of status: it was a hunting camp, before to become a burial place. The presence and disposition of these human remains are not attributable to natural phenomena. It's a primary intentional deposit with secondary intervention on bodies and skeletons. This brings us to the hypothesis of a complex funerary behavior, which does not match with the burials usually known in the Gravettian. The analysis of an important series of archaeological artifacts (ornaments, art objects, etc.) associated with human fossils confirms this hypothesis. Therefore, at the Abri Pataud, the final Gravettian presents original (and unexpected) funerary practices. Compared to other examples of French Gravettian sites, our results open new perspectives for interpreting the cultural complexity of Gravettian populations.

Poster Presentation

Three-dimensional microstructure finite element modeling of the third proximal phalanx in the siamang (*Symphalangus syndactylus*)

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Phalangeal curvature is a widely discussed feature of primate functional morphology. The degree of curvature has been shown to vary among primates with different positional behaviours and vary throughout ontogeny in taxa where locomotion changes from more arboreal to more terrestrial. This suggests that phalangeal curvature reflects mechanical stress and may be a reliable indicator of locomotor behaviour in fossil primates. Richmond (2007) examined the biomechanics of phalangeal curvature in the third proximal phalanx of a siamang (*Symphalangus syndactylus*) using finite element (FE) modeling, demonstrating that increased curvature reduced strains during suspensory grasping. Though this study was informative and valuable, Richmond used a 2D homogenized FE model. Here, we test Richmond's study using a high-resolution 3D FE model of the cortical and trabecular bone mircostructure. Four siamang third rays (third metacarpal to third distal phalanx) were micro-CT scanned at a resolution of approximately 40μ at the Dept. of Human Evolution, MPI-EVA and bone was segmented using the Ray Casting Algorithm (Scherf and Tilgner, 2009). Using Hyperworks®, a 3D FE model was created from each third proximal phalanx, modeling the cortical and trabecular bone structure with roughly 7 million tetrahedron elements. The phalanx FE model was placed within a biomechanical model of third ray used by Richmond (2007). Load was applied to the phalanx via embedding at the base, head and palmar surface of the shaft. Our results using the 3D FE model are generally similar to those of Richmond's 2D model in that the dorsal cortex is loaded in compression (and has thicker cortical bone) and the palmar cortex is loaded in tension (and has thinner cortical bone). However, our 3D model demonstrates that the stress and strain experienced by these areas are higher and more disparate than Richmond reported, the maximum strain is not distally placed along the shaft, and the flexor ridge, not the shaft, experiences the highest tensile loadings. The trabeculae play a stronger mechanical role in the head than they do in the base, acting as stiffening struts between the dorsal and palmar cortical bone and are loaded in tension. In the phalanx base, the dorsal and palmar trabeculae follow the loading pattern of the cortical bone, but experience high compression and tension, respectively, in some areas. The results suggest that 3D FE modeling of the variation in cortical thickness and trabecular structure have important implications for the functional interpretation of overall bone form.

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Poster Presentation

Virtual reconstruction and biomechanical analysis of the Magdalenian perinate Wilczyce 11

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The perinate from the Magdalenian site of Wilczyce site 10 is one of the most complete individuals of this age group yet found in a late Upper Palaeolithic context (Irish et al. 2008). Here I present some results arising from the virtual reconstruction of this individual. The fossil was scanned in Warsaw over two days in October 2011 using facilities from the new Glover Laboratory for Digital Osteology at the University of Sheffield Department of Archaeology. A high speed structured light scanner based upon the 3d3 white light scanning system was used, which is a robust but highly flexible setup. Reconstruction of the scans took place using Flexscan; Geomagic and Avizo on a dedicated workstation. Due to the preservation of the individual, it was possible to extract biomechanical properties of both left and right femora, tibiae and humeri from the surface scans. Comparisons of biomechanical properties of these bones against individuals of a similar age and other Middle and Upper Palaeolithic juveniles are presented here. Wilczyce 1 fits within the range of raw and size corrected scores expected for these parameters for a modern human perinate, taking into account the generally elevated torsional strength found in Pleistocene immature individuals (Cowgill 2010). The diaphysial torsion of the more complete longbones is also described and compared to individuals as above. Finally, the benefit of using virtual reconstructions for analysis of very small bones (for example the pars basilaris) is also discussed. Preliminary casts made by rapid prototyping the scans will also be available for inspection.

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Poster Presentation

Conflicting dates for the Late Aterian

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The tremendous importance of North-west Africa during the Late Pleistocene should be again stressed and clarified. Several key questions are to be raised in this geo-historical region: (1) contacts with Europe during the Middle Palaeolithic, (2) meaning of apparent total disappear of the Aterian culture, (3) interactions between Europe and Africa at the crucial time, (4) relationship with the Solutrean culture, (5) meaning, origins and history of Ibero-Maurusian cultures, (6) relationship with Italy and Spain and (7) Spanish Levantine and Saharan art. All of these issues have been tackled here and there, but never by sound, up-to-date and synthetic approaches. A few of these arguments will be raised here. As a whole background of all of these processes, clear dating results should be first achieved in order to allow pertinent comparisons. Two new cases of deep conflicting evidence deserve, besides others, our particular attention. First at the huge Ifri n'Ammar sites, TL dates have indicated 80,000 years for the Late Middle Palaeolithic/Aterian levels. Our new C14 dates yield 35,000 BP for exactly the same levels. At the "grotte des Contrebandiers", formerly dated at 28,000 BP by Debénath and his team, is now dated at 100,000 years by new TL dates. As starting points, this kind of methodological contradiction should be confronted, understood and resolved.

Poster Presentation

Cognitive 'barriers', synchronic development, and autism: A proposal for the integration of intelligence modules in the hominid cognitive architecture

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Evolutionary change occurs through two major mechanisms: the introduction of new traits and modifications to the development of existing ones (Gould, 1977). While accounts of cognitive evolution might tend to focus on the former, developmental changes to the onset, duration, rate, extent, stage sequencing, and organization of cognitive processes in primates, possible sequelae to hominid encephalization and concomitant extension of brain maturation, may have played a significant role in the development of modern cognition. The present paper proposes that developmental reorganization enabled the synergistic integration of key cognitive processes to help transformed the nonintegrated hominid cognitive architecture proposed by Mithen (1996) into an integrated one and reexamines his analysis of behavioral signatures of cognitive integration in the archaeological record. Mithen's cognitive architecture consisted of discrete intelligence modules with either 'barriers' between them prohibiting their interaction or 'lowered' barriers enabling synergistic interaction; however, he did not propose a mechanism for the integration of general, social, natural history, and technical intelligences and language that yielded the modern human mind. The approach proposed in the present analysis complements work focused on parietal lobes expansion and globularization (Bruner, 2004) and enhanced working memory (Coolidge & Wynn, 2005; Wynn & Coolidge, 2002). Primate cognition is characterized by traits common to New and Old World monkeys, great apes, and humans, potentially positioning these traits as primate cognitive universals. In Neo-Piagetian theory, cognitive domains acting on environmental stimuli can be broadly characterized as knowledge about necessary relations (cognition about relations of class, sequence, or number) and knowledge about contingent relations (cognition about causal, spatial, and temporal relations). Though shared by modern primates, these traits differ markedly in development, generally beginning the youngest, persisting the longest, and developing the fastest and to the greatest extent in humans compared to other primates (Langer, 2000, 2005; Matsuzawa, Tomonaga, & Tanaka, 2006; Menke, 2007). In particular, developmental organization differs significantly: non-overlapping (asynchronic) in monkeys, partially overlapping in apes, and completely overlapping (synchronic) in humans, with the degree of overlap mediating the exposure to common environmental stimuli and the opportunity for synergistic development within and between domains (Langer, 2000, 2005). The present paper also proposes that increased levels of understanding may result from the synergistic development of cognitive processes. In modern humans, synchronic cognitive processes are characterized by increased levels (for example, in categorization and Theory of Mind) relative to nonhuman primate abilities, an increase often attributed to developmental changes in rate and extent (Langer, 2000, 2005). However, increased levels might also result from synchronic development affording integration between cognitive domains. This implies that asynchronic cognitive processes would be characterized by reduced levels and cross-domain accessibility, impairments that in turn suggest further impairments in social interaction, social learning, and figurative language processing. Support for this hypothesis may come from autism, a disorder that affects the developmental timing of cognitive processes and results in, among other symptoms, impaired categorization (e.g., Froehlich, 2008) and Theory of Mind (e.g., Vivanti et al., 2011), as well as an impaired ability to process figurative language.

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Poster Presentation

Heel bones from the Middle Pleistocene site of Sima de los Huesos (Atapuerca, Burgos, Spain)

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Up to date, a total of 22 calcaneus (12 right, 10 left) remains have been recovered in the Middle Pleistocene site of Sima de los Huesos (Atapuerca, Burgos, Spain). The Sima de los Huesos (SH) sample constitutes more than 60% of the tarsal bones in the *Homo* fossil record prior to Neanderthals and fossil *Homo sapiens* all together. At least 14 individuals are represented by the calcaneus bones (eight adults, three late-adolescents and three juveniles). This piece of information is entirely compatible with 28 MNI determined with dental evidence and with other cranial and postcranial elements. A total of 20 metrical variables and six indexes have been studied. Our comparative sample includes Neanderthals (n=17), Late Pleistocene *Homo sapiens* (n=35) and modern humans (n=164). Morphologically, the calcanei from Sima de los Huesos are similar to that of modern humans, Late Pleistocene *Homo sapiens* and Neanderthals. In the comparison of metrical variables, the Sima de los Huesos calcaneus bones present a broader sustentaculum tali than that found in the comparative samples. Moreover, the calcaneus sustentacular index also shows a more projected sustentaculum for SH individuals than those of the comparative samples. On the other hand, the Sima de los Huesos calcanei display broad cuboid facets. Several characters are shared by Neanderthals and Sima de los Huesos samples. These variables correspond to derived characters for this evolutionary line, different from those found in Late Pleistocene *Homo sapiens* and modern humans.

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Podium Presentation

The Rio Secco Cave in the North Adriatic Region, Italy. A new context for investigating the Neanderthal demise and the settllement of Anatomically Modern Humans

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During the MIS3 the Northern Adriatic region was covered by open birch-conifer forests, xerophytic scrubs and steppe (Pini et al., 2009), forming a corridor that was crossed by the late Neanderthals and first Modern Humans (Karavanić and Janković, 2006; Peresani, 2011). In this key-region of Mediterranean Europe, where the end of the Middle Paleolithic and the Early Upper Palaeolithic remain undocumented, reliable archaeological contexts are needed to reconstruct the Neanderthal demise and the appearance of AMH. In this scenario, a new contribution comes from Grotta Rio Secco, a cave located at the fringe of the Carnic Pre-Alps and initially explored in 2002, 2010 and 2011 (Peresani and Gurioli, 2007; Peresani et al., 2012). Excavations have exposed a sequence with Early Gravettian and final Mousterian occurrences. The Early Gravettian dates to 33.0–31.2ky Cal BP and records short-term frequentations, suggested by a handful of selected blades and retouched tools made of flint collected outside the region. A sequence of several thin layers dated to 46.0–42.1ky Cal BP represents the final Mousterian. The lithic material shows evidence of Levallois blade and flake technology, discoid and other flaking methods. Formal tools were produced using low quality flint available at short distance from the plateau. Animals hunted by Neanderthals were primarily large ungulates, such as bovids, and brown bear. Although the cavity is not yet completely explored, it preserves an archive of potential interest for achieving markers of mobility, settlement dynamics and economy. The implementation of the project with fieldwork and laboratory studies will provide new elements to reconstruct the factors leading to the presence of Neanderthal groups in this area, considered so marginal in comparison to the north Adriatic plain that extended towards south in prehistoric times.
Acknowledgements: The 2010-2012 Grotta Rio Secco research project is promoted by the Administration of the Clauzetto Municipality and coordinated by the University of Ferrara after concession of the Archaeological Superintendency of the Friuli-Venezia Giulia. The Rio Secco project is co-designed by the Neanderthal Museum (Mettmann, Germany) and the Universitat Rovira y Virgili at Tarragona (Spain). Financial support is also ensured by a group of public institutions, Foundations and private companies. The logistic assistance was furnished by the Clauzetto Public Administration. A. Picin is beneficiary of the Fuhlrott Research Fellowship of the Neanderthal Museum Foundation.

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Podium Presentation

New Taphonomic Diagnostic of Hominoid Behavior and the Consumption of Meat and Bone by 1.2 Ma Hominins at Olduvai Gorge, Tanzania

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The phenomenon of equifinality complicates behavioral interpretations of faunal assemblages from contexts in which Pleistocene hominins are suspected bone accumulators. Stone tool butchery marks on ungulate fossils are diagnostic of hominin activities, but debate continues over the higher-order implications of butchered bones for the foraging capabilities of hominins. Additionally, tooth marks imparted on bones by hominins and some carnivores overlap in morphology and dimensions, further confounding our view of early hominins as hunters, scavengers or both. We report on the manual/oral peeling of cortical layers of ungulate ribs as a newly recognized taphonomic diagnostic of hominoid/hominin meat- and bone-eating behavior that indicates early access to large ungulate carcasses by hominins at the site of BK, Olduvai. Supporting these inferences, we show that rib peeling damage is unknown in faunas created by modern carnivores and African porcupines, but not unusual in faunas modified by modern human and chimpanzee butchery/consumption activities, during which these hominoids grasped ribs with their hands, and then used their teeth to peel strips of cortex from raggedly chewed ends of the ribs. Carnivores consume ribcage tissues soon after kills, so diagnostic traces of hominin butchery/consumption on ribs (peeling and butchery marks) indicate early access to ungulate carcasses by BK hominins. Tooth marks associated with the peeling and butchery marks are probably hominin-derived, and may indicate oral meat-stripping and bone consumption was not uncommon for our ancestors. Recognition of rib peeling as a diagnostic signature of hominoid/hominin behavior may aid the search for pre-archaeological traces of hominin meat-eating.
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Podium Presentation

New insight on the chronostratigraphic background of the Last Interglacial and Early Glacial loess-paleosol sequences related to Middle Palaeolithic assemblages in North-Western Europe

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Complementary stratigraphic record conducted during the last decade in the surrounding of Liège (Belgium) has improved the resolution of the Last Interglacial Early Glacial loess-paleosol sequence of Middle Belgium and Northern France based on high-resolution reproducible pedological events and specific sedimentary markers, both records encompassing a large number of various Middle Palaeolithic occurrences. Recently this correlative scheme could be extended across the Middle Rhine Area, to the Central and Eastern European loess belt, leading to a new insight on the chronostratigraphic background of the system. This approach is mainly based on the palynological data gathered in Central Ukraine which shows a consistent signature of the vegetation, from broad-leaved forest to dry forest-steppe, with regard to the pedosedimentary succession. It allows for the first time to correlate vegetation development phases from the loess-palaeosol sequences with those of long lacustrine reference pollen sequences of Europe, as well as with the marine and Greenland records. This correlative scheme which combines pedostratigraphic records and palynological data on a large geographic scale, demonstrates the global significance of the high-resolution climatic signature recorded for the Last Interglacial and the Early Glacial, from the Atlantic Front to the Russian Plain.

Podium Presentation

Endocranial asymmetries and vascular imprints in Crania 4, 5 and 6 from Sima de los Huesos site (Atapuerca, Spain)

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Two decades ago, three well-preserved skulls (Crania 4, 5 and 6, two adults and one juvenile respectively) from the Sima de los Huesos (SH) site (Atapuerca, Spain) were described and evaluated (Arsuaga, 1993; Arsuaga et al., 1993, 1995, 1997), as part of an important collection of a Middle Pleistocene population. The brain endocast of Cranium 5 was already introduced in a previous publication of the authors (Poza-Rey & Arsuaga, 2009). At the present work, a detailed and completed morpho-metrical analysis of the corresponding virtual brain endocasts is displayed, in order to increase our knowledge about this human group and the species which it belongs to. The virtual brain endocasts were reconstructed from CT-scans, using a 3D medical image reconstruction software (MIMICS v.12,11). Reconstitution of the incomplete brain endocast of Crania 6, has been performed with 3DStudioMax software. Endocranial asymmetries (Broca's area, petalial pattern, cerebral blood system components such as middle meningeal vessels pattern, posterior dural venous sinuses and sphenoparietal sinus) are graphically represented and described for these specimens. The combination of the results for Broca's area and petalial pattern indicates an undoubted right handedness for the specimen 5, while two different expressions not clearly related to right-handedness, are observed in the other studied individuals. The blood flow pattern in the juvenile individual from SH (Cranium 6) shows a similar behaviour to that in modern human children (2-9 years old), but the posterior dural venous sinuses are narrower than in the comparative modern sample. The other SH adult specimens show variation in the blood flow pattern respect the modern adult sample. Arsuaga et al., (1997) includes a short description of the sagittal sinus flow derivation in the three specimens. At the current description, that describes and interprets these dural sinuses in deep, we introduce the idea of an abnormal bifurcation of the sagittal sinus in the specimen 6, (before the confluence of sinuses, which is the normal location), as a possible cause of embolism (Iwabuchi et al, 1983 in Das et al., 2008). The middle meningeal vessels patterns in these individuals are IIb G.R. (II Ad.) in specimens 6 and 5 (right) and III G.R. (I Ad.) in specimens 4 and 5 (left). Specimens 4 and 6 show a sphenoparietal sinus, which is not clear in the specimen 5. A new protocol for the virtual reconstitution of incomplete brain endocasts has been tested on specimen 6. The use of the completed endocasts of Crania 4 and 5 and the location of the same cerebral landmarks on complete and incomplete specimens, allows the reduction or increment of the volume in the complete specimen to fit the size of the incomplete. The virtual reconstitution of the specimen 6, has provided an estimated brain volume of about 1225 ± 21 cc, similar to a previous value of 1220 cc obtained in Arsuaga et al., (2001). This makes this protocol reliable to be used with other incomplete specimens.

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Poster Presentation

First partial skeleton of *Paranthropus robustus* from Swartkrans (South Africa)

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Less than 15 Miocene, Pliocene and early Pleistocene partial hominid skeletons (i.e cranial and postcranial remains belonging to the same individual) have been discovered. We present here the first associated cranial and postcranial remains of *Paranthropus robustus* coming from Member 1 of the Swartkrans formation located in the Cradle of Humankind in South Africa. This partial skeleton (SK 1590) is, along with TM 1517 (the holotype of *Paranthropus robustus* from Kromdraai), the only partial skeletons of *Paranthropus robustus* ever described. The specimen SK 1590 comes a block of pink breccia prepared with acetic acid in April 1965 and collected by C. K. Brain in the Outer Cave resulting of 1930-1935' mining activities. This specimen housed at the Ditsong National Museum in Pretoria (previously named Transvaal Museum) consists of five major pieces which fit together: SK 1590 (a): right maxillary fragment with upper second premolar and first molar; SK 1590(b): right maxillary fragment with upper, second incisor, canine and first premolar; SK 1590 (c): right mandible fragment in two pieces; SK 1590 (f): left pelvic bone (part of ilium and acetabulum area); SK 1590 (g): left femoral head and part of femoral neck. Two other pieces SK 1590 (d): left superior pubic ramus and SK 1590 (e): fragment of left pelvic bone have been found in the same block. Usually, the diagnosis of all the hominid species are based on cranial and dental remains. Due to the scarcity of partial skeletons, the taxonomic assignment of the postcranial remains is often based on comparison with modern humans, great apes or other hominin isolated remains. It is particularly the case for early *Homo* and *Paranthropus* species. Concerning the taxonomical allocation of SK 1590, this specimen presents cranial traits which are considered as shared derived features (synapomorphies) of *Paranthropus* according to Strait et al. (1997), such nasoalveolar clivus concave in coronal plane, a smooth entrance of the short nasal cavity, the absence of anterior pillars, a thick palate and aligned anterior dentition. All these features along with the linear dental measurements allow us to attribute SK 1590 to the *Paranthropus robustus*. The association of the maxillary and mandibular fragments with the postcranial remains allow us to allocate the femur and hip-bone to *Paranthropus robustus*. This allocation confirms some previous hypothesized diagnosic postcranial features: the hemispherical shape of the femoral head, the antero-posterior flatness of the femoral neck and an anterior inferior iliac spine close to the well-developed acetabulum. SK 1590 (d,e,g) increase the collection of *Paranthropus robustus* femoral and pelvic bones. Furthermore, it allows us to confirm the previous attribution of some postcranial remains from South Africa to *Paranthropus robustus* (i.e. SK 82, SK 97, SKW 19, SK 3132, SWT1/LB-2 (Pickering et al, 2012), SK 50, SK 3155b, SKW 8012 (Gommery and Thackeray, 2008), DNH 43 and TM 1605) and to discuss the body mass estimation for *Paranthropus robustus*.

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Poster Presentation

The relationship between diet, craniofacial form and deformation in a papionin sample: Implications for fossil hominin dietary interpretations

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Inferences about a fossil hominin ecology and behaviour are often made by directly interpreting aspects of skull form. With respect to diet, this approach is based on the premise that masticatory system functioning and so, form is adapted to food acquisition and intraoral processing. Finite elements analysis (FEA) is increasingly used to assess biomechanical performance when biting. Performance parameters that derive from FEA include estimates of maximal bite force at particular teeth and strains, which characterise deformations of the cranial skeleton when resisting biting forces. Strains may be mapped and interpreted in terms of fracture risk at particular points or in terms of overall cranial deformation. However, no attempt has been made to compare such performance parameters among extant organisms with known diets, in order to understand if and how they reflect on diet. The aim of this work is to investigate the relationship between the diets of extant primate species, their craniofacial functional performance, craniofacial form and phylogeny to investigate if and how performance parameters from FEA reflect diet. The analyses examined biting performance in papionins, because they comprise a group of primates with well-established phylogeny, large variations in cranial form and reasonably well known ecologies and diets. Crania from 7 species of papionin monkeys were modelled using computerized tomography data, and FEA used to simulate bites at different teeth. Large scale deformation and craniofacial form were assessed using 70 landmarks distributed over the cranium. Geometric morphometric size and shape analyses were used to characterise deformations produced during 100N bites and estimated maximum bite forces. Strain maps were assessed visually. Cranial form and mechanical performance were then related to broad dietary categories through partial least squares. A strong relationship is found between cranial form and dietary categories. The analyses of bite forces and deformations due to biting show a less clear relationship with dietary categories but point to *Macaca* and *Theropithecus* as being distinct from all other species. This pattern does not match the expected groupings if phylogeny were the only driver of cranial shape and mechanical performance. However *Macaca* is the most distinctive phylogenetically and in terms of performance. *Theropithecus* is a dietary specialist, being almost exclusively graminivorous and in terms of deformation when biting it is distinctive from its sister taxa. In conclusion, cranial deformation and maximum bite force predictions appear to relate less well to diet than does overall cranial form. Further work is therefore needed before ecological and behavioural interpretations from FEA can be made. Future studies will require an extended sample and a wider range and better characterised dietary categories.

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Poster Presentation

New frontiers? – A Solutrean assemblage from the Magdalenahöhle (Eifel Uplands, Western Central Europe)

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Over the last years an increasing number of studies has produced evidence that refutes the supposed settlement hiatus during the Last Glacial Maximum sensu lato (LGM s.l.), thereby documenting human presence and communication over Central Europe before the permanent recolonisation during the Magdalenian (Terberger and Street, 2003; Kozłowski et al., in press). The Magdalenahöhle (Magdalena-Cave) near Gerolstein in the Eifel Uplands of Western Germany adds to this evidence, extending the maximum distribution of the Solutrean significantly to the East. The cave was excavated between 1969 and 1972. While first studies focused on the unique ivory artifacts, assessments of the lithic assemblage provided only tentative conclusions about their Upper Paleolithic character. A new study based on a thorough evaluation of sedimentological and stratigraphical evidence shows the existence of two distinct archaeological horizons. While the lower horizon consists of artifacts made from local quartz only, the upper horizon is almost exclusively characterized by exogenous raw-material. The latter artifacts include remains of blade production and are associated with perforated teeth and fragments of ivory bracelets. Most importantly it is shown that the vast majority of the upper lithic assemblage consists of typical flakes of bifacial retouch. Since bifacial thinning of thin cores in the Upper Paleolithic is only known from the Solutrean, it is argued that the Magdalenahöhle represents an Eastern excursion of people belonging to this cultural entity. Most flakes were produced during a reduction phase between cortex-removal and roughing-out on the one side and final shaping on the other. The cores itself are missing and have been carried away. The occupation therefore represents a short stay during which only a well-defined stage of leaf point production took place. In addition to retouched flakes from this stage few others, probably imported flakes from earlier stages have been retouched as well and discarded on site. This evidence therefore shows the combined use of bifacial cores as – most likely – leaf points for hunting purposes and of flakes detached from those cores as retouched tools. This raw-material conserving behavior of bifacial cores/tools has been described to be especially useful in regions with lacking or unknown raw-material outcrops of high quality (e.g. Kelly 1988) which also holds true for the Eifel area in which the Magdalenahöhle is located. The study's results therefore not only contribute to the discussion of LGM s.l. settlement in Central Europe, but also provide insights into Upper Paleolithic land-use patterns.

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Poster Presentation

Neanderthal vs. anatomically modern: the endostructural signature of the human femoral shaft

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Together with aspects of genetically-related developmental history, structural morphology of the human lower limb bones reflects habitual mechanical loads related to functional levels and patterns of physical activity, as well as variation in body shape and pelvic proportions and, likely, climate adaptation (Ruff et al., 1993). Relative to modern humans, the Neanderthal femur shows subcircular midshaft subperiosteal contours, variable development of a medial buttress, a variably prominent linea aspera, and no evidence of pilaster. Overall, it exhibits greater diaphyseal robusticity, which is consistent with higher mechanical load regimes, and has a greater resistance to medio-laterally-directed bending stresses, mainly on mid-diaphysis, in addition to a typical resistance to axial and torsional stresses (Trinkaus and Ruff, 2012). Paleobiomechanical analyses of Late Pleistocene human femora usually rely upon outer and radiographically-based linear and surface measurements set at specific cross-sectional sites. By using techniques of (μ)CT-based 3D virtual modelling and quantitative analysis, we characterized the endostructural morphology of six Neanderthal adult (La Chaise-BD 5, Ferrassie 1, Ferrassie 2, Spy 8, Spy 16, Tour 1) and two immature femora (Ferrassie 6, Roc de Marsal) and compared the results to similar evidence from two Upper Paleolithic adult skeletons, Cro-Magnon 1 and Chancelade, and from a recent European reference sample including infant and adult individuals of both sexes. Cross-sectional geometric properties have been measured on virtual sections set each 1% of the biomechanical length. The variables considered include: total area, cortical area, percent of cortical area, second moments of area about the m-l and a-p axes, polar second moment of area, section modulus about the m-l and a-p axes, polar section modulus, maximal and minimal second moments of area. Functional imaging of each diaphyseal structural organization has been rendered through a synthetic morphometric map (Bondioli et al., 2010). Accordingly, each surface portion has been mapped onto a cylinder, whose diameter corresponds to the maximum width of the original surface of the shaft, virtually unzipped along a predefined vertical line along the anterior aspect, and then unrolled into a plane. Since it is possible to perform generalized additive models of interpolation to obtain consensus maps by merging individual morphometric maps into a single dataset, we also considered the consensus map summarizing the whole variation expressed by our comparative sample. Similarly to the condition shown by Upper Paleolithic and recent humans, percent cortical area in Neanderthals decreases distally and indicates more robust proximal shafts in both adult and immature individuals (Volpato et al., 2007); conversely, the ratio a-p vs. m-l second moments of area (Ix/Iy) is below the unit around the midshaft. Neanderthal morphometric maps show a distinct reinforcement along the medial aspect of the mid-proximal shaft portion, associated to a narrow bony thickening in correspondence to the outline of the linea aspera. This pattern, reflecting the unique condition of medio-lateral strengthening of the proximal femoral shaft, contrasts with that found in both fossil and extant modern humans, where the thickest values are concentrated along the pilaster, while both medial and lateral aspects show only moderately thick bone.

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Podium Presentation

Early hominin auditory ossicles from South Africa

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The middle ear ossicles have historically played a prominent role in paleontological studies, and the appearance of the three bone ossicular chain is considered a defining feature of the emergence of mammals. However, surprisingly little is known of the auditory ossicles in our early human ancestors, since they are among the rarest hominin fossils recovered. Here we report the discovery of a complete ossicular chain (malleus, incus and stapes) of *Paranthropus robustus* as well as additional ear ossicles from *Australopithecus africanus*. These discoveries allow for the first direct comparison of the ear ossicles between these two early hominin taxa, and for comparison with the few previously reported early hominin specimens. The malleus in both early hominin taxa is clearly human-like in the proportions of the manubrium and corpus, and a deep phylogenetic origin is proposed for the derived malleus morphology. Thus, anatomical changes in the malleus, like bipedalism and canine reduction, may represent one of the earliest human-like features to appear in the fossil record. In contrast, the relatively short incus functional length and absolutely small stapes dimensions, including the size of the footplate, resemble African and Asian great apes more closely. Although the relationship between individual auditory structures and hearing performance is complex, the anatomical differences found in the early hominin incus and stapes, along with other aspects of the outer, middle and inner ear, are consistent with the suggestion of different auditory capacities in these early hominin taxa compared to modern humans. Study of the ear ossicles, then, holds great potential as a novel avenue of inquiry into the evolutionary relationships among fossil taxa, as well as aspects of their sensory perception.

Podium Presentation

New insights to the transitional sequence of Les Cottes (Saint-Pierre-de-Maillé, France). A zooarchaeological approach

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The behavioral evolution during the transition from the Middle to the Upper Paleolithic has become a major topic in Prehistory researches. These past decades, scholars have particularly focused on the environment exploitation and some strong relationships have been proposed between subsistence strategies and human societies. Studying the hunting behaviors of different human populations in a same location (i. e. with the same geographic and geomorphologic constraints) provides a valuable source of information to characterized the strategies they developed to fulfill their needs. In this context, les Cottés site, which exhibits the complete transitional sequence with levels attributed to the Mousterian, Chatelperronian and the early phases of the Aurignacian, is of prime interest to tackle this particular topic. The faunal spectrum has underlined some major changes in the hunted prey through the stratigraphy. The frequency of reindeer in the faunal spectrum increases from 35% of the NISP (level 08) to 70% (level 04inf) and finishes by overwhelming the faunal assemblage (95% in level 02). Simultaneously carnivore remains and modifications decrease significantly, suggesting a drop in their frequentation of the cavity. With the aim to understand these evolutions, environmental and cultural factors have been tested through a zooarchaeological analysis. Its conclusion highlights that their respective influence evolved during the site formation. Moreover, major changes occurred during the Aurignacian. While in the protoAurignacian level, the site seems to have been used as a residential camp devoted to the exploitation of the reindeer carcasses, modifications in the skeletal part representation and in the carcass processing suggest a possible transformation of the site function during the formation of the youngest Early Aurignacian level. The possible use of the site as a task specific location during the Early Aurignacian suggests that the Les Cottés inhabitants developed a complex mobility pattern, different from the Southwestern France Early Aurignacian populations. These results find an interesting echo within the lithic analysis results and the personal ornament ones which identify a linked between Les Cottés and the Parisian Basin. If this hypothesis is confirmed, it would be an evidence of a regional differentiation of the subsistence and mobility strategies during the Early Aurignacian.
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Poster Presentation

Luminescence dating of the Quaternary volcanism in the Eifel (Germany): First results for the Neanderthal remains from Wannen/Ochtendung

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A detailed reconstruction of the Quaternary volcanism of the Eifel region (Germany) is hampered by the young age and/or the lack of suitable material for Ar/Ar-dating. Therefore new dating techniques have to be developed to determine the volcanic activities. Luminescence methods allow the dating of crustal xenoliths or other material, which has been heated by volcanic eruptions. Promising first results were obtained for the detection of the luminescence signal in the orange-red wavelength band (RTL), which appears to allow the dating of older events, compared to the traditional UV-blue detection. The development of new techniques is paralleled in this project by Ar/Ar-dating of samples from identical volcanic eruption wherever possible, in order to verify luminescence dating results before establishing chronologies of volcanic activities. The sediment fillings of the Eifel volcanoes are rich in archaeological remains and sites. The dating of volcanic activities therefore benefits the establishment of Palaeolithic chronostratigraphies as well. A Neanderthal neurocranium was found in some distance and not directly associated with a Middle Palaeolithic site within the crater filling of the Wannen volcanoe. However, these Neanderthal remains from Ochtendung are indirectly associated with volcanic events. They appear to have been found in secondary position because the edges of the bones show rounding of corners. The fragments of a neurocranium in association with a few stone artefacts were deposited in a small depression within the crater of the Wannen volcanoe. At the base of the volcanic sequence the occurrence of the Hüttenberg tephra (215 ka by Ar/Ar) provides a terminus ante quem for the deposition of the fossil. Tertiary clay was mobilised, pressed upwards and heated at the end of the volcanic activities at Wannen because these dykes penetrate the entire volcanic sequence. Due to the heating these clays are suitable for luminescence dating of this event and provide a terminus ante quem, which is closer in time to the deposition of the fossil. First chronometric ages of the heating and therefore a maximal age of the „Neanderthal from Wannen“ will be presented.

Poster Presentation

Personal ornaments: a proxy for tracing cultural geography and population dynamics at the Mesolithic-Neolithic transition in Europe

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The Neolithic transition represents the major economic and cultural shift in the history of mankind that is clearly perceptible in the archaeological record. The emergence of this new production system inevitably created a novel relationship between Humans and Nature and between humans themselves. It had for consequences the development of new social settings and of new systems of beliefs. Numerous studies have focused on the mechanisms that may have led to the transfer of know-how between Neolithic and Mesolithic populations. However, very few have concerned the symbolic sphere and almost none has tackled this issue at the European scale. This study provides the first attempt to extract information on cultural and population geographies, interactions, boundaries, replacements at this turning point of the European Prehistory from personal ornaments. In this aim, a comprehensive georeferenced database of Mesolithic and Early Neolithic personal ornaments from Europe (registered from 408 sites and 1022 stratigraphic units) has been created and been submitted to spatial and statistical analyses. The database exclusively records univocal personal ornaments from well preserved stratigraphic units. The different terminologies used to depict personal ornaments in publications have been reassessed and homogenized by updating raw material, shape and system of suspension of the beads. This work has conducted to the creation of 384 mutually exclusive bead types. Several geostatistical tools, including calculation of the Dice index for each stratigrahic units recorded on the database, correspondence and neighbor-joining analyses, have been used to characterize the regional Mesolithic and Early Neolithic bead type diversity. Each cultural entities identified by these analyses have been mapped to verify their spatial coherence. The Kernel density of each bead types has been mapped to discuss their geographic distribution. The spatial distribution of the bead types associations has been mapped by Spline interpolation. The results draw a complex European cultural landscape during Mesolithic and Early Neolithic. The results show a complex scenario involving varying degrees of regional continuity in Mesolithic bead types used in Neolithic societies. Mesolithic exchange networks were either maintained or abandoned according to regions. The Early Neolithic is also characterized by the large-scale diffusion of exclusively Neolithic ornament types, as well as trends towards the creation of distinct associations of bead types for each region. Numerous mechanisms, involving varying degrees of regional continuity in Mesolithic bead types used in Neolithic societies have been identified. For instance, the Baltic region shows very limited change while the northern Iberian Peninsula shows an almost complete replacement in personal ornament types. The Early Neolithic is also characterized by the large-scale diffusion of exclusively Neolithic ornament types, as well as trends towards the creation of distinct associations of bead types for each region. The different results give a convincing picture of how Mesolithic personal ornamentation was affected by the Neolithisation. The different regional outcomes open a renewed discussion on the demographic and cultural processes that contributed to reshape the symbolic geography of Europe during the Neolithic transition.

Podium Presentation

Neandertals in the Last Interglacial lake area of Neumark-Nord (Germany)

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The Neandertal record is strongly biased in favour of sites from cold to cool-temperate periods. Full interglacial sites are small in number and hence we know relatively little about the "warmer" side of Neandertal adaptations. The possibility of studying Neandertal adaptations to interglacial environments was one of the reasons for the fieldwork at the Neumark-Nord 2 (NN2) site in Germany. During a three-year period of almost all-year round excavations the sedimentary infill of the NN2 basin was studied and an area of approximately 500m^2 was excavated in detail. Excavations yielded c. 20,000 flint artefacts and more than 120,000 faunal remains, with abundant traces of human interference. A wide variety of dating methods situate the main find bearing units in the first half of the Last Interglacial period, the Eemian. In the Corylus phase of that interglacial the basin was a shallow pool of at least two hectares in size, which kept on being a depression because of continuous subsidence of the underlying sediments. In its deepest parts silt loam sediments accumulated up to a thickness of 10 metres, containing a wide variety of data on the former environment around the pool. The relevance of the NN2 site goes beyond its importance for archaeology and palaeontology: combining the results of the various disciplines studying the NN2 exposures has yielded surprising information about the relationship between the climatic signal obtained from deep sea cores and contemporary developments on the continent (Sier et al., 2011). On a local level, the archaeology from the small NN2 pond is contemporaneous with the rich palaeontological and archaeological record from the much larger neighbouring lake of Neumark-Nord 1 (NN1). The NN1 exposures were studied in the 1980s and 1990s by Dietrich Mania and colleagues, under very difficult conditions, and with very impressive results. The sediment infill of this large (up to 24 hectares) NN1 lake contained well-preserved remains of the former flora and fauna (as well as flint artefacts) of a quantity and a quality which does not have any parallel for a Pleistocene interglacial site in Europe. According to pollen, sedimentary, AAR and other data, the archaeology of the two basins is contemporaneous at a scale of resolution rarely achievable in palaeolithic studies. This implies that NN2 was just a small "puddle" at the margins of the larger NN1 lake. The two basins constitute a unique window unto a Last Interglacial landscape, sampled over an area of about 25 hectares. The different faunal and lithic accumulations uncovered in the Neumark-Nord "lake land" provide a rare opportunity to study Neandertal behaviour and interaction with their environment within a solid temporal and spatial framework. Our paper will 1) briefly present the setting of the two basins, NN1 and NN2, 2) present the first results of the archaeological studies at the NN2 locale and 3) sketch the future direction of the studies of this vast archaeological potential.

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Podium Presentation

A juvenile mandible from the El Sidrón (Asturias, Spain) site and the growth of the Neandertal craniofacial system

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The current sample from El Sidrón site preserves remains of at least 13 individuals: 7 adults and 6 immature (Rosas et al., 2006; 2012), which are considered to be derived from a single local Neandertal population (Lalueza et al., 2011). Such circumstance allows the in-depth study of different aspects of its paleobiology, including growth and development. In this study we expand previous studies on Neandertal growth (Bastir et al., 2007) with the evaluation of a new mandibular specimen from the El Sidrón site. Direct intrapopulational growth trajectory calculated with the El Sidrón juvenile and adult male specimens may partially mitigate the problem of growth studies dealing with fossil spatiotemporally distant samples. We take advantage of the relatively larger sample of mandibles as compared with other skeletal systems. The specimen is a nearly complete mandible (SD-1660), with the left condyle missing, and is part of a partial skeleton belonging to the Juvenile 1, which preserves some skull fragments, dentition, upper limb long bones, a fragment of ileum and femora. The estimated age of this individual is 6 years, assessed on the basis of macroscopic dental development. The specimen has been submitted to a morphometric and comparative analysis. Comparative sample consists in transversal series of mandibles consisting in 34 Neandertals (14 immatures, 20 adults), 100 chimpanzees (50 immatures, 50 adults of *Pan troglodytes*), 141 modern humans from Spitalfields –London, England- and Coimbra –Portugal- collections (67 immature, 74 adults). Thirty 3D landmarks were digitized and geometric morphometric analyses were performed using the EVAN toolkit. As further reference, we measured 69 2D landmarks and semilandmarks on a lateral x-ray sample of the complete craniofacial system of 194 modern human males and females for preliminary exploration of potential covariation of the mandible and the entire craniofacial system using TPS-series and MorphoJ software. A conceptual framework of craniofacial biology is used as the background for the study. This study confirms that Neandertals present a different mandibular growth pattern than *H. sapiens*, and also supports the hypothesis of highly significant differences in growth allometries. Also , growth remodeling has revealed consistent differences (Martinez-Maza et al., 2011). Further, within the well-known forward and downward facial growth vector in the Hominoidea, the main mandibular growth direction in Neandertals is largely horizontal (e.g. anterior growth). This human species shows thus a strong forward facial expansion, while in modern humans, facial increase occurs more in an inferior direction (Bastir et al., 2007). Modern human facial growth is determined by a differential increment in the anterior and posterior face, the latter of which keeps actively growing vertically until maturation, giving rise to a characteristic anterior rotation of the mandibular corpus (Bjork and Skieller, 1983). By contrast, in Neandertals both anterior and posterior face keeps growing downwards and forwards until puberty, especially the sagittal component of the anterior face. As a consequence, mesial drift is a quite conspicuous aspect of the Neandertal mandibular growth pattern, directly contributing to the emergence of apomorphic traits.
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Podium Presentation

The Dhofar Nubian Tradition: an enduring Middle Stone Age technocomplex in southern Arabia

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Between 2010 and 2012, the Dhofar Archaeological Project has located and mapped 260 Nubian Complex occurrences across the Nejd Plateau of southern Oman. Diagnostic Nubian artifacts were found cemented in fluvial sediments at the site of Aybut Al Auwal in Dhofar, with two OSL dates around 106 ka BP; hence, roughly contemporaneous with the African Nubian Complex (Rose et al. 2011). Many of these lithic assemblages, such as that from Aybut al Auwal, are technologically homologous to the Late Nubian Industry found in northeast Africa, *sensu stricto*, while others may represent local facies of the greater "Afro-Arabian Nubian Technocomplex." This presentation describes the various reduction strategies encountered at a sample of Nubian Complex sites from Oman, explores inter-assemblage variability, and begins to articulate technological units within the "Dhofar Nubian Tradition." To achieve this aim, we have developed an analytical scheme with which to describe technological variability among Nubian Levallois reduction strategies in both Africa and Arabia. Our analysis indicates at least two distinct Nubian industries. The first, which we refer to as the "Classic Dhofar Nubian," is virtually identical to Late Nubian Industry from the Lower Nile Valley and Red Sea Hills in Egypt. The subsequent group of assemblages in Dhofar, called the "Mudayyan," exhibits a technological shift toward diminutive Nubian Levallois cores and flat, recurrent bidirectional cores with opposed, faceted striking platforms. We interpret this evidence to indicate an enduring, local Nubian tradition in Dhofar that is ultimately rooted in the African Nubian Complex.

Poster Presentation

New excavations at Le Fontenioux. A forgotten Châtelperronian/Aurignacian cave site in the Seuil du Poitou (France)

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The origin, the nature, the geo-chronology and the makers of the Châtelperronian culture are currently debated. Contacts between Châtelperronian groups and Protoaurignacian have been recently described based on the analysis of the lithic industry from three Châtelperronian layers found in sequence at Quinçay (Roussel, 2011). However, few Châtelperronian sites have been recently excavated and dated. To evaluate behaviors of groups from the initial Upper Palaeolithic in the northern half of France, we have decided to reassess the sequence of "Le Fontenioux", a cave site which yielded two layers with lithics, fauna and bone-tools from the initial Upper Palaeolithic. In this poster we will present the first results of our new excavation undertaken at Le Fontenioux. This cave is located along the Gartempe River in the Vienne area, and is distant of around 400 meters upstream to Les Cottés. This latter is well known for its sequence of Châtelperronian, Protoaurignacian and Early Aurignacian layers (Soressi et al., 2010; Talamo et al., 2012; Roussel and Soressi, in press). Le Fontenioux has been excavated at the end of the 19th century, during the 30's and the 50's. L. Pradel provided the most complete description of the stratigraphy in the fifties. Two distinct layers, one of Perigordian IV below an Aurignacian V, are separated by a sterile layer (Pradel, 1952). The cultural interpretation of these two layers was criticized by scholars (Delporte, 1953). Later, studies of the lithics by D. de Sonneville-Bordes (1960) and by F. Harrold (1978) agreed to re-interpret the cultural layers of this sequence as a Châtelperronian layer below an Aurignacian layer. Nowadays, the reality of the so-called Perigordian IV and the Aurignacian V is questioned (e.g. Zilhão et al., 1999). New excavation at this site was necessary to test the stratigraphy and to give precise cultural attribution to the layers. After Pradel's excavation the site was abandoned and its precise location has been lost. In the summer 2011, we were able to re-locate it and then, we have planned to re-open it as Pradel's sections were still visible, with the presence of lithics as well as fauna in the backdirt over and above the sections. In this poster, we will present the current state of our excavation and the first results of our typo-technologic and petrographic analysis of lithics and of the fauna.

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Poster Presentation

Late Pleistocene (MIS 3–4) climate inferred from micromammal communities and oxygen isotope compositions of rodents from Les Pradelles, Charente, France

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The middle Paleolithic stratigraphic sequence of Les Pradelles, France, spans from the end of Marine Isotope Stage (MIS) 4 until middle of MIS 3. Micromammals remains are present in all the stratigraphic sequence, therefore offering a rare opportunity to address the question of modifications of both environments and climate throughout this period. Climate modes were studied through the taphonomy, biodiversity and oxygen isotope compositions of phosphate (δ18Op) from teeth of rodent assemblages. In the sedimentary sequence of Les Pradelles, the digestion pattern is comparable between the different levels, which means that these rodents were accumulated by a similar predator (coprocoenosis) throughout the 15–20 kyrs of the sedimentary sequence. The biodiversity studied with NP-MANOVA presents three distinct groups that combine different levels despite differential taphonomical conservations (levels 2/1, 2A, 2B and 4A versus levels 4B-1, 4B-2 and 5-1 versus level 5-2). Differences between these groups are determined by significant changes in the relative abundance of the common species. The change occurring between level 4A and 4B is characterized by an increase of Dicrostonyx torquatus and Microtus gregalis. At the level 5-2, an important increase of Microtus arvalis is observed. Considering the preferred habitats of these taxa, the three groups reflect a diachronic change in the palaeohabitats distributed around the site, with levels 4B-1, 4B-2 and 5-1 presenting the harshest environments. Oxygen isotope compositions of fossil rodents lead to distinguish two sections inside the sedimentary sequence exposed at Les Pradelles. The first section is composed by the lower levels 2/1, 2A, 2B and 4A, presenting restricted ranges in oxygen isotope compositions of rodent teeth (≤ 4.7‰) consistent with those of high latitude specimens mainly captured during the summer. The δ18Op values obtained are interpreted as summer mean air temperatures of 19±2°C for the levels 2/1 and of 16±2°C for the levels 2A, 2B and 4A. The second section is made of the upper sedimentary levels 4B-1, 4B-2, 5-1 and 5-2, which presents the largest range of δ18O values (until to 11.4‰) as well as maximum δ18Op values 3.5‰ higher than their present–day counterparts. Large isotopic variations are compatible with a high seasonality, isotopic enrichment in the heavy isotope reflects a diet under arid conditions while the occurrence of arctic rodent species testifies to cold conditions. The transition between these two sections most likely corresponds to a major change in the continental climatic mode contemporaneous to the MIS 3 and 4. This climate change most likely triggered modifications in the structure of small mammal communities as suggested by the change in the frequency of cold species such as the collared lemming. Changes in both biodiversity and isotopic patterns suggest that this major shift observed at Les Pradelles could be correlated to a Heinrich event, when arid and cold conditions prevailed in Western Europe.
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Poster Presentation

From Keilmesser to Bout-Coupé Handaxes: Regional Variability in Western European Late Middle Palaeolithic Bifacial Tools

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Bifacial tools, and especially handaxes, are the dominant tool type of the Lower Palaeolithic and in the European record their presence declines strongly with the onset of the Middle Palaeolithic. However, during the Late Middle Palaeolithic (MIS 5d-3, ca. 115,000 – 35,000 BP) bifacial tools once again form a substantial part of the Neanderthal tool kit. This reoccurrence is observed all over Europe with two main biface-rich entities being distinguished: 1) the Mousterian of Acheulean Tradition (MTA) centred in Southwestern France, with cordiform and triangular handaxes 2) the recent Micoquian or Keilmessergruppe (KMG) centred in Germany, with backed (Keilmesser) and leafshaped bifacial tools Additionally, over the last decades a plethora of smaller, often poorly defined, entities have been proposed based on specific, often region-specific, bifacial tool characteristics. These assemblages have served to illustrate the large number of assemblages that do not fit into the basic MTA/KMG dichotomy. Overall the reappearance of bifacial tools in the Late Middle Palaeolithic is still a poorly understood phenomenon; this because past debates of Middle Palaeolithic variability strongly focused on unifacial tools and often had a regionally restricted focus. The study presented here is a new investigation into the late Middle Palaeolithic bifacial phenomenon, incorporating data on a macro-regional scale, bridging the 'core areas' of the MTA (SW France) and KMG (Germany) with the more peripheral regions of the Netherlands, Britain, Belgium and the rest of France. A twofold methodology was applied. Firstly, the local terms, types and entities which were previously hampering larger-scale comparisons were unravelled and a new, simplified, typological scheme was developed. Secondly, 1,303 bifacial tools from 14 key assemblages were reanalysed, both by applying a detailed attribute analysis and by conducting a wider comparative study based on this new simplified classification. This methodology resulted in a detailed assessment of the validity and characteristics of the Late Middle Palaeolithic bifacial entities. The chronological, techno-typological and regional variability of the bifacial tools was explored and the definition and extent of the MTA and KMG entities were revaluated. Moreover this research demonstrates that some clear regional trends are present amongst these artefacts. It is proposed that a third entity, the "Mousterian with Bifacial Tools" should be recognised. This entity borders the core MTA and KMG regions and contains a wide array of bifacial tools including both classic handaxes and backed bifacial tools. Overall this research for the first time incorporates data on Late Middle Palaeolithic bifacial tools from different areas of Western Europe and demonstrates the existence of complex regional trends in Neanderthal lithic technology and behaviour.

Poster Presentation

Taphonomical analysis of the Cranium 5 from the Sima de los Huesos Site (Atapuerca, Spain)

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The Sima de los Huesos (Atapuerca, Spain) hominin sample constitutes the largest one in the Middle Pleistocene fossil record. Skull 5 (AT-700 + AT-888) is a complete adult cranium discovered in 1992, and represents one of the most complete and best preserved skulls of the hominin fossil record (Arsuaga et al. 1997). This specimen has been extensively studied from a paleoanthropological and paleopathological perspective (Arsuaga et al. 1993; 1997; 2001; Gracia-Téllez et al. 2012). The aim of this study is to describe and analyze exhaustively all the anomalous superficial marks of probable taphonomic origin present in this specimen. The cranium shows seven grooves crossing the sagittal suture and affecting both the left and the right parietals. Similar grooves are also present on the external surface of the occipital bone. The present work describes these modifications using different macro- and microscopic techniques. Several factors have been considered as possible causal agents of the cranial grooves and fractures present in Skull 5: 1) Biological activity as carnivore modification (tooth scores or bear's swipe), 2) insects or root etching; 3) Pathological origin (traumatism or disease); 4) post-depositional origin (trampling, abrasion or chemical dissolution). It is also discussed if those marks could have been produced antemorten, perimortem, or postmortem. In order to test all these hypotheses, some analytical procedures have been developed, as comparing it with bone modification caused by living carnivores, microscopic analysis of the bone to look for evidences of bone regeneration, etc. Cranium 5 also shows other taphonomical alterations as rodent activity at the foramen magnum margin. The study of fracturation patterns of this specimen is also analyzed and reveals the presence of perimortem fracturing.

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Poster Presentation

Endocranial traits of the Sima de los Huesos (Atapuerca) and Petralona Middle Pleistocene ursids. Phylogenetic and biochronological implications

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A complete cranium of *Ursus deningeri* from Petralona Cave (PEC) (Chalkidiki, Greece) covered by a thick carbonate crust, has been virtually liberated through CT-scan and 3D image reconstruction, and compared with a specimen from the Sima de los Huesos (SH), Sierra de Atapuerca (Spain) Middle Pleistocene site. X-ray computed tomography allowed for the identification of previously unrecognized and phylogenetically relevant traits. Our comparison of the complete SH and PEC *U. deningeri* skulls demonstrates the strong similarity between these specimens in exocranial and endocranial traits. When both *U. deningeri* skulls are compared, we find they share some derived traits (cranial shape, dental morphology and proportions, stepped forehead, shape and placement of the frontal sinuses, thick palate and basioccipital) and some primitive traits (non-pneumatized basioccipital) that support an early evolutionary stage of *U. deningeri* within the cave bear phylogenetic lineage (Garcia et al. 2007). In some traits the SH and PEC skulls are equally intermediate between *U. arctos* and *U. spelaeus*, the typical situation of *U. deningeri*, while in some others (anterodorsal profile and the shape of the cribriform plate) the Petralona individual (PEC1002) seems to be some more primitive than the SH one (SH99). On the basis of their very similar morphology, it is reasonable to support the near identity of these specimens thereby, confirming an early stage of the speloid "(cave bear)" condition. Combined ESR–U-series dates SH to 320 ± 4 ka with a modelled intermediate-mode of uranium uptake. The dating results, therefore, seem to provide a firm minimum age of about 200 ka for the human entry; and suggestive evidence of entry before 320 ka (Bischoff et al. 1997). Thus, the radiometric results are conclusive for an age in excess of 350 kyr, with other constraints placing a likely age in the interval of 400 to 500 kyr (OIS 12–14) for the SH hominids (Bischoff et al, 2003). Considering the SH fossil assemblage is well established, we suggest to ascribe PEC1002 to a similar, if not earlier, chronological and evolutionary stage than SH99. This would suggest an age that is even greater than 350 ka for the Petralona bear.

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Podium Presentation

Neandertal and Denisovan Genomes from the Altai

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In 2010 a draft genome sequence was determined from a small finger bone found in Denisova Cave in southern Siberia. Its analysis revealed that it derives from an individual who belonged to a population related to, but distinct from, Neandertals. A molar has also been described from Denisova Cave and has shown to carry an mtDNA genome closely related to that of the finger bone. We have recently determined the DNA sequence of the Denisova genome to a quality similar to present-day human genomes. We have also retrieved a complete mitochondrial genome and nuclear DNA sequences from an additional molar found in Denisova Cave. Furthermore, we have determined a high-quality nuclear genome from a pedal phalanx found in Denisova Cave in 2010. We show that the pedal phalanx derived from a Neandertal and thus that Neandertals as well as Denisovans have been present in the cave. We will discuss the genetic history of Denisovans as well as Neandertals in light of these new genome sequences.

Poster Presentation

A revision of the southern African "MSA 1" based on new excavations at Elands Bay Cave (South Africa)

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The southern African MSA has a long history of research (Goodwin and van Riet Lowe 1929), but only since the beginning of the 1980's has a chrono-cultural framework for the MSA been established (Singer & Wymer 1982; Volman 1981). Yet the MSA is in the centre of the debate regarding the cultural evolution of anatomically modern humans. In recent years, researchers have focused on the Still Bay and Howiesons Poort techno-complexes but little work has been conducted on the earlier phases of the MSA. We argue that a complete understanding of the MSA must be based on a longer temporal scale. In his doctoral thesis from 1981 T. Volman defined the MSA 1 as the earliest phase of the MSA technology in southern Africa. The classification as the earliest phase must be seen in the view of the fact that at that time the full temporal range of the MSA was not yet known. This definition was based on two main sites in the Western Cape (South Africa): Elands Bay Cave (EBC) and Peers Cave. Here, we present a technological analysis of the so called MSA 1 of EBC based on new data from our fieldwork in 2011 and 2012. EBC is a coastal site located at about 200 km north of Cape Town and 14 km from Diepkloof Rock Shelter. The strata Volman defined as MSA 1 directly overlie the bedrock and contain an accumulation of lithic artefacts made on local quartzite. We observe the selection of quartzite slabs and large flakes and their exploitation in different axes of reduction. We compare this industry from EBC to other MSA assemblages and identify the main features that characterize this early phase of the MSA. In this context we also examine the evidence for regional and technological variability within the MSA.

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Poster Presentation

Heat treatment in the South African Middle Stone Age: New data on its cost in terms of investment and firewood

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It was recently found that silcrete raw material was heat-treated during the South African Middle Stone Age (MSA) for altering its flaking properties. This finding led to hypotheses about the implications for the MSA hunter-gatherers such as the cost of thermal treatment in terms of investment and firewood. To date, these hypotheses lack a solid basis, for data on the thermal transformations of South African silcrete and, hence, the necessary heating procedure and heating environment, is missing. In order to produce such data, we conducted an experimental study within the framework of the Diepkloof project. This work is based on the petrographic, mineralogical and structural analysis of South African silcrete and its thermal transformations. Our results shed light on the nature of these transformations, the ideal heating temperatures and the tolerated heating speed. The processes occurring in silcrete are comparable to flint, i.e. the loss of chemically bound 'water' and the formation of new Si-O-Si bond, but their intensity is less pronounced. Effective heating temperatures are significantly higher than for flint and the heating speed tolerated by South African silcrete is relatively fast. These findings imply that silcrete heat treatment cannot be directly compared with flint heat treatment. Unlike flint, heating silcrete does not require the setup of a dedicated heating environment and may have been performed in the same time as other fire related activities. This would represent only a minor supplementary investment in time and firewood. These results have broad implications for the discussion about technological evolution and the acquisition of specialised knowledge in the MSA.

Poster Presentation

Revisiting "Zinj:" Premolar morphology supports multiple robust australopith genera

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When *Zinjanthropus boisei* was announced in 1959, its discoverers considered "Zinj" morphologically distinct from all previously established hominin genera. Though often considered a representative of *Australopithecus* or *Paranthropus* (i.e., the robust australopiths), the phylogenetic relationships of *Z. boisei* to other fossil hominins remain murky. Recent studies have found evidence of homology in the anterior pillars (Villmoare and Kimbel, 2011) and facial shapes of robust australopiths (Gunz, 2012), but stable isotope studies indicate that East and southern African robust australopiths occupied different adaptive niches despite the similarity of their gnathic morphology (Ungar and Sponheimer, 2011). Our study examines the morphological variation of structures well known to both evolutionary developmental biology and dietary ecology: the postcanine dentition. Revisiting differences in crown and root morphology among the postcanine teeth of fossil hominins, we find evidence that *Z. boisei* is highly derived with respect to both its closest proposed relative, *Paranthropus robustus*, and the hominins proposed to have lived sympatrically with it. We adapted the inhibitory cascade model of mammalian molar development (Kavanagh et al., 2007) to investigate the occlusal proportions and relative cusp areas of 40 fossil dentitions from gracile and robust australopith taxa and early *Homo* in the comparative context of over 50 extant hominoid dentitions. We find that the occlusal structure of the postcanines of *Z. boisei* is distinct from that of other hominins and hominoids, most notably in the hypermolarization of the distal mandibular premolars of *Z. boisei*. This study provides additional evidence that, among closely related hominin taxa, mandibular premolars are more variable than mandibular molars and are more taxonomically and phylogenetically valent. In combination with increasing evidence of postcanine morphological variation among gracile australopiths and early *Homo*, our comparative study of postcanine morphological variation in *Z. boisei* has implications for reconstructing A) the evolutionary relationships between the hominins of East and southern Africa, B) the community composition of East African hominins living c. 2 million years, and C) the proposed monophyly of the robust australopith genus, *Paranthropus*.

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Poster Presentation

Two new Upper Palaeolithic/Mesolithic finds of portable art from Eastern Thuringia, Germany, and there 3D investigations of the ornament succession

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One of the slate gravel shows on one side an oblique criss-cross engraved pattern and on the other side a zoomorphic figure. The find place is situated on the eastern part of the "Thüringer Schiefergebirge". From this region some Mesolithic stations were known but until now no Upper Palaeolithic or older ones. The inventory (38 pieces of stone artefacts) found together with the engraved piece is not usable for precise dating unfortunately. The kind of ornament suggests a Mesolithic context. This ornamented find is usable for the study of the development of the engraved lines to the final pattern because there are a lot of well defined cross points. So laser scanning, digital microscopy and an autofocus sensor system were used to study the surface. Filter techniques allow also the interpretation of strong convex parts of the surface. The same techniques were used for the other find of portable art which was rediscovered in a collection from the Magdalenian find place Oelknitz. Here the figures from Horses overlap each other and it is difficult to order particular lines to the figures and the ornamental spiral like pattern combined with parallel lines which represent the abstract component. The developed technical methods help to reconstruct the figures as the basis of further interpretations.

Podium Presentation

Revisiting Genus *Homo*

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Ever since Mayr (Mayr 1950) collapsed hominid diversity into genus *Homo* with three species, and even after he (Mayr 1953) capitulated to recognizing Leakey et al's (Leakey et al. 1964) *H. habilis* and the separateness of australopiths, genus *Homo* has largely remained an undiagnosed taxon. Indeed, decades later when Wood and Collard (Wood and Collard 1999a, b) boldly tried to do so, they essentially presented an updated version of Mayr's "adaptive niche" approach to defining genera. In the end, specimens previously assumed to represent one or another species of *Homo* were evaluated in terms of what adaptations they might possess that australopiths did not. The answer was basically Mayr's: a particular body form and mode of locomotion, and in this specific case, "striding bipedalism". In this presentation I will review both the postcranial evidence for "striding bipedalism" to adduce what might indeed be diagnostic of a taxon that includes *H. sapiens*, and the craniodental evidence for delineating potential morphs and subclades within this hypothetical clade. Interestingly, while there is morphological basis for recognizing "Neanderthal", "*heidelbergensis*", and "*sapiens*" clades, the situation is not clear-cut when considering the Asian hominids. Further, while an argument can be made for uniting "Neanderthal" and "*heidelbergensis*" subclades, the relationships of a "*sapiens*" subclade and of the Asian hominids within the larger "*Homo*" clade are obscure. Until such time as these questions can be resolved, it will be difficult to diagnose a genus *Homo*. But perhaps that is asking too much of the human fossil record. Indeed, perhaps the time has come to entertain the possibility that as a diversity of genera are accepted for the early history of human evolution such taxic diversity characterized all of human evolution.

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Poster Presentation

Comparing endocranial ontogenies in extant hominoids

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Due to the rarity of fossilised braincases, much remains unknown regarding the evolution of the complex hominid brain. To counter this, one approach to studying brain evolution is to compare brain development across extant primates, using the endocranium as a neural proxy. By quantifying the changes in the shape of the endocranium during ontogeny, it is possible to identify characteristics in developmental patterns that are shared or unique between hominids, enabling inferences to be made about the underlying evolutionary processes. Previously we have found that the ontogenetic endocranial shape trajectory of recent modern humans differs from Neanderthals (Gunz et al., 2010), and chimpanzees (Neubauer et al., 2010; Gunz et al., 2012) in the first year of life: a difference that is presumed to reflect developmental changes in the tempo and mode of brain development. After the eruption of the first deciduous teeth, however, the endocranial developmental trajectories are similar among modern humans, Neanderthals, and chimpanzees. However, it is unknown to what extent this pattern of endocranial shape development is shared across extant hominoid species. To address these questions, we have here extended our analysis to include virtual endocasts from CT scans of 60 gorillas (*Gorilla gorilla*) and 35 hylobatids (*Hylobates sp.*). From these, we have measured 29 three-dimensional endocranial landmarks as well as several hundred semilandmarks on curves and the endocranial surface. Following Procrustes superimposition, we have statistically compared the ontogenetic shape trajectories within hominids and between African and Asian apes. Our results reveal a conserved pattern of endocranial shape development between chimpanzees and gorillas. In addition, we have observed an extended trajectory in the endocranial shape space of gorillas compared to chimpanzees. These observed differences in the development rates of endocranial structure may potentially underlie differences in function; an important caveat of this, however, is that the endocranial structure is influenced unequally by several different developmental modules and thus the changes due to brain development are currently indistinguishable from the changes due to the developing cranial base and the face. We anticipate that further research in this area will aid in deciphering the evolvability of hominoid endocranial development.

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Poster Presentation

MARS (Multimedia Archaeological Research System): An open-source web database to manage all data from collection to repository

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The standardized recording of the complete information of an archaeological excavation is a complex task due to the multidisciplinary aspect of fieldwork. After the excavation, the scientific study of the field data and collected specimens involves again collaborative work from specialists of different disciplines. After subsequent publications, the artefacts and specimens join museum and/or university collections. MARS provides an integrated web database allowing to store and share all of this information and associated multimedia files using a Plone-based application. NESPOS already offers a centralized technical solution for the storage and sharing of the information and data on Pleistocene humans. MARS is a complementary decentralized tool at the institution level that can be easily customized for other periods and areas. MARS manages documents, pictures, 3D files, PDFs, and other format files in relation with an extensive, structured object database dedicated to the description of sites, their stratigraphy, and associated collections, in a similar way to the data model of NESPOS. The options for the specific fields can be easily edited and developed. All of the objects follow specific workflows and access rights can be defined at the object level. This allows to share objects with specific users without moving them to dedicated shared folders. In addition, MARS manages bibliographical references with import and export functions from bibliographic databases and to client side-applications (Endnote & Zotero) using international bibliographic standards. For MARS objects, the import and export functions are also available using CSV files thus allowing the synchronisation of different databases or an offline input. The final interface of MARS is a browser and is usable on small screens like tablets and netbooks. This allows direct field encoding using 3G connections or WIFI if local servers are available. The potential users of MARS are scientific institutions, administrations, and private companies that are involved in archaeology, palaeontology, and biological anthropology. The main application is currently in English but translations for the French and Dutch versions already exist. The application is multi-platform but a Linux server is recommended. The client side is totally open. MARS and Plone are open-source systems. Nevertheless, a commercial technical support can be provided by Makina Corpus, which developed the latest version of the application. The Paleolithic cave site of Spy (Belgium) was used as a case study and will be available for a live demo.

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Poster Presentation

Neandertal Humeri may Reflect Adaptation to Scraping Tasks, but not Spear Thrusting

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Aspects of Neandertal skeletal anatomy that fall outside the range of modern human morphological variation may reflect osseous adaptation to specific activities. Indirect experimental evidence has supported the hypothesis that spear thrusting plausibly explains two of these skeletal attributes: a) pronounced (right-side dominant) humeral bilateral strength (J) asymmetry and, b) anteroposteriorly reinforced mid-diaphyseal cross-sectional shape (Ix/Iy) in both the right and left arm. However, alternative habitual tasks have not been evaluated. To extend this line of inquiry, muscle activity was measured using surface electromyography at the right and left pectoralis major (PM) and the anterior (AD) and posterior (PD) deltoid during the performance of various 'spear thrusting' and 'hide scraping' tasks. Contrary to published predictions of greater dominant limb (right-side) muscle activity during spear thrusting, bilateral comparisons measured during three separate spearing activities reveal significantly greater non-dominant (left-side) innervation of the shoulder (AD, PD) and chest (PM) musculature. Similar bilateral comparisons performed during single-handed, 'pushing', 'pulling' and 'hacking' scraping tasks reveal significantly greater dominant-limb muscle activity at these same muscles (AD and PM). In contrast, the performance of a two-handed 'vertical pull-down' scraping technique caused significantly greater non-dominant-limb muscle activity. These measures of in vivo muscle activity do not support previous attempts to link unique skeletal attributes of the Neandertal and Palaeolithic *Homo sapiens* humeri to bimanual spearing tasks. The question remains whether a more repetitive, yet still physically demanding task, such as hide scraping, might better explain these unique humeral adaptations.

Poster Presentation

A Palaeomagnetic Signal from the Last Interglacial

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Until recently, the Eemian (Last) interglacial was generally seen as the terrestrial equivalent of Marine Isotope Stage (MIS) 5e. However, studies of the MD952042 core off the Iberian coast did show a delay of the Eemian in relation to its inferred MIS counterpart and placed the base of the Eemian as defined by the pollenzones within the MIS 5e plateau (Sánchez-Goñi et al., 1999; Shackleton et al., 2002; Shackleton et al., 2003). Other workers argued for placing the base of the Eemian well before the MIS 5e plateau (Beets et al., 2006). A recent study indicated that the MD952042 delay is even larger than expected, at least in the middle latitudes (Sier et al., 2011). The high resolution sequence from the Neumark Nord 2 (NN2) archaeological site (Germany) provided data that enabled precise terrestrial-marine correlation for the Eemian stage in central Europe. Terrestrial-marine correlation was done by means of the identification of the palaeomagnetic Blake Event. In combination with the local Eemian pollen zones it showed a surprising time lag between the MIS 5e 'peak' in the marine record and the start of the Last Interglacial in this region. If correct, such a large time lag would have consequences for our views on the development of the Eemian in Central Europe and possible North Western Europe. Furthermore, our high-resolution positioning of the Blake Event within a Last Interglacial pollen succession holds potential for the correlation of Last Interglacial archaeological sites on a very fine time scale. Hence, it became imperative to test our reading of the Neumark-Nord 2 data at other Last Interglacial locations. In this contribution, we present results obtained from an onshore orientated (25 meter long) continuous core containing Eemian sediments near the village of Rutten (The Netherlands), in the area of the type locality of the Eemian Interglacial The core was located on a N-S section across the Eemian River Rhine palaeo-valley, containing Eemian floodbasin deposits consisting of a thick organic-rich clayey sequence. Palynological studies indicate the presence of a complete Eemian pollen sequence, with the Last Interglacial age of the deposits confirmed by Optically Stimulated Luminescence dating. Palaeomagnetic studies on the orientated core indicate the presence of a palaeomagnetic excursion which we have interpreted as the Blake Event. The similarities and differences between the Neumark-Nord 2 and Rutten Gemaalweg record, as well as their possible implications, will be presented in this contribution.

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Podium Presentation

Structure and explanation models of the East European Early Upper Palaeolithic

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Structure and explanation models of the East European Early Upper Palaeolithic. At present, the early development of the Upper Palaeolithic is explained by two models: (1) acculturation and (2) poly- or monocentric gradual evolution of local Middle Palaeolithic traditions before the expansion of the Aurignacian. Both assume a migration of people making Aurignacian assemblages, and both have been developed within the context of the culture-historic approach. A related issue is the organization of Upper Palaeolithic entities. The following observations may be considered fundamental: - although the Aurignacian is an independent cultural entity, it invariably co-exists with other "transitional" cultures. The Early Upper Palaeolithic exhibits a binary structure, one component of which is Aurignacian of cross-continental distribution, and second is represented by series of local "transitional" cultures; - current dating of sites indicates a broadly simultaneous appearance of the Aurignacian over wide areas from the Atlantic coast to the Don Basin (possibly to the Altai and Zagros regions), and it is not possible to identify a linear sequence of movement from one area to another; The primary basis for reconstructing the development of the Upper Palaeolithic in Eastern Europe is the Kostenki model, which contains a chronological Initial Upper Palaeolithic (IUP-stratum) unit that antedates the traditional Early Upper Palaeolithic. It comprises two distinct cultural traditions: Spitsynean and the assemblage of Kostenki 14 (cultural layer IVb) which is neither "transitional" nor Aurignacian, although some Aurignacian elements may be identified in both traditions. They also lack features of the Levallois-leptolithic phylum. Some sites outside Kostenki (Buran-Kaya III in Cimea, Zaozerie 1 at Ural, Sokernitsa in Carpathians) can be included in IUP stratum on the same basis, i.e., they represent the oldest Upper Palaeolithic in the region and are neither transitional nor Aurignacian. Four explanatory models for the IUP phenomenon are under consideration: - a pioneering pre-Aurignacian wave, as suggested by W. Davies, on the basis of some isolated Aurignacian features in each IUP assemblage; - the initial (starting) point of new cultural unities, the development of which was interrupted by the Aurignacian expansion; - the end point of a protracted process, the beginning of which may lie with blade industries of the early Mousterian, the evolution of which was interrupted by Middle Palaeolithic stagnation; - the undeservedly forgotten theory of the synthetotype of G. Laplace. The last explanatory model seems the most probable at present, as it accords well with the archaeological data and does not require postulated migrations. In any case, the IUP seems to be a real entity, at least in Eastern Europe, with uncertain temporal and spatial boundaries at the current state of our knowlege.
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Poster Presentation

Muscle Area Estimation - Neanderthal vs. Modern

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A sample of Paleolithic modern humans and Neanderthals has been scanned using a pQCT device in order to determine the cortical area of the radius bone at 65% of maximum length. Using a data set of almost 700 living humans as a reference sample, the muscle area of the Paleolithic specimen was then estimated based on linear regression. The results of muscle area estimation were then standardized to forearm length in order to obtain a value that enables us to approximate the muscular strength of the forearms. The poster presents the results of this study and compares Neanderthals and Paleolithic Modern Humans in order to evaluate which human species would have 'won the arm wrestling'.
Acknowledgements: This study was supported by the Gerda Henkel Stiftung and the Heinrich-Hertz-Stiftung. Special thanks go to all the institutions who supported research by granting access to the Paleolithic specimen and the Universitätsklinikum Köln.

Podium Presentation

Mammoths among Handaxes: Neanderthal-Megafauna interactions at the Late Middle Palaeolithic site of Lynford, UK

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Lynford, discovered in 2002, is the only contextualised Late Middle Palaeolithic site in Britain. The site yielded a large and well preserved collection of faunal remains and stone tools, including over 60 handaxes. The material was recovered from fine grained organic deposits within an oxbow lake that preserved an exceptional late Middle Palaeolithic (MIS3) palaeoenvironmental record. This includes pollen, macro-flora and beetle data allowing for a high degree of environmental resolution. The faunal assemblage is dominated by mammoth and other cold adapted species such as woolly rhinoceros and reindeer. Current interpretation of the mammoth remains suggests an absence of long bones and high incidence of bone pathologies as evidence for habitual hunting and butchery of these animals by late Neanderthal populations (Schreve 2006; 2012). Such evidence is apparently borne out by high isotope values that suggest meat was a key component of Neanderthal diet; furthermore, archaeological finds such as the wooden spear from Lehringen (Germany), embedded in the ribcage of an elephant provide further tantalising glimpses of Neanderthal behaviour. At present, there is no clear archaeological or zooarchaeological evidence for systematic megafaunal exploitation by Neanderthals. Often arguments are based on an ambiguous taphonomic correlation for example, the presence of stone tools near megafaunal remains or the absence of cut-marked bones due to the removal of larger muscle packages. Moreover, the influence of the depositional environment in faunal accumulation and modification is not accounted for, which can prove problematic with fluvially disturbed contexts. Lynford's fine-grained sedimentary context provides a more secure spatial and temporal context to assess hominin meat-procurement behaviour and was therefore selected out as a case study. To reassess the importance of Neanderthal behaviour in site formation and bone modification at Lynford a twofold methodology was developed: firstly, primary zooarchaeological and taphonomic data was recorded including the distribution of modifications including weathering, root etching, fluival modification, and carnivore and hominin modification. Secondly, this primary data was contextualised using data on the depositional history and sedimentary processes at the site. This twofold approach rigorously tested the direct association between the lithic tools and faunal material at the site. Specifically, whether the material accumulated at this location represented the remains of past Neanderthal hunting and butchery activities. Results of this reanalysis suggest Neanderthals had a reduced role both in faunal accumulation and modification. Evidence for the attritional accumulation of faunal material and significant post-depositional disturbance through animal trampling and bank collapse was recorded. An analysis of bone surface modification signatures identified no humanly-modified mammoth remains, despite evidence for exploitation of other species, including woolly rhino and reindeer. Conversely, substantial carnivore exploitation, often preceding Neanderthal modifications, was recorded across all species at the site, and especially on the mammoth remains. In summary, this research identified no evidence for the systematic hunting or exploitation of any species, including megafauna, at Lynford. It is therefore argued that the oxbow lake environment provided a 'natural freezer' preserving animal carcasses longer and allowing for repeated and prolonged exploitation by Neanderthals, potentially on a seasonal basis.

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Podium Presentation

How do we reconstruct relationship between late Middle and early Upper Paleolithic lithics industries in Western Europe? The case study of the MTA and the Châtelperronian, and inferences about the makers of the Châtelperronian

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Discussions on the makers of the Châtelperronian have been recently refuelled (Bar-Yosef, 2006; Bar-Yosef and Bordes, 2010; Higham et al., 2010; Caron et al. 2011). However, no diagnostic human remains other than Neandertals have been found within the Châtelperronian (see Hoffmann et al., 2011). Châtelperronian human remains are overwhelmingly more abundant than human remains found in late Mousterian or in early phases of the Aurignacian. Lastly, Châtelperronian human remains include one nearly complete skeleton. The view that the Châtelperronian was made by Neandertals was recently challenged primarily by questioning the stratigraphical integrity of key sites rather than discovering new human remains. It was also discussed at the light of a re-evaluation of cultural filiations between late Middle Palaeolithic and initial Upper Palaeolithic. In this paper, I will focus on the arguments concerning cultural continuity between the local late Middle Paleolithic and the Châtelperronian. One main argument, put forward first by F. Bordes in the fifties and later developed by others (Pelegrin and Soressi, 2007) is grounded on the unique typological and technological similarities between MTA type B and Châtelperronian. This combination of similarities is unknown within other industries at a European scale. This view was criticized by O. Bar-Yosef and J.-G. Bordes (2010) who did not suggest an alternative. Failure to discuss the technical features specific to the MTA and to the Châtelperronian as well as the geography of the MTA and the Châtelperronian restricted to MIS 3 gives a false impression and avoids the core arguments for the relatedness of these two industries. This paper discuss the methodological foundation used to reconstruct industrial phylogenies, and will address the typological and technological points missing in Bar-Yosef and Bordes' argument. It also re-evaluates the geography of the MTA as well as the stratigraphic superimposition of MTA and Châtelperronian. The Châtelperronian has a local ancestor, namely the Mousterian of Acheulian Tradition type B, itself in vertical continuity with the older MTA type A. A unique combination of refined technological, geographical as well as chronological data is needed to reconstruct industrial phylogenies. When applied, and considering available fossils and archaeological sites, they show that the current parsimonious hypothesis is that the MTA type A, type B and the Châtelperronian was made by Neanderthals.
Acknowledgements: This paper benefited from valuable discussions with S. McPherron, M. Roussel and J.-J. Hublin.

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Poster Presentation

The evolution of the emotional brain

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This paper considers how neurobiology and psychology can contribute to our understanding of the evolutionary development of 'the emotional brain' in human evolution, suggesting a series of stages in emotional development related to changes in other aspects of cognition such as perspective taking, self control and language abilities. Key stages in the development of the 'emotional brain' are related to archaeological and anatomical evidence for key evolutionary thresholds. A particular focus in placed on pro-social emotions, and it is argued that progressive developments in empathy, compassion and complex pro-social emotions are reflected in the archaeological record for the structure of social relationships within and between groups (documented in patterns of large scale raw material movements) and in relationships to material culture (documented in patterning in elements of handaxe form).

Poster Presentation

Results from the geoarchaeological research in Schöningen, Germany: Contextualizing the archaeological remains

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Schöningen is mostly known for the famous spear horizon, containing butchered horse remains and stone artifacts in association with 8 wooden spears. However, Schöningen comprises a complex of several Middle Pleistocene open-air sites associated with paleolacustrine deposits. While former work assumed a pristine site formation model with the remains of hominin activity on the lakeshore being rapidly embedded (Thieme, 1997, 2005), new analysis and excavations challenge this model. Recent studies and interpretations on the bone remains suggest that some experienced complex depositional histories. The ongoing geoarchaeological research, employing the methods of micromorphology and organic petrology, suggests that the archaeological material was deposited within an open water setting and not a terrestrial setting. While a single, short-term drying out of the lake cannot be excluded, there is no direct geological evidence for such an episode. Furthermore, there is no sedimentary evidence for one single event. Instead, the archaeological remains are distributed vertically through several distinct geological layers. In this paper, we propose several site formation models that could explain the unusual geological context of the archaeological materials: 1. The hominin activity occurred on the frozen lake surface. Possible activities include hunting on ice, or caching of meat. This has larger ramifications for middle Pleistocene hominin hunting behavior and reflects on their understanding and exploitation of landscapes, on their knowledge of prey behavior, and implies that they had the ability for advanced planning. 2. The hominins disposed of waste into the lake, possibly to avoid predatory competition. Both scenarios explain the geological context of the archaeological remains, but have different behavioral implications, which we explore here.
Acknowledgements: We are grateful to the Deutsche Forschungsgemeinschaft for financing this research and the Niedersächsische Landesamt für Denkmalpflege for support.

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Podium Presentation

Quantitative comparison of dental macrowear patterns in *Australopithecus afarensis*, *Australopithecus africanus* and *Pan troglodytes*

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Fossilized dental remains preserve important clues about the dietary adaptions and habits of extinct taxa. Dental microwear provides a glimpse into the material properties of the diet consumed shortly before the individual's death, and stable isotopes can track the proportions of C4 vs. C3 plant intake. However, recent studies of dental microwear and stable isotopes have provided contradictory evidence about the dietary preferences of early hominins. Besides the microwear, the chewing movements linked to the mechanical properties of the food also create a characteristic macrowear pattern, the 'occlusal fingerprint' in teeth via the attrition and abrasion of enamel. This pattern of enamel loss can be used to study dietary behavior over an individual's life time, as it reflects a summary of the individual's diet during the time-span the tooth was in occlusion. Here we use occlusal fingerprint analysis to assess a collection of wild chimpanzees from the Tai forest, Ivory Coast; the diet of this group has been documented from field observations. We then compare the occlusal fingerprint pattern of *Pan troglodytes* verus to fossil teeth of *Australopithecus afarensis* and *A. africanus*. The chimpanzees from the Tai forest show signals of tough and fibrous and elastic foods. This pattern is consistent with the actual reported diet of nuts, fruits, leaves and bark. *A. afarensis* shows significant differences to *Pan troglodytes* in size, shape and spatial position of enamel loss. The pattern we observe from our limited sample could be indicative of tough and fibrous foods with a hard and brittle component that was processed over a long period of the individual's life. Here, we extend our sample to *A. africanus* specimens to create a larger data set on dental macrowear and compare these to the existing data on microwear and stable isotope analyses to broaden our knowledge on early hominid diet.
Acknowledgements: We are grateful to Mamitu Yilma, Ethiopian National Museum, Addis Ababa and Ato Jara Haile Mariam, Authority for Research and Conservation of Cultural Heritage, Ethiopia for access to the fossil specimens, and Heiko Temming and Andreas Winzer from the Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany for providing the 3D-models of the *Pan troglodytes* and *A. africanus*. We thank Philipp Gunz and Marjolein Bosch for their helpful comments.

Podium Presentation

Evidence for long distance terrestrial locomotion among early Modern Humans and Neandertals relative to Holocene foragers and modern human athletes

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Previous research has linked lower limb diaphyseal cross-sectional geometry to patterns of terrestrial locomotion among modern human hunter-gatherers and living athletes. This study provides a new assessment of diaphyseal robusticity and locomotion by investigating the relative hypertrophy of the tibia in comparison to the upper limbs among modern human foragers and living athletes of known activity patterns. This provides an index which approximates mechanical loading of the lower limb in response to habitual activity, relative to the upper limb. The results suggest that tibial rigidity, relative to upper limb humeral rigidity, is a good indicator of the relative magnitude and intensity of terrestrial locomotion among recent human foragers and living populations. Cross-country runners exhibit significantly ($p < 0.05$) greater relative tibial rigidity compared to swimmers, and higher values compared to controls. In contrast, swimmers displayed significantly ($p < 0.05$) lower relative tibial rigidity than both runners and controls. Comparison of the morphology of Levantine and European Neandertals, and Upper Palaeolithic *Homo sapiens* to the pattern of variation found among Holocene hunter-gatherers and living human athletes and controls reveals intriguing differences. Despite having humeral rigidity that is within the range of or higher than recent humans, all middle Palaeolithic hominins displayed relative tibial rigidity similar to or exceeding, highly terrestrially mobile LSA southern Africans and modern human cross-country runners. Several Neandertal and Upper Palaeolithic specimens show a pattern of skeletal robusticity which is closest to highly mobile human foragers and distance runners, while other individuals, particularly modern humans from Skhul and Paviland, and Neandertals from La Ferrassie, show the most extreme tibial morphology relative to upper limb strength. Skeletal variation among the athlete and foraging groups are consistent with their athletic and life histories, which supports the position that the morphology of Middle Palaeolithic fossil hominins reflects adaptation to very high rates of terrestrial mobility. Furthermore, while variation exists among all Holocene *Homo sapiens*, cross-country runners and highly terrestrially mobile LSA southern Africans display the highest relative tibial rigidity, while swimmers and maritime Andaman Islanders display the lowest. The pattern of morphology found among Neandertals and Upper Palaeolithic *Homo sapiens* is most parsimoniously interpreted as evidence for levels of terrestrial mobility which match or exceed the highest levels found among modern humans.

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Poster Presentation

The small vertebrates of Témara's caves (Morocco): implications for the understanding of the Middle-Late Palaeolithic and Neolithic occupations

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Since a few years, new archaeological excavations and datations in the Rabat-Témara region (Morocco) showed that the anatomically modern humans were present in this area since at least 120 ka BP. These occupations are classified among the oldest ones of Africa and Middle East. Among these sites, El Mnasra and El Harhoura 2 caves have yielded, within a very complete sedimentary sequence corresponding to the last climatic cycle (since OIS 5e), human and faunal remains as well as exceptional archaeological objects associated to so called modern behaviors (lithic and bone industries, collected and worked hematite, collected marine shells, fireplaces, stony structures). In addition, the abundance of microvertebrate remains found in the Témara's caves constitutes an exceptional documentation to propose a high resolution framework of the environmental variations in Morocco during Late Pleistocene and Holocene. Small vertebrate remains found in abundance in the Témara's caves provide important information on the evolution of biodiversity and palaeoenvironmental context of the human remains in North Africa, as well as on the origin and the history of the deposits. A pluridisciplinary approach was used to study the small vertebrate remains from El Mnasra and El Harhoura 2 (systematics, taphonomy, palaeoecology) in a renewed geologic, stratigraphic, chronological and cultural framework, and in comparison with data from large faunas. The small vertebrate assemblages have been mainly accumulated by several types of predators. Because the pre- and post-depositional taphonomic biases appear low, we have been able to make palaeoenvironmental reconstructions. Some species, today absent from the studied region, or even from Morocco, argue for the persistence of faunal (and human?) migrations between several African areas during the Late Pleistocene. The alternation of dry / wet periods and the concomitant variation of "palaeo" coastal lines seem to be the structuring elements having influenced the faunal and human occupations in this area.

Podium Presentation

Late juvenile cranial growth in hominids

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Some of the most prominent specimens in the hominin fossil record are either late juvenile or early adult individuals (M2s but not M3s in occlusion; unfused spheno-occipital synchondrosis). Examples include type specimens (MH1, OH5, and OH7), as well as well-preserved skulls (KNM-WT-15000 and D2700). Studies assessing phylogeny, sexual dimorphism and biomechanics have frequently included those specimens without taking their subadult status into account. Little is actually known about late phase of growth and development of the hominin skull, and comprehensive quantitative studies of late ontogenetic changes are lacking. In phylogenetic studies late juveniles are usually considered with the explicit or implicit assumption that at this stage of development various relevant characters are already fully adult in morphology (eg. MH-1), although the opposite assumption has also been made (eg. L338y-6). From a biomechanical perspective it is also important to control for late stages of growth. OH5, for example, is a subadult specimen that has been used to simulate loading forces during mastication in *Paranthropus*. A better understanding of cranial growth and development during the late stages of ontogeny is also critical for assessing the degree and the pattern of sexual dimorphism in fossil taxa. Here we present a quantitative analysis of shape changes during late stages of cranial ontogeny in a sample of 100 wild chimpanzees and 80 wild gorillas in order to provide a framework to allow the non-adult morphology of late juveniles hominins to be accounted for in future studies. Cranial morphology was quantified using 152 3D landmarks and 38 semilandmarks on curves. Data were collected from high-resolution computed tomographic scans. Changes in size and shape were analyzed using geometric morphometric techniques. Data were converted to shape variables using Procrustes superimposition and visualized using principal component analysis in Mathematica and the EVAN toolbox. Multivariate regressions of shape on the logarithm of centroid size were used to assess ontogenetic allometry; comparisons of mean shapes computed for dental age groups further illustrate the shape changes in late juveniles. Our results show that after the eruption of the M2s the crania of gorillas and chimpanzees show little change in overall size, but changes in shape are apparent. Associated with ongoing development of the masticatory musculature adults present a stronger anteromedial incursion of the temporal lines and accentuated postorbital constriction. Moreover, fully adult specimens have a larger frontal sinus, and a more heavily pneumatized temporal squama and mastoid region. These morphological changes are relevant for the interpretation of phylogeny, biomechanics as well as sexual dimorphism, and considering late juveniles in such analyses as if they were adults is not appropriate.

Podium Presentation

Comparison of Middle to Upper Palaeolithic transition sites in Central France. An accurate chronology

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The nature and duration of the Middle to Upper Palaeolithic transition (MUP) in Western Europe is one of the key ongoing debates in Palaeoanthropology. Central to this debate is the biological nature of the makers of the different lithic assemblages (Neanderthals and modern humans), and contradictory models have been proposed to explain the cultural evolution of these hominids. Common to all these questions is chronology, and radiocarbon dating is the backbone of the time frame during this period, even though it is close to the limit of the method. We undertook an extensive radiocarbon dating program mainly on bones modified by human which allows us to propose a chronological framework of different sites dating to the Middle to Upper Palaeolithic transition in Central France. The main objectives were to remove contamination from the organic bone fraction, which generally results in younger ages, and to avoid the incorporation of exogenous carbon in the laboratory by careful cleaning of the equipment. We present chronologies of two sites in Central France spanning Mousterian to Aurignacian phases, using radiocarbon dates combined with stratigraphy in OxCal models (Bronk Ramsey, 2009). We conclude that with refinement of AMS 14C bone dating methods, including ultrafiltration, and the IntCal09 calibration dataset, which resolved doubts about the reliability of 14C in the this time period (Talamo et al. 2012), more accurate chronologies for late Middle and Upper Palaeolithic sites in Europe are now emerging.

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Poster Presentation

The wolf-child never stands up ! At the search of this ideal model … The influence of the learning process of walking on the skeleton. Evolutionary implications

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My research shows how gravity drastically modifies the skeleton of the child during the long process of learning to walk. To asses the modifications of the skeleton linked to bipedal gait acquisition, I was at the search of the ideal model showing the presence of the heritage of natural selection for bipedalism but lacking the influence of learning to walk: the skeleton of a wolf child who never stands up. I report the history of two young wolf children (Wolf Children and Feral Man, J. Sing, R. Zing, 1940). I show the strength of the myth and the results of the research of the archives. I reveal a key of comprehension of the myth, the biological certainty of the phenomenon which lies on the social biology of the wolves. What the child needs to stand up one day? I give my answer and the one of Boris Cyrulnik ("La Naissance du Sens", "The Rise of the Meaning" 1991) who filmed « cupboard-children », "enfants-placards", who never stood upright. What can we expect from the skeleton of a non walking child? A key character of the pelvic skeleton corresponds to the acquisition of sagittal balance of the body in erect position. Using morphometric geometry on a sample of 100 pelves of newborns, children and adults, we showed that the angle of sacral incidence of the pelvis increases strongly in the child who learns to walk as the same time as the lumbar curvature of his spine develops… This increase will not take place in the child who doesn't stand up. I show the evolutionary importance of the progressive formation of this tight relationships between sagittal pelvic morphology and the degree of vertebral curvature. Finally quadrupedal children discovered in Turkey are presented with the project of their study.

Poster Presentation

A new assessment of the Neanderthal child mandible from Molare, SW Italy, using x-ray microtomography

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Molare 1 represents an incomplete mandible from a Neanderthal child discovered in situ in 1985, during excavations of the about 10-m-thick residual continental deposits of the Molare shelter, an ancient cave opening on the Tyrrhenian Sea along the Cilento (Campania) coasts, in SW Italy (Mallegni and Ronchitelli, 1987). The lithic industry and the abundant associated fauna suggest for this anthropic layer a chronological attribution to OIS 5 (in Giacobini and Manzi, 2005). Lacking the left ramus and distal corpus immediately after the m2, as well as large part of the right ramus, this rather robust mandible preserves 4 deciduous molars fully erupted. Overall, crown size and morphology fit the figures available for homologous teeth from the OIS 5e series of Krapina and Bourgeois-Delaunay (Mallegni and Ronchitelli, 1989). According to its first radiographic analysis, Molare 1 is from a 3-4 years old individual (Mallegni and Ronchitelli, 1987). To assess its dental maturational status with respect to the condition shown by other immature Neanderthals, to refine its age at death, to comparatively characterize its crowns in terms of endostructural organization and dental tissue proportions, and to explore details of its enamel microstructure, in 2011 Molare 1 has been imaged using microtomography at the ICTP of Trieste (Tuniz et al., 2012) according to the following parameters: 120 kV voltage, 80 μA current, and 2400 projections over 360°. The final volumes were reconstructed using Cobra 7.4 (Exxim) in 16-bit format at an isotropic voxel size of 38 μm. An additional record has been realized by synchrotron radiation microtomography at the SYRMEP beamline of Elettra, where scans (1800 projections over 180°) were performed in white beam mode with propagation phase-contrast. The final volumes were reconstructed with an isotropic voxel size of 2 μm using the Syrmep tomo project 4.0 software developed at Elettra. The high resolution 3D analysis of this highly mineralized specimen allowed the virtual extraction of 4 deciduous and 9 permanent dental elements (some incomplete) still preserved within the mandible. The resulting assessment of the developmental stage permits to evaluate its probable age at death between 2.5 and 3 years. With a Bayesian approach, we calculated the probability that the maturational sequences of its deciduous and permanent dentitions are found within the variation represented by a large extant human reference sample (229 individuals aged 1-5 years). Results show that neither the mixed (including both deciduous and permanent elements) nor the permanent sequences displayed by Molare 1 are precisely found within our comparative series. As seen in Roc de Marsal 1 (OIS 5a) and other Neanderthal children (Bayle et al., 2009), its sequence is characterized by a relative maturational delay of both incisors associated with a relative advancement of the deciduous and permanent molars. In terms of dental tissue proportions, Molare 1's endostructural morphology, notably that of the deciduous molars, fits the typical Neanderthal condition characterized by a relatively thin enamel deposited over absolutely larger volumes of coronal dentine.

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Poster Presentation

Change and adaptation? Insights into Neanderthal subsistence in interglacials from a new archaeozoological analysis of faunal remains from level 11 at Kůlna Cave (Czech Republic)

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Research into Neanderthal behaviour during interglacial phases has recently become a major core project of the Monrepos Archaeological Research Centre. A focal point of this research is the identification of prey procurement strategies and the extent to which Neanderthal adapted these as a response to changes in faunal availability. The well-preserved fauna from Level 11 in the Kůlna Cave in the Moravian karst (Czech Republic) plays a pivotal role in this research. The Middle Palaeolithic Level 11 (sector D) is attributed to the Eemian Interglacial: the fauna from two phases (11b and 11a) has been attributed to the end of the Eem (Valoch 1988; Patou-Mathis et al. 2005). The bone assemblage comprises some 50,000 finds. In order to effectively and systematically extract the maximum archaeozoological information from this large body of material, all of the finds will be incorporated into the archaeozoological analysis. So far, a total of just over 30,000 finds has been processed, of which 7,392 larger remains are currently being studied in more detail. The fauna is dominated by remains of horse, with low counts of bones of a large bovid, red deer, rhinoceros, a large cervid, an unidentified species of Elephantidae, bear, lion, hyaena, ibex, wolf and beaver. Butchery traces were observed on the bones of horse, bovid, the cervids and rhinoceros. A somewhat unexpected result is the unusually high proportion of bones bearing cut marks. In some cases, up to 16% of the bones from a single excavation unit display cut mark traces. Marks attributable to filleting activities are most abundant. Impact notches have been less frequently observed, but numerous detached bone flakes attest to the deliberate smashing of bone to obtain marrow. Some long bones show traces of longitudinal splitting. A few bones and a canine of a bear display small areas of damage produced during their use as bone retouchers. The picture that is emerging from Kůlna is a Neanderthal hunting strategy focussing primarily on several medium-large herbivores during the Eemian warm phase: the same strategy has also been recognised at numerous Middle Palaeolithic cold stage sites. Unusual is, however, the intensity with which these dietary resources were processed at Kůlna. Whether this phenomenon reflects an equally intensive exploitation of the landscape at this time, i.e. the use of the cave as an economically important focal point in the Neanderthal mobility cycle, or is simply a result of good conditions of bone preservation in the cave, remains to be seen. Comparisons with faunal remains from open sites dating to warm phases, such as Neumark-Nord II (Germany) as well as with faunal remains deposited under different environmental conditions at Kůlna will attempt to provide the answers to these questions.

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Poster Presentation

Hand preference of Lower Palaeolithic hominins in UK: results from 3D laser scanning of stone flakes

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The hand preference of extinct hominins can tell us about the evolution of linguistic and cognitive capacities. One way to determine the hand preference of past stone tool-makers is from lateralisation in flakes left as knapping waste. A research programme is underway to analyse laterality in stone flakes from several Lower Palaeolithic sites of the Old World. The method involves 3D laser scanning the ventral surface of the flake and measuring the angle of the Hertzian cone of percussion relative to the striking platform (Rugg & Mullane, 2001). Results will be presented for flakes from the UK.
Acknowledgements: Thanks to the Leverhulme Trust, the Department of A.C.E. at Liverpool, John Gowlett, and Nick Ashton.

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Podium Presentation

Fashion Change in Middle Stone Age Shell Beads from Blombos Cave (South Africa)

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Here we report on unpublished Nassarius kraussianus shell beads from the Middle Stone Age levels of Blombos Cave and, in particular the discovery of a cluster of twenty-four specimens probably originating from a single beadwork. Morphometric analysis of this enlarged collection suggests that the Nassarius kraussianus shell bead tradition lasted at Blombos for several millennia. Contextual information, microscopic analysis of published and newly identified beads coupled with experimental reproduction of wearing and heat treatment allow to reconstruct the most probable way in which the Nassarius kraussianus shell were strung and their color changed. Results reveal unsuspected regularities and a change over time in manufacture and design that, we argue, imply that the cognitive settings involved in the coding, broadcasting and recovery of meaning by Blombos Middle Stone Age people was comparable to the one applied today to the same tasks.

Podium Presentation

Genetic Changes in Sialic Acid Biology during Hominin Evolution

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In 1998, we reported the first example of a human-unique and human-universal genomic mutation with a clear biochemical consequence. This event altered the structure of major cell surface sugars called sialic acids (Sias) on almost all cells in the body, and may have protected against a form of hominid malaria. The mutation was an *Alu*-mediated inactivating exon deletion in the *CMAH* gene that likely occurred ∼3 mya, with a coalescence time (likely fixation) of ∼2 mya. The resulting immune reaction against the non-human sialic acid Neu5Gc may have contributed to speciation of the genus *Homo*, by anti-Neu5Gc-antibody-mediated cryptic female choice against sperm and embryos with an intact *CMAH* gene that were still Neu5Gc-positive. We also discovered a human-unique pattern of expression of alpha2-6-linked sialic acid expression on epithelial surfaces that can explain the human resistance to avian influenza virus infection.

These dramatic alterations in the human "sialome" apparently set in motion a series of additional human-specific changes in Sia biology, which affect >10 of the less than 70 genes involved in synthesis, recognition and turnover of Sias. In particular, we have found multiple human-specific and human-universal differences in a family of receptor proteins called Siglecs (Sialic acid-recognizing immunoglobulin-like lectins). These include binding specificity changes (in Siglecs-5, -7, -9, -11, -12 and -14); expression pattern changes (in Siglecs-1, -5, -6, and -11); gene conversion (*SIGLEC11*); gene deletion (*SIGLEC13*) and pseudogenization (*SIGLEC17*). Human-unique and human-population-universal polymorphic pseudogenization of *SIGLEC12*, *SIGLEC14* and *SIGLEC16* suggest ongoing selection on *SIGLEC* genes. Candidate selection mechanisms include pathogens that bind sialic acids or Siglecs. Human-specific consequences of interest to hominin evolution include expression of Siglec-11 in brain microglia, expression of Siglec-6 on the placental trophoblast, suppression of Siglec-5 expression on adaptive immune cells, and elimination of Siglec-13 and -17 from innate immune cells. Siglec-13 and -17 inactivations seem to have occurred shortly before the common origin of modern humans 100-200 kya, and resurrected gene products bind potentially lethal pathogens of infants. While such pathogens may have contributed to population bottlenecks in human evolution, the resulting changes in Sia biology may have also altered multiple systems where sialic acids and Siglecs have endogenous roles. A non-genetic result of the *CMAH* mutation is human metabolic incorporation of foreign dietary Neu5Gc occurring in the face of circulating anti-Neu5Gc antibodies, a novel "xeno-autoantigen" situation. Thus, genes associated with Sia biology may comprise a relative "hot spot" of genetic and physiological changes during human evolution, with implications for human origins and uniquely human features, in health and disease.

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Poster Presentation

Diet and Environment at Taforalt, Morocco: an isotopic study

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The cave site of Grotte des Pigeons, Taforalt, holds evidence of a recurrent human presence over the last 70-80ka, throughout the Aterian and Iberomaurusian stone tool industries. As the site of one of the earliest examples of decorative art (pierced shell bead necklaces) Taforalt is of key importance in the debate surrounding the spread of culturally and anatomically modern humans across Africa. Its later phases show a stark shift in the mechanism and rate of sediment accumulation that appears to coincide with the amelioration of environmental conditions following the termination of the LGM in the northern hemisphere. This study seeks to understand the timing and degree of environmental change at the site using a combination of isotopic techniques and radiocarbon dating. Initial results show promise, and it is envisaged that the information generated from this study and other related investigations will facilitate a deeper understanding of the environmental and dietary pressures placed upon these humans by global climatic fluctuations.

Poster Presentation

New Middle Stone Age human remains found at the site of Diepkloof Rock Shelter (Western Cape, South Africa)

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Although there is general agreement that anatomically modern humans (AMH) emerged in Africa and subsequently expanded in Eurasia in the Upper Pleistocene, the mode and tempo of AMH dispersal within and out of Africa is still unclear and the matter of lively discussions. This is in part due to the scarcity and discontinuity of the African Upper Pleistocene record, which represent a main obstacle in our understanding of AMH geographic origin and evolutionary history. In the course of recent excavations at Diepkloof Rock Shelter (South Africa), three human remains were found in the Middle Stone Age layers. These human remains are two pedal phalanges (intermediate and distal) from a fifth ray, which belong to the same individual, and a deciduous first lower molar. The layers in which they were found represent the end of the Howiesons Poort and the beginning of post-Howiesons Poort occupation, and are radiometrically dated to the MIS 3, between 45 and 65 kyr ago. They are thus very close in time to the assumed period of AMH dispersal out of Africa into Eurasia, a period for which very few remains are available in the African fossil record. Here, we describe these new remains and compare their morphology and dimensions to samples of African and Eurasian Pleistocene and Holocene humans. The Pleistocene samples encompass late Middle- and Upper Pleistocene human fossils from Africa, Southwest Asia and Europe that are attributed to anatomically modern humans (AMH) and Neandertals. Our metric comparative study include nine linear measurements of the phalanges as well as crown diameters of the deciduous molar. These dimensions are graphically and statistically compared to the Pleistocene and Holocene samples using univariate and bivariate analyses. Our results show that the human remains from Diepkloof Rock Shelter are distinct from Neandertals but fall well within the range of variation of AMH. Although the phalanges are indistinguishable from those of recent humans, the size and shape of the deciduous molar make it distinct from our Holocene samples and align it with Upper Pleistocene AMH. Morphologically, this tooth shows a modern occlusal outline associated with the retention of primitive features. The analyses also suggest that the remains from DRS are more similar to European Upper Palaeolithic specimens than to chronologically older West Asian AMH from Qafzeh and Skhul. In addition, our analysis of the dm1 underlines a large variability at the end of the MIS 4/beginning of the MIS 3 in Southern Africa. In conclusion, the discovery of human remains at Diepkloof Rock Shelter, albeit limited to three small bones, enriches a poorly represented chronological period of the African hominin fossil record and adds to the growing evidence of a population structure in Africa in the Upper Pleistocene.

Poster Presentation

A Lower Pleistocene human fossil from Kocabaş (Denizli, Turkey) pushing *Homo erectus* far to the west of Asia

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Turkey is at the crossroad of Africa, Europe and Asia and a key region to follow the first settlements throughout the Old World. Few human remains are known in this country until now. Only some fossils from the Karain E cave near Antalya were discovered and attributed to (pre)Neandertal. In 2002, a partial skullcap was collected in a quarry, near a village called Kocabaş, in the Denizli region, South-West of Turkey. Using CT data and 3D imaging techniques, we have reconstructed the fossil skull which consists of 3 fragmentary bones (putting in connexion the partial parietal bones and the isolated right part of the frontal). This paper presents the further anthropological study done on this reconstructed fossil since the article by Vialet et al. 2012 and preliminary results on dating. Results show that the Kocabaş skull must be attributed to the *Homo erectus* species because of its morphological and metrical similarities with the fossils from Zhoukoudian Lower-Cave and Nanjing-Hulu cave. Dating was not available until our last Franco-Turkish work done in the high sequence of travertine sediments where the fossil comes from. Preliminary results give an age older than 780 000 years by paleomagnetism. Indeed, the Kocabaş fossil, contemporary or older to the oldest fossils from the Zhoukoudian Lower-cave, is the only one representative of *Homo erectus* in Turkey. It opens the extension of the geographical area of this species further west in Asia.
Acknowledgements: This research program is supported by TUBITAK-CNRS bilateral cooperation of 110Y335 grant and the Pernod-Ricard company in Turkey.

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Poster Presentation

The study of the human remains from Baousso da Torre cave: implications for lifestyle, sexual dimorphism and burial practices during the Gravettian

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BT1, BT2, and BT3, three Gravettian skeletons from Baousso da Torre cave (Liguria, Italy), are largely complete skeletons excavated by E. Rivière in 1873. After his death in 1922, his collection was auctioned. Since that time, two of these skeletons, BT1 and BT3, were lost, and the only descriptions of these specimens are found in the principle studies done by E. Rivière (1887) and R. Verneau (1906). BT1 (an adult) and BT3 (an adolescent) were rediscovered recently in the collection of G. Goury, a French prehistorian (Villotte and Henry-Gambier 2010). The third individual, BT2, has only received partial study to date. The ongoing study of these remains addresses three critical issues with regard to human evolution during the Gravettian: 1) lifestyle, mobility and subsistence strategies, as reflected in upper and lower limb robusticity; 2) sexual dimorphism based on new stature estimates and cranial morphology of the two adult subjects; and 3) burial practices as revealed by taphonomic study of the remains. Finally, palaeopathological findings (three probable congenital conditions) indicate a possible close genetic relationship for at least two of the three individuals. These pathological conditions have not been described previously for the Upper Paleolithic.
Acknowledgements: SV would like to thank the British Academy for a small research grant for the study of these skeletons.

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Podium Presentation

A Neanderthal mandible fragment from Chagyrskaya Cave (Altai Mountains, Russian Federation)

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The Altai mountains contain a unique site cluster for Central Asia, covering the Middle and Upper Palaeolithic, including several sites with fragmentary hominin remains. Ancient DNA research played a key role in unraveling the affinities of these hominins. Krause et al. (2007) showed that the hominins from Okladnikov Cave are genetically closely related to Neanderthals, while a genetically distinct hominin population existed in Denisova cave, less than 100 km away (Krause et al. 2010, Reich et al, 2010). In addition to these two sites, the only Middle Palaeolithic associated hominin is an undiagnostic ulnar shaft fragment from level 6 of Strashnaya cave. A new site, Chagyrskaya cave, excavated since 2007 by one of us (SVM) significantly improves our knowledge about the Middle Palaeolithic inhabitants of the Altai (Derevianko and Markin, 2011). The site is in the Charysh valley, about 70 km from Okladnikov cave. A rich lithic industry of the Sibiryachikha type, similar to the one found in Okladnikov cave was found in Layers 6a to 6v. An absolute dating programme is in progress, but based on pollen and biostratigraphical data Layer 6 probably belongs to the end of OIS 4. Several fragmentary human remains were found in Layer 6, of which Chagyrskaya 6, a right mandibular ramus fragment preserving the Cinf-M2 is the most diagnostic. Both the mandible and the dentition preserve numerous derived Neanderthal traits: among else a posteriorly placed mandibular foramen, an oblique mylohyoid line, an asymmetrical P4 and continuous mid-trigonid crests on the M1 and M2. Until now, the hypothesis that the Neanderthal range extended to the Altai was mostly based on genetic arguments, as the fragmentary fossils from Okladnikov cave preserved few derived Neanderthal traits. The Chagyrskaya 6 mandible shows numerous derived traits and allows us now to link this material morphologically as well to the Neanderthals in Western Eurasia. Several questions remain: the timing and extent of Neanderthal expansion into the Altai, and especially the potential coexistence and interaction between Neanderthals and Denisovans. Based on availabe dates, the Neanderthals in Okladnikov cave and the possibly slightly earlier Chagyrskaya remains overlap with the wide range of dates for Layer 11 of Denisova cave. Sadly, we can not compare the Altai Neanderthals and Denisovans morphologically, as no common anatomical elements are preserved. Ongoing ancient DNA analyses of the hominin remains from Chagyrskaya cave and absolute dates for the site will hopefully help to clarify the origin of the Altai Neanderthals, and their relationship with the Denisovans.

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Podium Presentation

Structural dissymmetry in the iliac cancellous network supports postural/gait-related problems in the KNM-WT 15000 early adolescent from Nariokotome

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The remarkably complete 1.53 Ma KNM-WT 15000 skeleton from Nariokotome, Kenya, represents an early adolescent *H. erectus/ergaster* of male sex likely died at the age of 8 or 9 years (Dean and Smith, 2009). Following the original description of nearly 80 pieces representing his postcranial skeleton (Walker and Leakey, 1993), Latimer and Ohman (2001) have suggested the presence of some abnormalities in this individual's axial skeleton, some acquired and other of congenital origin. Their list included: diminutive and platyspondylic vertebrae, condylus tertius, kyphoscoliosis, pelvic and vertebral asymmetries, rib distortions, clavicular asymmetries, and spina bifida (referred to as a "distinct sacral hiatus" on S4 by Walker and Leakey, 1993: 118). Interestingly, in prehistoric populations a relatively high frequency of dehiscence of the crista sacralis mediana is associated to an unusual peak in juvenile (<15 years) mortality. According to Latimer and Ohman (2001), the adolescent from Nariokotome suffered some form of axial dysplasia. Nonetheless, these preliminary suggestions were never followed by a contribution in extenso. More recently, using new vertebral and rib fragments, Haeusler and co-workers (2011; and additional cited references) have refined the original reconstruction of the KNM-WT 15000 rib cage (which is now symmetrical) and concluded against previous claims for idiopathic or congenital scoliosis. However, despite the juvenile age of this individual, Haeusler (2012) has also identified a facet joint subluxation at his L4/5, which is compatible with a chronic disc pathology of traumatic origin. In contrast to adults, important risk factors for disc lesions in adolescents are the pubertal growth spurt and trauma, and this lesion might well have caused disabling backache and severe sciatica in KNM-WT 15000 (Haeusler, 2012). Since a diagnosis of traumatic spinal injury in the youth of Nariokotome implies that some extra mechanical demand affected the lower portion of his vertebral column, given that bone tissues respond and tend to adapt to the external and internal biomechanical loads by partial alteration of their shape, mass and microstructure (Lieberman et al., 2012), it is expected that such postural and gait-related constraints may have affected the functional arrangement of the iliac cancellous network. KNM-WT 15000 preserves most of the left (spec. N) and right (spec. O) iliac blades. As over 80% of the variance in cancellous network biomechanical behaviour and patterning of sandwich-like bones can be explained by measures of density and orientation, we compared mean strut thickness, bone fraction, and trabecular anisotropy on homologous ROIs identified within the ilioischial and the sacropubic iliac bundles on calibrated x-ray films of both specimens transformed into high-resolution digital images. Line Fraction Deviation index maps were also generated (Volpato et al., 2007). Compared to the evidence from a subadult modern human sample, KNM-WT 15000 reveals a morphostructural dissymmetry in terms of morphology of the chiasmatic cross-area at the level of the sciatic notch, textural anisotropy, site-specific trabecular thickness, and bone fraction (Volpato et al., 2005). As a whole, these features are compatible with an unbalanced load distribution through the trabecular bundles during walking.
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Poster Presentation

The Sima de las Palomas Neanderthal skeletons: First steps towards "virtual" reconstruction

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Sima de las Palomas del Cabezo Gordo (Torre Pacheco, Murcia, Spain) has provided remains of at least 9 Neanderthal individuals following discovery of the first human fossil in 1991 (Walker et al., 2008, 2010, 2011a, 2011b, 2012). They include 3 articulated skeletons excavated in cemented large angular scree (*éboulis*) between 2005 and 2008. Many bones were found in correct anatomical articulation, albeit often encrusted in a heavily-cemented sedimentary matrix, and several had undergone deformation (very likely post-depositional). Laboratory cleaning and preparation of the skeletal components at the University of Murcia have been enhanced both by *computer-assisted tomography* (*CAT*) scanning of fossil-containing blocks of cemented sediment in order to locate the fossils, with precision and accuracy, and by employing vibroscalpels, powered by compressed air, in order to remove cemented sediment adhering to the bones (thereby avoiding many risks inherent in traditional cleaning methods). *CAT* scanning is a necessary prerequisite for the application of methods of *computer-assisted palaeoanthropology* (*CAP*) in "virtual" reconstruction of bones that had undergone deformation in antiquity, thereby enabling accurate and precise osteometry and palaeoanthropological comparisons (Zollikofer & Ponce de León, 2005). Aspects are illustrated of the archaeological context of discovery, techniques of recovery on-site, laboratory preparation, *CAT* scanning, and steps towards "virtual" reconstruction using *CAP* methodology. Particular consideration is given to Sima de las Palomas Neanderthal adult skeletons such as SP96 and SP92, and the child skeleton SP97. *Methods and techniques*: Murcia University: removal of cemented matrix by compressed air-powered *CTS* vibroscalpels and *CAT* scanning in a sixth-generation helicoidal *GE* scanner; Zurich University *CAP* analysis using *AVIZO* and *OSIRIS* software.
Acknowledgements: Staff and students at Murcia University (Subdept. of Physical Anthropology, Dept. of Zoology & Physical Anthropology, Biology Faculty, and CAT Unit, Dept. of Animal Medicine & Surgery, University Veterinary Hospital, Veterinary Faculty) and at the Zurich University Anthropological Institute; and members of the field-research team excavating Sima de las Palomas.

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Poster Presentation

Taphonomic indicators of post-mortem body manipulations during the Mesolithic and transition to the Neolithic in the Danube Gorges, Serbia

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Situated along the bank of the Danube River in Serbia, the sites of Vlasac, Lepenski Vir, Padina and Hajdučka Vodenica are well-known for their unique architecture, sculptured boulders, and large intramural data set; with extensive archaeological sequences documenting the period leading up to, and during, the transition to agriculture (c. 9,500–5,500 cal BC). Disarticulated human bone deposits have ubiquitously been found alongside articulated inhumations and in a number of differing contexts (houses, pits, graves, or scattered). These deposits have only been subjected to traditional funerary archaeological approaches into either biological aspects of the skeleton (such as age, sex, and isotopes) or the burial context (e.g. Radovanović 1996), while the few suggestions of funerary practices involving body disarticulation have not been combined with sufficient scientific rigour. This paper presents the results of taphonomic analysis of disarticulated, fragmented and isolated human remains, in order to understand the constitution of these assemblages and to reconstruct the post-mortem manipulation of bodies. Results indicate that funerary practices were variable, and engagement with corpses was temporally extended. A number of human bones were furthermore intended to be visible during day-to-day life, one possibly as a decorative item.

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Poster Presentation

Land use and palaeodemography in the Upper Palaeolithic. Data from of the Iberian Peninsula

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Various studies suggest that the human population on the Iberian Peninsula was directly affected by the extremely variable climatic conditions of the Late Pleistocene – especially during Heinrich Events. Southern Iberia has been frequently proposed as a refugium for hunter-gatherer populations during these phases of climatic deterioration. A closer look at the archaeological evidence of 152 cave sites and rock shelters for human presence from the late Middle Palaeolithic (LMP) to early Upper Palaeolithic (EUP), Gravettian (GRA), and Solutrean (SOL) reveals strong regional differences between Northern and Southern Iberia – from both, an isochronic as well as diachronic perspective (Schmidt et al. in press). From the late Middle Palaeolithic until the onset of the Solutrean, human presence is significantly lower in Southern Iberia compared to Northern Iberia. This pattern changes for the first time in the Solutrean. Mapping of Kernel density estimations for archaeological sites displays different forms of land use for each technocomplex. While LMP sites are distributed from the coastal strip into the interior, EUP site distribution is strongly limited to the coast. This break in land use is also documented by occupation hiatus after the LMP at many sites with long stratigraphical sequences (Maillol et al. in press). In our sample more than one-third of the LMP sites were not reoccupied; neither during the EUP nor the Gravettian. The expansion into the coastal hinterland starts again during the Gravettian, but reaches the interior only during the Solutrean. These data suggest that changes of technocomplexes were linked to changes of human land use. Additionally, the radiocarbon chronology indicates that cultural changes between technocomplexes coincide with Heinrich Events, which raises the question about population continuity or discontinuity during environmental crises.

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Podium Presentation

An early Pleistocene lithic sequence from the southern Loess Plateau, Central China and the first arrival of hominins in NE Asia

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The Loess Plateau of China covers an area larger than France, and is best known for its superlative loess-palaeosol sequence that covers the last 2.5 Ma, and matches the marine isotope record in the quality of detail it provides of climatic change from the late Pliocene to the terminal Pleistocene. As a result of Chinese-led investigations over the last 40 years, its stratigraphic sequence of 32 loess layers and palaeosols is well-established from numerous sections across the Loess Plateau, and has been accurately dated by palaeomagnetism in conjunction with estimates of sedimentation rates and comparisons with the marine isotope record (Liu et al. 1999). Until now, its palaeolithic potential has been largely ignored, largely because of previous emphasis upon palaeoclimatic investigations, but partly because of the assumption that the Loess Plateau lacks flakeable stone. Here, we present the first results of investigations in Lantian County, in the southern Loess Plateau, near Xi'an and the Qinling Mountains. The Lantian area was already well-known because of the discovery in 1964 of the *Homo erectus* cranium from Gongwangling, previously dated to ca. 1.15 Ma (An and Ho, 1989), and a mandible from Chenjiawo, dated to ca. 650 ka. We show that the Gongwangling hominin is substantially older than 1.15 Ma, and that stone tools are present in several Early Pleistocene palaeosols. Several artefacts have been found in and below palaeosol S22, dated to ca. 1.540-1.571 Ma. As the earliest indications of hominins in North China are currently the artefacts from Majuangou in the Nihewan Basin, dated to 1.66 Ma (Zhu et al., 2004), our results indicate that hominins may have entered China before this time. Future investigations of palaeosols older than 1.66 Ma may provide firmer indications of when hominins first entered NE Asia.

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Podium Presentation

From Late Mousterian to Evolved Aurignacian: New evidence for the Middle-to-Upper Paleolithic transition in Mediterranean Spain

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Chronostratigraphic patterns and the radiometric evidence available in the early 1990s suggested that Neandertals and the Middle Paleolithic persisted south of the Ebro river drainage long after their disappearance elsewhere in Europe. The duration of the persistence pattern, however, remained imprecise, and its very reality was questioned as possibly a simple byproduct of dating error. The 2011 and 2012 field seasons at two sites in excavation since 2006 in the Mula basin (Murcia, Spain)—the rockshelters of Finca Doña Martina (FDM) and Cueva Antón (CA), which are located within 2.5 km of each other—have contributed data that help significantly to advance the clarification of these issues. At CA, level I-k had yielded, in 2008, a very small lithic assemblage of Middle Paleolithic affinities in association with a perforated and painted Pecten shell and an ABOx radiocarbon date in the 37-38 ka cal BP range (Zilhão et al., 2010a). This level is now area-excavated over 33 m^2. The additional work confirmed that level I-k corresponds to a low-density, episodic human occupation of Middle Paleolithic technology contained in a sediment package of high stratigraphic integrity whose basal levels have been (preliminarily) OSL-dated to the 60-75 ka interval. Additional lithics include Levallois flakes, and refitting work shows little (if any) post-depositional horizontal scatter of the finds. Additional ABOx dating of charcoal from level I-k and underlying levels II-a and II-b returned an internally consistent series of results indicating that these sediments post-date 38 ka cal BP and were laid down very rapidly. At FDM, a low density Early Gravettian context (level 7b) containing Gravette points and underlying a Middle Gravettian unit (level 7) with micrograveттes had been reached at the end of the 2010 field season. The techno-typological assignment of these levels is corroborated by ABA radiocarbon dates on humic acids of, respectively, 29.7 and 31.5 ka cal BP. In 2012, extension of the excavation outward of the drip line allowed the identification of two additional occupations below the Early Gravettian. Level 8 yielded nosed scrapers and twisted Dufour bladelets and is therefore of Evolved Aurignacian affinities. Level 9 yielded sidescrapers, denticulates and Mousterian points and is therefore of Middle Paleolithic affinities. Radiocarbon dates have yet to be obtained but the geological context argues against any significant amount of time separating the accumulation of levels 8 and 9. Combined, the evidence from CA and FDM indicates that, in chronostratigraphic terms, the Middle-to-Upper Paleolithic transition in Murcia consists of the replacement of a Late Mousterian by an Evolved Aurignacian and occurred some time during the 38th millennium cal BP. This evidence is in line with recent results obtained farther to the west, in the Atlantic façade of the Iberian Peninsula (Zilhão et al., 2010b; Hoffmann et al., 2012). As, in Europe, the Middle Paleolithic is associated with Neandertals only and the Evolved Aurignacian with modern humans only, a persistence of Neandertals in southern and western Iberia for some five millennia after they were replaced/assimilated elsewhere in Europe is the corollary of current evidence.

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Poster Presentation

Comparative tooth crown endostructural morphology in two penecontemporaneous samples of Indonesian *H. erectus* (Sangiran) and African *H. heidelbergensis* (Tighenif)

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During the last decade, methodological advances in "virtual" dental paleoanthropology showed that information of taxonomic and phylogenetic value stored within the dental tissues can be reliably extracted, imaged, and quantified by means of high-resolution noninvasive methods. In particular, the growing use of microfocal X-ray computed tomography for the 2-3D subtle characterization of the structural dental morphology is opening completely unexplored research tracks, notably in the (re)analysis and (re)interpretation of the fossil record. However, while relevant aspects of the differences traditionally reported between the modern human and the Neanderthal tooth structural organization are now better understood (e.g., Olejniczak et al., 2008), the condition characterizing Early and Middle Pleistocene *Homo* is still poorly known (Smith et al., 2012). This contribution virtually explores and compares for their 3D inner morphology (dental tissue proportions, enamel thickness topographic variation assessed through virtual cartographies, morphology of the enamel-dentine junction [EDJ], pulp morphology) five still unreported lower permanent molar crowns of *H. erectus s.s.* from the Ngebung site in the Sangiran Dome area of Java, Indonesia, and 4 molars from the North African *H. heidelbergensis* adult mandibles Tighenif 1 and 2, from Algeria (Zanolli, 2011). More precisely, the two late Early-early Middle Pleistocene dental samples specifically considered in this analysis consist respectively of four M2/M3 and one M3 (Java) and of two M2 and two M3 (Algeria). The specimens have been imaged using high-resolution microtomography (μCT) at the Centre de Microtomographie of the Université de Poitiers (equipment X8050-16 Viscom AG; camera 1004 × 1004) at varied resolutions ranging from 17.0 μm to 57.5μm isotropic voxel size. We compared our findings to the figures derived from 25 Neanderthal molars and 30 molars from a recent human reference sample of western European origin. Tissue proportions in the Javanese specimens (e.g., average 3DRET: 20.7, range: 18.0-23.6) and comparative 3D geometric morphometric analyses of the inner crown conformation (EDJ and pulp cavity) provide results which globally approximate a modern human-like structural pattern, including a relatively simplified occlusal morphology and elevated dentine horns. Interestingly, a similar picture, which parsimoniously suggests that modern humans may have retained a configuration rather close to the primitive condition, has been recently provided also by the analysis of two *H. erectus* deciduous molar crowns from Pucung, in the Sangiran Dome (Zanolli et al., 2012). The structural organization of the *H. heidelbergensis* dental sample from Tighenif exhibits a blend of modern human- and Neanderthal- like features, with intermediate enamel thickness (av. 3DRET: 14.2, range: 9.7-20.3) and a rather distinct EDJ morphology. Overall, these molars are characterized by a relatively mesiodistally elongated crown and slightly lower pulp horns (as in Neanderthals), associated with more closely set EDJ and pulp reliefs (as in modern humans). Nonetheless, as revealed by the preliminary study of the deciduous molars from the same site (Zanolli et al., 2010), the linear discriminant analyses of the EDJ and pulp conformation variables classify the Algerian material closer to the modern (primitive) rather than to the derived Neanderthal condition.

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Co-authors' names are listed alphabetically below, and indicate the session of their presentation. Podium presentations include the time of the talk and posters include the poster number. Sessions are listed in chronological order from left to right in the following format: PL = Plenary Session (eg. PL 1-Fr (8:30) – Plenary Session 1, Friday at 8:30)
PA = Parallel Session (eg. PA 4-Sa (14:10) – Parallel Session 4, Saturday at 14:10)
PO = Poster Session (eg. PO 1-Fr (47) – Poster Session 1, Friday. Poster # 47)

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