

Madrid edition  
2015, 1st-3rd june



## PROGRAMME

# ARCHAEO-METALLURGY IN EUROPE IV



MAN  
MUSEO ARQUEOLÓGICO NACIONAL



UAM  
UNIVERSIDAD AUTÓNOMA  
DE MADRID



# 1St JUNE

Timetable	CONFERENCE ROOM	ROOM 0E18: Menendez Pidal	ROOM 0D1: José Castillejo
9.15-10.30	REGISTRATION		
10.30-10.50	WELCOME		
10.50-11.25	<b>Opening Lecture by William O'Brien:</b> Information flow and the early spread of metallurgical knowledge in Atlantic Europe		
11.25-11.45	COFFEE BREAK		COFFEE BREAK
	<b>SESSION 1: Early Metallurgy: Iberian Peninsula</b> Chair: Martin Bartelheim		<b>SESSION 2: Gold 1</b> Chair: Alicia Perea
12.00-12.15	ROLAND GAUSS & MIGUEL KUNST: Copper and Bronze-Age metallurgy at Zambujal and in South-Western Iberia and how it compares to metallurgical traditions in the Mediterranean and the Near east	YANNIS BASSIAKOS, MYRTO GEORGAKOPOULOU,, AKIS GOUMAS, ELENI KONSTANTINIDI-SYVRIDI, GEORGIOS MASTROTHEODOROS, NIKOLAOS PAPADIMITRIOU, ANNA PHILIPPA-TOUCHAIS & ROMAIN PREVALET: Analysis of gold artefacts from The Mycenaean Cemetery of Argos with XRF, SEM and PIXE	
12.15-12.30	MERCEDES MURILLO-BARROSO: Society, Metallurgy and Innovation: The Iberian Hypothesis (SMITH Project)	SUSAN LA NIECE, BEN ROBERTS, HAYLEY BULLOCK: Bronze age gold wire ornaments from Northern Europe and their joining technology	
12.30-12.45	AUXILIO MORENO ONORATO, SALVADOR ROVIRA LLORENS, FRANCISCO CONTRERAS CORTES, MARTINA RENZI, LUIS ARBOLEDAS MARTINEZ, EVA ALARCÓN GARCIA & ADRIAN MORA GONZALEZ: New data on scale production of copper in the culture of the Argar. The dumping ground for Peñalosa (Baños de la Encina, Jaen)	ALESSANDRA GIUMLIA-MAIR & MARIA BERNABÒ BREA: Composition and production technology of the gold cup from Montecchio	
12.45-13.00	IGNACIO MONTERO-RUIZ, MERCEDES MURILLO-BARROSO, GUSTAU AGUILELLA, SALVADOR ROVIRA: Small scale Bronze Age metallurgy: new data from Santa Lucia (Alcossebre, Castellón, Spain)	ISABEL TISSOT, MARIA FILOMENA GUERRA: Composition and technology of Bronze Age and Early Iron age gold bracelets from the Portuguese area	
13.00-13.30	Debate	Debate	
13.30	LUNCH		LUNCH

Timetable	CONFERENCE ROOM	ROOM 0E18: Menendez Pidal	ROOM 0D1: José Castillejo
	<b>SESSION 3: Ores and Mines 1</b> Chair: William O'Brien	<b>SESSION 4: Gold 2</b> Chair: Susan La Niece	<b>SESSION 5: Experimental</b> Chair: Duncan Hook
15.00-15.15	SIMON TIMBERLAKE: New ideas on the exploitation of copper, tin, gold and lead ores during the British Bronze Age: the mining, smelting and movement of metal	BARBARA ARMBRUSTER, BIRGIT SCHORER, VERENA LEUSCH, ROLAND SCHWAB, ERNST PERNICKA, BERNARD GRATUZE & MARYSE BLET-LEMARQUAND: Metallurgical and technological aspects of Early Iron Age Gold	GEORGES VERLY & MARCO ROMEO PITONE: Experimental archaeology and archaeometallurgy on smelting furnaces from Ayn Soukhna (Middle Kingdom, Egypt): Establishment of a comparative methodology for Pyrgos-Mavroraki (Limassol, Cy)
15.15-15.30	R. ALAN WILLIAMS: The Great Orme Bronze Age copper mine: linking ores to metals by developing a geochemically and isotopically defined mine-based metal group	MARYSE BLET-LEMARQUAND, SYLVIA NIETO-PELLETIER, FLORIAN TEREYGEOL & ARNAUD SUSPENE: Are Platinum and Palladium relevant tracers for ancient gold coins? Archaeometallurgical and archaeometric data to study an Antique numismatic problem	AARON LACKINGER, ELIN FIGUEREDO, BEATRIZ COMENDADOR, RUI J.C. SILVA & JOSÉ MIRÃO: An experimental approach for smelting tin ores from Northwestern Iberia
15.30-15.45	NICOLAU ESCANILLA-ARTIGAS, BENOIT MILLE & DAVID BOURGARIT: Copper ore supply at the beginnings of metallurgy in Southeast Iberian Peninsula	PIETA GREAVES: Rediscovering the art of the Anglo-Saxon goldsmith: conservation and the Staffordshire Hoard	AGNESE BENZONELLI, IAN FREESTONE & MARCOS MARTINÓN-TORRES: An archaeological and archaeometric approach to black bronzes
15.45-16.00	LUIS ARBOLEDAS MARTÍNEZ, EVA ALARCÓN GARCÍA, AUXILIO MORENO ONORATO, FRANCISCO CONTRERAS CORTÉS, CHARLES BASHORE & JUAN JESÚS PADILLA: New contributions to mining the Bronze Age in the South of the Iberian Peninsula. Copper mines of prehistoric valley Jándula (Andújar-Marmolejo, Jaén)	ELEANOR BLAKELOCK: The Staffordshire Hoard: choices of metal composition and the underlying secrets of the Anglo-Saxon goldsmith	SANTIAGO CANO GONZÁLEZ, NOHORA BUSTAMANTE & JAIRO ARTURO ESCOBAR: Esthetic and functional replica of a Nariño copper and silver alloy disk with properties comparable to the ones of a fragment made by Pre-Columbian goldsmiths
16.00-16.30	Debate	Debate	Debate
16.30-17.00	<b>COFFEE BREAK</b>	<b>COFFEE BREAK</b>	<b>COFFEE BREAK</b>

<u>Timetable</u>	<b>CONFERENCE ROOM</b>	<b>ROOM 0E18: Menendez Pidal</b>	<b>ROOM 0D1: José Castillejo</b>
	<b>SESSION 6: Ores and Mines 2</b> <b>Chair: Ignacio Montero</b>		<b>SESSION 7: Early Metallurgy</b> <b>Chair: Yannis Bassiakos</b>
17.00-17.15	VASILIKI KASSIANIDOU: The copper mine of Skouriotissa, Cyprus. New information about its history		MILJANA RADIVOJEVIĆ & JELENA GRUJIĆ: A Rocky Relationship: Ores, Metals And Networks In the 5th Millennium BC
17.15-17.30	EREZ BEN-YOSEF: New insights on Iron Age copper production from the first phase of the central Timna Valley Project		EVELINE SALZMANN, SABINE KLEIN, ANDREAS HAUPTMANN & RICHARD ZETTLER: Material analysis of Early Dynastic copper-, bronze- and silver artefacts from the Royal Tombs of Ur, Mid 3rd Millennium BC
17.30-17.45	GUNTRAM GASSMANN, KATRIN J. WESTNER, SABINE KLEIN & GABRIELE KÖRLIN: Technological changes in mining and metallurgy from Roman to Medieval times: evidence from a Pb-Ag (-cu) ore district in Central Kosovo		NAAMA YAHALOM MACK & URI DAVIDOVICH: Analyses of Chalcolithic and Bronze Age metal objects and a unique Chalcolithic lead macehead from caves in Israel
17.45-18.00	JOSEPH GAUTHIER: New evidence of washing ores in the Altenberg (Alsace, France): a major technical breakthrough at the Berg Armuth Site (14th-15th c. AD)		Debate
18.00-18.30	Debate		

## 2nd JUNE

Timetable	CONFERENCE ROOM	ROOM 0E18: Menendez Pidal	ROOM 0D1: José Castillejo
	<b>SESSION 8: Smelting technology</b> Chair: Thilo Rehren	<b>SESSION 9: Provenance</b> Chair: Ernst Pernicka	<b>SESSION 10: workshops</b> Chair: Maria Filomena Guerra
9.15-9.30	SARIEL SHALEV, SANA SHILSTEIN & UZI AVNER: Comparative study of slags from two different copper smelting sites in the Southern 'Araba Valley, Israel	MATTHIEU LABAUNE, FLORENCE CATTIN, OLIVIER LEMERCIER, IGNACIO SORIANO &, IGOR VILLA: Trace the origin of the Bell Beaker copper artefacts in Western Europe	CARLOTTA GARDNER & IAN FREESTONE: Innovative or resourceful: metal-working crucibles in Roman Britain
9.30-9.45	ROLAND HAUBNER, SUSANNE STROBL & SUSANNE KLEMM: Investigations of a slag from copper smelting discovered at the Bronze Age site Prein VII/Cu in Lower Austria	JOHAN LING, ZOFIA STOS-GALE & ANNE-LENE MELHEIM: Iberian Copper in Scandinavian Forms?	FREDERIK RADEMAKERS, THILO REHREN & ANASTASYA CHOLAKOVA: Fragmented remains of Roman crucible metallurgy in Thracia
9.45-10.00	MARTINA RENZI, MYRTO GEORGAKOPOULOU, THILO REHREN, CHRISTINA PEEGE & WALTER FASNACHT: Copper production at Almyras (Ayia Varvara, Cyprus) in the Cypro-Archaic II period	PAOLO VALERA, CAROLINA GUTIERREZ, PAU SUREDA, M <sup>a</sup> ROSARIA MANUNZA, FULVIA LO SCHIAVO, NURIA RAFEL, RAQUEL VILAÇA & IGNACIO MONTERO: New insights into central Mediterranean copper trade during the Late Bronze Age	NY BJÖRN GUSTAFSSON: Multiplying identities – mastermodels and reduplication in Early Medieval Gotland
10.00-10.15	BENOIT MILLE, VALENTINA FIGUEROA & DIEGO SALAZAR: Technology and organisation of prehispanic copper production at Collahuasi (Southern Altiplano, Chile)	CATERINA CANOVARO, IVANA ANGELINI, GILBERTO ARTIOLI, ELISABETTA BORGNA, PAOLO NIMIS & IGOR M. VILLA: Late bronze age ingots from Friuli Venezia Giulia (Italy): composition and origin of the metal	DANIEL SAHLÉN: Technological specialisation and material choices: Viking Age metal crafts in the Mälars Valley
10.15-10.30	COLIN TODD THOMAS: Smelting and the sacred at Dos Cruces: investigating a Pre-Incan smelting site on the North coast of Peru	MORITZ KIDERLEN, HANS MOMMSEN & ANNO HEIN: Use Of Neutron Activation Analysis (Naa) for provenancing artefacts cast in the lost-wax technique. A pilot-study with EIA Tripod-Cauldrons found at Olympia and Kalapodi/Abai	JULIEN FLAMENT, SARAH GUILLAUME & TEREYGEOL FLORIAN: Litharge cakes from Castel-Minier (Ariège, France): Understanding strategies of the cupellation in a multi metals workshop from the 15th century
10.30-10.50	Debate	Debate	Debate
11.00-11.30	<b>COFFEE BREAK</b>	<b>COFFEE BREAK</b>	<b>COFFEE BREAK</b>

Timetable	CONFERENCE ROOM	ROOM 0E18: Menendez Pidal	ROOM 0D1: José Castillejo
	SESSION 11: Bronze Age 1 Chair: Marianne Mödlinger	SESSION 12: Out of Europe Chair: Marcos Martín-Torres	SESSION 13: Iron 1 Chair: Emilio Cano
11.30-11.45	MARTIN BARTELHEIM: Metal as a resource in the European Bronze Age	THOMAS R. FENN, JEFFREY FLEISCHER, STEPHANIE WYNNE-JONES, EDWARD POLLARD, TOM FITTON & ADRIA LAVIOLETTE: Economic Changes through Time along the Tanzanian Swahili Coast, as Seen through the Examination of Non-Ferrous Metals and Metallurgical Technologies	ADI ELIYAHU BEHAR, NAAMA YAHALOM MACK, STEVE WEINER & ISRAEL FINKELSTEIN: Early Iron objects from Israel; the rusty evidence
11.45-12.00	CECILE LE CARLIER DE VESLUD & CELINE SIEPI: The Armorican Brittany Tin production / a rich region exploited since Bronze	ZIAD EL MORR, DAVID BOURGARIT & ANNABELLE COLLINET: Islamic metalwork from Iran (10th-14th century AD)	SALVADOR ROVIRA & MARTINA RENZI: On the "invisibility" of Early iron smelting technology in the Iberian Peninsula. A preliminary approach
12.00-12.15	NERANTZIS NERANTZIS, YANNIS BASSIAKOS, MYRTO GEORGAKOPOULOU, ELENI FILIPPAKI & GEORGE MASTROTODOROS: Copper production in EBA Thassos: new finds, experimental simulations and links with the Southern Aegean contemporaneous metallurgical practices	SIRAN LIU, THILO REHREN, JIANLI CHEN & CHANGQING XU: Iron reduction process of lead/precious metal smelting in 9th-13th century AD China	MARC GENER MORET: Archaeometallurgical studies of iron age weapons from the Iberian Peninsula. A vision in perspective.
12.15-12.30	MAIKEL HENRICUS GERARDUS KUIJPERS: Early Bronze Age metalworking craftsmanship; an evidence based argument about levels of skill	Debate	MARION BERRANGER, SYLVAIN BAUVAIS, MOSTEPHA BOUKEZZOULA, PHILIPPE FLUZIN, STEPHANIE LEROY & PHILIPPE DILLMANN: Archaeometrical studies (metallography, chemical, radiocarbon dating) of an exceptional iron semi-product deposit: restitution of know-how, organization and circulation of production in the First Iron Age
12.30-12.45	LENTE VAN BREMPT & VASILIKI KASSIANIDOU: Late Bronze Age copper production in the Kalavassos-Maroni area of		PETER HALKON: Putting some iron back in Iron Age Britain - recent research on the Arras Culture, UK
12.45-13.00	PETER NORTHOVER: Copper ingots of the British Late Bronze Age		BERNT RUNDBERGET & JAN HENNING LARSEN: The earliest iron bloomery in Southern Norway - Technological conformity and variation
13.00-13.30	Debate		Debate
LUNCH	LUNCH	LUNCH	LUNCH



14.45		TRANSPORT TO THE MUSEUM	TRANSPORT TO THE MUSEUM
		MUSEO ARQUEOLOGICO NACIONAL CONFERENCE ROOM	MUSEO ARQUEOLOGICO NACIONAL ROOM 1
15.30-15.35	<b>WELCOME TO THE MUSEUM</b>		
15.35-16.10	<b>Lecture by Ernst Pernicka:</b> Analysis of ancient metals: Where have we come from and where shall we go?		
		<b>SESSION 14: Provenance and trade</b> <b>Chair: Gilberto Artioli</b>	<b>SESSION 15: Iron 2</b> <b>Chair: Salvador Rovira</b>
16.15-16.30	GERHARD BRÜGMANN, DANIEL BERGER, ERNST PERNICKA & BIANKA NESSEL: Tin isotopes and the problem of the provenance of Prehistoric Tin	BRIAN GILMOUR: The early use of ultra-high carbon steel in a main door hinge from the Nabatean temple at Khirbet et-Tannur, Jordan	
16.30-16.45	YASSER ABD EL-RAHMAN: The Provenance of iron ore in Naukratis: local Egyptian or imported European?	JUAN ANTONIO QUIRÓS CASTILLO & DAVID LARREINA GARCIA: Iron Tools in Early Mediaeval Basque Country (North of Spain): Metallographic analysis and peasant agency	
16.45-17.00	THOMAS E. BIRCH, FLEUR KEMMERS, SABINE KLEIN, H.-MICHAEL SEITZ & HEIDI E. HÖFER: Coinage and mines: monitoring access to silver sources in the Western Mediterranean from the 5th-3rd centuries BCE.	FCO. JAVIER FRANCO PÉREZ & MARC GENER MORET: Paleosiderurgy in Bizkaia (Basque Country, Spain): survey, excavation, experimentation and materials characterization. An integral study of the Ferrerías de Monte or “Haizeolak”	
17.15-17.30	STEPHEN MERKEL & ANDREAS HAUPTMANN: Connecting the Dots: Production and Trade of Early Medieval Brass in light of new analyses from Hedeby, Cologne, and Dortmund	ALEXANDRE DISSER, MAXIME L'HERITIER, CATHERINE BOURGAIN, EMILIE BERARD, MARC LEROY & PHILIPPE DILLMANN: The impact of technical changes on Late Medieval ironworking activities in Lorraine (France)	
17.30-17.45	MARCOS MARTINÓN-TORRES, THOMAS BIRCH, MICHAEL F. CHARLTON, LYNN BIGGS & ZOFIA A. STOS-GALE: The Gresham shipwreck: european metals in a global world	ENRIQUE VEGA, STEPHANIE LEROY, FLORIAN TEREYGEOL & PHILIPPE DILLMANN: Statistical treatment of chemical data for direct process understanding: the iron production of Castel-Minier (14th-16th)	
17.45-18.15	Debate	Debate	
FREE VISIT TO THE MUSEUM		FREE VISIT TO THE MUSEUM	

# 3rd JUNE

Timetable	CONFERENCE ROOM	ROOM 0E18: Menendez Pidal	ROOM 0D1: José Castillejo
	<b>SESSION 16: Bronze age 2</b> Chair: Vasiliki Kassianidou	<b>SESSION 17: Iron 3</b> Chair:	<b>SESSION 18: Roman Metallurgy</b> Chair: Almudena Orejas
9.15-9.30	VLAD RUMEGA-IRIMUŞ: Prehistoric copper mining and the bronze hoards of the Middle Hallstatt period (HA B-C) in Transylvania	ÜMIT GÜDER, SCOTT REDFORD, ASA EGER, CEMAL CEM TASAN, DIERK RAABE & ÜNSAL YALÇIN: Iron at the frontier: Medieval iron smithing at Kinet and Hisn al-Tinat	MICHAEL BODE, PETER ROTHENHOEFER, NORBERT HANEL & ANDREAS HAUPTMANN: Lead-silver mines of the Iberian Peninsula and their exploiters – a reconstruction of Roman lead production in Southeastern Spain
9.30-9.45	ALEKSANDAR JAŠAREVIĆ, MARTINA BLEČIĆ KAVUR & DIANA ĆUBELA: Special edition: studies of Late Bronze Age hoards from Northern Bosnia	VINCENT SERNEELS: Korsimoro (burkina faso): iron mass production in Africa (7th – 17th AD)	GILBERTO ARTIOLI, IVANA ANGELINI, CATERINA CANOVARO & MARICA VENTURINO: The “Tesoro di Marengo” Roman silver hoard: lead isotope analysis of the metal
9.45-10.00	XOSÉ-LOIS ARMADA & MARCOS MARTINÓN-TORRES: The ALBIMEH project – new contributions to the comparative study of Atlantic Late Bronze Age hoards	STEPHANIE LEROY, MITCH HENDRICKSON, EMMANUELLE DELQUÉ-KOLIC, ENRIQUE VEGA & PHILIPPE DILLMANN: Iron and the Khmer Empire (9th to 15th c.): A multidisciplinary (sourcing and dating) approach to evaluate the iron procurement during the Angkorian period	MÁRTON BENKE, VALÉRIA MERTINGER, ISTVÁN FÓRIZS, VIKTÓRIA MOZGAI, BERNADETT BAJNÓCZI, ZSOLT MRÁV, MARIANNA DÁGI, MÁTÉ SZABÓ & MÁRIA TÓTH: Special applications of X-Ray diffraction on Late Roman silver artefacts
10.00-10.15	OLTA ÇAKAJ, TEUTA DILO, GERT SCHMIDT, NIKOLLA CIVICI, EDLIRA DUKA, FREDERIK STAMATI & ZAMIR TAFILICA: Bronze sword from the 14th-13th Century BC found in Northern Albania: war weapon or monetary exchange tool?	THOMAS OLIVER PRYCE, OLIVIER EVRARD & CHANTHAPHILITH CHIEMISISOURAJ: An upland iron industry in Pre-Tai NW Laos	ELISA GRASSI & LORNA ANGUILANO: Moulds, pits, hearths: evidence of bronze casting in Roman Northern Italy
10.15-10.30	MARIANNE MÖDLINGER: European Bronze Age defensive armour: analyses and development	RAHIL ALIPOUR, THILO REHREN & MARCOS MARTINÓN-TORRES: Persian Pulād Production	ARNE JOUTTIJÄRVI: Copper alloys in the Roman Empire and Germania Magna
10.45-11.15	Debate	Debate	Debate
11.15-11.45	COFFEE BREAK	COFFEE BREAK	COFFEE BREAK
11.45-13.15	POSTER SESSION		
LUNCH	LUNCH	LUNCH	LUNCH



Timetable	CONFERENCE ROOM	ROOM 0E18: Menendez Pidal	ROOM 0D1: José Castillejo
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**SESION 19: Recycling**  
**Chair: Alessandra Giumlia-Mair**

**SESION 20: Medieval and Modern**  
**Chair: Javier Sánchez Palencia**

15.00-15.15	YIU-KANG (GARY) HSU & BENJAMIN SABATINI: A Novel Chemical Approach To Investigating The Dynamic Flow Of Non-Ferrous Metals In The Pontic Steppe During The Late Bronze Age (1800-1500 BC)	MANON CASTELLE YVAN COQUINOT & DAVID BOURGARIT: French bronze statues of the 16th -17th c AD: what can we learn from the casting cores
15.15-15.30	BENJAMIN SABATINI YIU-KANG HSU: Experimental recycling, modeling, and thermodynamic explanations of some ancient copper-based alloys	ADRIÁN BERTA, MÁRIA TÓTH, BÉLA TÖRÖK, PÉTER BARKÓCZY & ÁRPÁD KOVÁCS: Archaeometallurgical examination of finds from Medieval bell casting foundries in Hungary
15.30-15.45	ROLAND SCHWAB: Supply and demand: metal recycling in Southern Germany at the End of the Late Iron Age	SARIEL SHALEV: How Theophillus, Cyril Smith, and Oppy Untracht help describing the history of a Byzantine metal object from the Holy Land.
15.45-16.00	THOMAS E. BIRCH, GUÐMUNDUR S. SIGURÐSSON, ZSOLT KASZTOVSZKY, BOGLÁRKA MARÓTI, IMRE KOVÁCS, ZOLTÁN SZÓKEFALVI-NAGY, DANIEL SAHLÉN, GARÐAR GUÐMUNDSSON & MARCOS MARTINÓN-TORRES: Iceland's early crucible metallurgy: adapting to new environments with old metals	JUSTINE BAYLEY, HARRIET WHITE & MEGAN GOOCH The Tudor (16th-century) mint in the Tower of London
16.00-16.30	Debate	Debate
16.30-17.05	<b>Closing Lecture by Thilo Rehren: Archaeometallurgy - a scientific discipline?</b>	
17.05-17.20	<b>HMS Prizes and CLOSING</b>	