



Επιστημονικό Σωματείο,  
Έτος Ίδρυσης 1982, έδρα:  
Κάνιγγος 27, 106 82 Αθήνα  
(Ένωση Ελλήνων Χημικών)

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# Πληροφοριακό Δελτίο της Ελληνικής Αρχαιομετρικής Εταιρείας

**- Απρίλιος 2011 -**

# Newsletter of the Hellenic Society of Archaeometry

**- April 2011 -**

**Nr. 121**

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## **ΣΥΝΕΔΡΙΑ - CONFERENCES/WORKSHOPS**

# **INTERNATIONAL CONFERENCE ON INTEGRATED INFORMATION (IC-ININFO) 2011, KOS, GREECE, 29TH SEPTEMBER – 3RD OCTOBER 2011**

## **CALL FOR PAPERS**

### **SCOPE/OBJECTIVES**

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IC-ININFO 2011 will take place at Kos, in Greece, between 29th September and 3rd October, 2011.

The theme of IC-ININFO 2011 is integration.

We would like to consider problems and possibilities posed by an Integrated field of Information, as the latter can be observed and discussed against a variety of diverse institutions. We are looking forward to an exciting mix of academics considering with the information cultures of institutions such as Archives (public and corporate), Libraries and Museums, in the context of theoretical perspectives as well as empirical case studies, as well as academics and practitioners working in the field of information management more broadly defined.

We invite proposals for oral presentations, posters, or virtual presentations. All delegates are welcome to submit their written papers to the International Conference on Integrated Information fully refereed Conference Proceedings. All Conference participants who have finalized their registration will receive an online confirmation.

One of the aims of IC-ININFO 2011 is to explore information-based managerial change in organizations. Driven by the fast-paced advances in the Information field, this change is characterized in terms of its impact on organizations that manage information in their everyday operations.

Grouping emerging technologies in the Information field together in a close examination of practices, problems and trends, IC-ININFO 2011 and its emphases on integration and management aims to map the state of the art in the field. Addressed jointly to the academic and practitioner, it will provide an open yet scholarly forum for the presentation of diverse perspectives comprising theoretical analyses or empirical case studies that will foster dialogue and exchange of ideas against a diverse array of institutions.

### **TOPICS OF INTEREST**

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Authors are invited to submit research papers describing original, unpublished research that is not (and will not be) simultaneously under consideration for publication elsewhere.

IC-ININFO 2011 solicits the submission of research papers (4 pages max.). General areas of interests include, but are not limited to, the following topics:

- Library Science
- Archives Science
- Museum and Gallery Studies
- Information Science
- Documentation
- Digital Libraries
- Electronic Archives
- Information Management
- Records / Document Management
- Knowledge Management
- Data Management
- Copyright
- Electronic Publications
- Cultural Heritage Management
- Conservation Management
- Management of Nonprofit Organizations
- History of Information
- History of Collections
- Health Information

In addition, a number of specific sessions or symposiums are available at the conference website. More sessions and symposiums will be announced shortly.

## **PAPER AND POSTER SUBMISSION**

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All research papers must be written in English and follow the formatting guidelines of IC-ININFO 2011.

Research papers must be up to 4 pages, and must be submitted via the conference submission system. All papers will be reviewed by 2 members of the program committee. Paper acceptance can be as paper or poster.

The size of the poster should follow the poster preparation instructions available at the Conference Website (<http://www.icininfo.net/>) in PDF format.

All papers need to be submitted via the conference submission system (through the authors menu): <http://www.icininfo.net/>

## **FULL PAPER SUBMISSION**

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All authors are encouraged to submit their full papers one month after the completion of IC-ININFO 2011 Conference. The full papers will be considered for publication after a double blind peer review process in the International Journal on Integrated Information Management, which is an open access journal. This journal, which includes quality controlled full papers, was selected in an attempt to increase the visibility of delegates' works, aiming at expanding the targeted audience and achieving higher levels of papers promotion.

All research papers must be written in English and follow the formatting guidelines of the International Journal on Integrated Information Management.

The full papers must be up to 12 pages of length, and must be submitted via the International Journal on Integrated Information Management submission system.

## **IMPORTANT DATES**

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Paper submission deadline: May 30, 2011

Poster submission deadline: May 30, 2011

Full paper submission deadline for the Journal on Integrated Information  
Management: November 3, 2011

Notification of acceptance (paper and poster): July 31, 2011

All information can be found on our website: <http://www.icininfo.net/>

Conference Officers

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George Giannakopoulos, Technological Educational Institute of Athens, Greece

Damianos Sakas, University of Peloponnese, Greece

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Dionysis Kokkinos, National Technical University of Athens, Greece

IC-ININFO 2011 - International Conference on Integrated Information

Conference: 29th September – 3rd October, 2011

Venue: Kos International Convention Centre (KICC), Kos Island, Greece  
Conference Website: <http://www.icininfo.net/>

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**POCA 2011, LYON (AT THE MAISON DE  
L'ORIENT ET DE LA MÉDITERRANÉE  
"J. POUILLOUX"), 19TH TO 22ND  
OCTOBER 2011 - CALL FOR PAPERS**

We are pleased to announce the 11th edition of the POCA -POstgraduate Cypriot Archaeology - which will be held in Lyon (at the Maison de l'Orient et de la Méditerranée "J. Pouilloux") from 19th to 22nd October 2011.

Registration and abstract submission are now open!

The deadline for submitting abstracts is 31st July 2011.

For registration informations and further details please visit the website: <http://poca2011.sciencesconf.org/>

We look forward to seeing you all in Lyon !

The Organising Committee - Anna Cannavò and Aurélie Carbillet -

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## **XVIIITH INTERNATIONAL CONGRESS OF ANCIENT BRONZES, MAY 21-25, 2011, IZMIR, TURKEY, 2ND CIRCULAR**

We are pleased to announce that the XVIIth International Congress of Ancient Bronzes will take place on May 21-25, 2011 in Izmir, Turkey.

We have just sent our 2nd Circular to the participants. We received more than a hundred applications from 22 countries. We will try our best to accommodate everybody with 60 lectures and the rest as posters. We want to avoid parallel sessions, and only 60 lectures can be fitted into three days. It is still possible to apply with a poster or to attend as an observer.

Please send an e-mail to Doc. Dr. Ergun LAFLI at [elafli@yahoo.ca](mailto:elafli@yahoo.ca) or [ergun.lafli@deu.edu.tr](mailto:ergun.lafli@deu.edu.tr) with your abstract before 1 May 2011 for a poster presentation. Please also inform your colleagues about the deadline extension for poster submissions by forwarding this e-mail, or by printing this message and displaying it in your institution. We hope you will be able to participate and we look forward to your joining us in Izmir.

### **SCHEDULE OF EVENTS OF THE CONGRESS**

20 May 2011

6:00 - 10:00 pm: Payment and Registration.

21 May 2011

Sabancı Cultural Center

8:30 - 9:30 am: Registration.

9:30 - 10:00 am: Welcome, Ceremonial Talks, and Opening Remarks.

10:30 am - 12:00 noon: Lectures: session 1.

12.00 noon - 1:30 pm: Lunch break.

1.30 pm: Opening of poster session.

2:00 pm - 8:00 pm: Lectures: sessions 2, 3 and 4.

22 May 2011

9:30 am - 12:00 noon: Lectures: session 5.

12.00 noon - 1:30 pm: Lunch break.

1:30 am - 8:00 pm: Lectures: sessions 6, 7 and 8.

23 May 2011

9:30 am - 12:00 noon: Lectures: session 9.

12.00 noon - 1:30 pm: Lunch break.

1:30 - 7:00 pm: Lectures: sessions 10 and 11.

7:30 - 8:30 pm: Closing discussions.

9:00 - 11.00 pm: Closing dinner at Dokuz Eylul University, Rectorate Restaurant.

24 May 2011

9:30 am: Meeting for the archaeological tour of Izmir (individual transport by public taxis or buses for those who do not want to walk).

Itinerary: Private Museum of the Izmir Chamber of Commerce, Museum of History and Arts at Kulturpark, Archaeological Museum and Ethnographical Museum (lunch break 1:00 - 2:00 pm).

Ca. 8.00 pm: Return to the city centre.

25 May 2011

Meeting Point: Rectorate Building-DESEM.

8:30 - 9:30 am: Payment & registration for those who have not yet registered.

9:30 am: Meeting for the Excursion to archaeological ruins at Mylasa, recently found Persian sarcophagi, Museum of Milas, and ruins at Bodrum (theatre, Myndos Gate, harbor, Medieval fort, Mausolleion etc.).

Lunch break 1:00 - 2:00 pm: In Milas, in a Turkish traditional restaurant in the town.

Ca. 5.00 pm: Accommodation in Bodrum for one night. The bus will take back to Izmir the participants who do not wish to stay in Bodrum.

Ca. 8.00 pm: Dinner in Bodrum, disco & drinks in Gumbet, accommodation in Bodrum (This is not included and has to be paid individually. The hotel will be booked when the number of people is known).

26 May 2011

Bodrum: meeting point to be determined.

10:30 am: Check out and going back to Izmir with public busses in Bodrum (The participants who stay in Bodrum for the night must pay their own transportation back to Izmir).

Ca. 2.30 pm: Return to the city center of Izmir and valediction at the Coach Station of Izmir (Yeni Garaj).

## **PARTICIPANTS**

Here is an alphabetical list of applications to our Congress.

Dr Duygu Sevil AKAR TANRIVER (Izmir), Dr Lisa M. ANDERSON (Cambridge, MA), Dr Melih ARSLAN (Ankara), Mr Mustafa METİN (Ankara), Ms Asli ASLAN (Izmir), Dr Helene AURIGNY (Aix-en-Provence), Ms Derya BARAN (Izmir), Ms Hanife YUKSEL (Izmir), Prof. Beryl BARR-SHARRAR (New York City, NY), Dr David BARTUS (Budapest), Mrs Ceren BAYKAN (Edirne), Dr Danis BAYKAN (Edirne), Dr Fede BERTI (Ferrara), Mrs Roberta FABIANI (Ferrara), Dr Margherita BOLLA (Verona), Mr Hermann BORN (Berlin), Mr Yorgos BROKALAKIS (Rome/Iraklio), Dr Maurizio BUORA (Udine), Dr Marina CASTOLDI (Milan), Mrs Snezana CERNAC-RATKOVIC (Belgrade), Dr Arzu CAKIR ATIL (Izmir), Dr Alessandro D'ALESSIO (Sibari), Dr Klara DE DECKER (Munster), Dr Eckhard DESCHLER-ERB (Zurich), Prof. Exhlale DOBRUNA-SALIHU (Pristina), Dr Ertekin

M. DOKSANALTI (Konya), Prof. Ramazan OZGAN (Konya), Dr Sevket DONMEZ (Istanbul), Mrs Kristina DZIN (Medulin/Pula), Dr Susanne EBBINGHAUS (Cambridge, MA), Dr Helga EIWANGER-DONDER (Bochum/Bonn), Ms Makbule EKICI (Konya), Dr Romana ERICE (Zaragoza), Prof. Naser FERRI (Pristina), Mr Rrezarta LOXHA (Pristina), Dr Daniela FERRO (Rome), Mr Vojislav FILIPOVIĆ (Belgrade), Mr Kirill FIRSOV (Moscow), Prof. Edilberto FORMIGLI (Murlo), Dr Patrizia FRAMARIN (Aosta), Dr. Norbert FRANKEN (Berlin), Dr Elene GIGOLASHVILI (Tbilisi), Dr Marine PIRTSKHALAVA (Tbilisi), Dr Alessandra R. GIUMLIA-MAIR (Merano), Prof. Sergio MERIANI (Trieste), Mr Zsolt MRAV (Budapest), Prof. Vesna GIRARDI JURKIĆ (Zagreb), Dr Kurt GSCHWANTLER (Vienna), Dr Nadezda GULYAEVA (St. Petersburg), Dr Koichi HADA (Toride), Dr Pasquale DAPOTO (Reggio Calabria), Dr Roberto CIABATTONI (Rome), Ms Sanda HEINZ (Oxford), Dr Sean HEMINGWAY (New York City, NY), Dr Hilde HILLER (Freiburg), Dr Despina IGNATIADOU (Thessaloniki), Dr Darejan KACHARAVA (Tbilisi), Dr Annemarie KAUFMANN-HEINIMANN (Basel), Dr Gudrun KLEBINDER-GAUSS (Athens), Dr Ergun LAFLI (Izmir), Dr Kenneth LAPATIN (Los Angeles, CA), Dr Jens DAEHNER (Los Angeles, CA), Prof. Stefan LEHMANN (Halle on the Saale River), Mr Joseph W. LEHNER (Los Angeles, CA), Dr Nino LORDKIPANIDZE (Tbilisi), Mr Maximilian LUBOS (Berlin/Halle on the Saale River), Mr Wugan LUO (Beijing), Mr Jeffrey MAISCH (Los Angeles, CA), Dr Marc WALTON (Los Angeles, CA), Dr David SAUNDERS (Los Angeles, CA), Dr Nino KALANDADZE (Tbilisi), Prof. Richard MASON (Baltimore, MD), Prof. Carol C. MATTUSCH (Fairfax, VA), Dr Valeria MEIRANO (Turin), Mr Ilker Mete MIMIROGLU (Konya), Mr Niccolo MUGNAI (Siena), Ms Silvia MUSTATA (Cluj-Napoca), Dr Esen OGUS (New York City, NY), Mr Omid OUDBASHI (Esfahan), Dr S. Mohammadamin EMAMI (Esfahan/Siegen), Prof. Parviz DAVAMI (Tehran), Dr Rossella PACE (Arcavacata di Rende), Dr Alessandro PACINI (Montepulciano), Prof. Olga PALAGIA (Athens), Dr Vladimir P. PETROVIC (Belgrade), Mr Vojislav FILIPOVIC (Belgrade), Ms Vesna PINTARIC (Ljubljana), Prof. John POLLINI (Los Angeles, CA), Prof. Andrew RAMAGE (Ithaca, NY), Dr Ketino RAMISHVILI (Tbilisi), Ms Deana RATKOVIC (Belgrade), Mrs Irina RAVICH (Moscow), Mr Sergej SIROTIN (Sterlitamak), Dr Mikhail TREISTER (Bonn/Berlin), Dr Heather F. SHARPE (West Chester, PA), Dr Athanasios SIDERIS (Athens), Ms Anise SOLTANI NEJAD (Tehran), Ms Sepideh MAZIAR (Tehran), Mr Mohammad MORTAZAVI (Esfahan), Ms Lillian Bartlett STONER (New York City, NY), Dr Nino SULAVA (Tbilisi), Dr Milica TAPAVICKI-ILIC (Belgrade), Mrs Dragana SPASIC-DURIC (Pozarevac), Dr Chiara TARDITI (Brescia), Dr Mehmet TEKOCAK (Konya), Prof. Ahmet Adil TIRPAN (Konya), Mr Babur Mehmet AKARSU (Konya), Ms Seda AKARSU (Konya), Dr Mikhail TREISTER (Bonn/Berlin), Dr Pavlos TRIANTAFYLLIDIS (Rhodes), Prof. Leonid YABLONSKY (Moscow), Dr Maya VASSILEVA (Sofia), Prof. Stephane VERGER (Paris), Dr Miroslav VUJOVIC (Belgrade), Dr Katherine E. WELCH (New York City, NY), Dr Susanne WILLER (Bonn), Mr Frank WILLER (Bonn), Prof. Gerhard ZIMMER (Eichstaett), Prof. Dragana ZIVKOVICA (Bor), Prof. Nada STRBAC (Bor), Miroslav SOKICB (Belgrade), Velibor ANDRICC (Belgrade), Igor JOVANOVICD (Bor), Marija JOVICICD (Bor), Branka ANDJELICE (Bor), Dr Radmila ZOTOVIC (Belgrade), Mrs Iskra KARNIS VIDOVIC (Zagreb), Prof. Nancy RAMAGE (Ithaca, NY), Dr Nadia GULYAEVA (St. Petersburg), and Dr Paula ZSIDI (Budapest).

## FEES

The participation fee is 60 euro (or \$US 100, or 30 British pounds, or 120 Turkish Lira). The fee includes Congress packages, coffee and refreshments at breaks, name badges, the social dinner with wine at the University's restaurant on May 23, the busses for the post-Congress excursion from Izmir to Bodrum and back on the same day as well as publication of your abstract and paper in the Congress proceedings in 2012, both in printed and pdf versions.

The fee does not include your travel expenses to Izmir, accommodation, food (except the final dinner on May 23), the booklet of abstracts and distribution of printed proceedings book when it is out in 2012.

Extra and optional expenses:

- 1- Abstract booklet (optional; 5 euro, or US\$ 10, or 15 TL).
- 2- Museum and site entries in the 1st and 2nd post-excursion days;
- 3- Personal transport in Izmir (hotel to Congress hall etc.) as well as in Bodrum (hotel to coach station).

### **PUBLICATION OF ABSTRACTS**

The abstracts will be published with black-white photos in the Turkish peer-reviewed journal Kubaba. If you wish to have your abstract printed in the journal and you did not send it yet, please submit it as soon as possible.

The journal issue with Conference abstracts will be available with your registration packet at the Congress, and it will cost 5 euro (or US\$ 10, or 15 TL).

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# **RADIOCARBON AND ARCHAEOLOGY,** **6TH INTERNATIONAL SYMPOSIUM,** **PAFOS, CYPRUS, APRIL 10-15, 2011**

## SCIENTIFIC PROGRAM

at March 23, 2011

**SUNDAY, APRIL 10, 2011**

17:00 Registration opens

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19:25 – 20:10 Opening Session

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19:25 WELCOME ADDRESS

**S. Vergas**, Mayor of Pafos

19:30 **Keynote Lecture**

ARCHAEOLOGY AND RADIOCARBON CHRONOLOGY: WHICH DIALOGUE?

**P. de Miroschedji**, France

20:10 *Welcome Reception – sponsored by the Municipality of Pafos.*

**MONDAY, APRIL 11, 2011**

08:00 Registration opens

08:55 INTRODUCTION AND GREETINGS

**E. Boaretto**, Symposium Chair, Israel

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09:00 – 11:10 Session I

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### **DENDROCHRONOLOGY AND BOTANICAL REMAINS**

Session Coordinators: **O. Cichocki**, Austria

**G. Fiorentino**, Italy

**S.W. Manning**, USA

Chair: **G. Fiorentino**, Italy

#### **Invited Lecture**

09:00 RADIOCARBON OFFSETS IN EUROPE AND THE EAST  
MEDITERRANEAN: STARTING TO QUANTIFY THE PARAMETERS OF DEBATE

**S.W. Manning**, B. Kromer, USA

09:30 PAIRED DATING OF SAPWOOD AND HEARTWOOD SAMPLES FROM  
PRE-HISPANIC CARIBBEAN WOODEN SCULPTURES

**F. Brock**, J. Ostapkowicz, T.F.G. Higham, C. Bronk Ramsey, UK

09:50 ARCHAEOBOTANY AND C14 DATING – PROPOSED COOPERATION

**M.E. Kislev**, O. Simchoni, E. Weiss, Israel

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**MONDAY, APRIL 11, 2011 (continued)**

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09:00 – 11:10 Session I (continued)

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10:10 RADIOCARBON AND  $\delta^{13}\text{C}$  ANALYSIS OF ARCHAEOBOTANICAL  
REMAINS: NEW TOOL FOR PALAEOCLIMATE INVESTIGATION IN THE  
MEDITERRANEAN PREHISTORY

V. Caracuta, **G. Fiorentino**, Italy

10:30 RELATIVE AND ABSOLUTE DATING OF WOOD

**O. Cichocki**, Austria

10:50 DENDROCHRONOLOGICAL AND 14C WIGGLE-MATCHED DATES FOR RENOVATIONS TO AL-AQSA MOSQUE IN JERUSALEM AND EVIDENCE FOR MEDITERRANEAN TIMBER TRADE DURING THE EARLY ISLAMIC PERIOD

**B. Lorentzen**, S.W. Manning, P.I. Kuniholm, T. Wazny, C.B. Griggs, USA

11:10 *Coffee Break*

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11:40 – 13:20 Session II

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### **RADIOCARBON RESEARCH IN THE 1st MILLENNIUM BC**

Session Coordinator and Chair: **A. Mederos Martín**, Spain

11:40 NEW PERSPECTIVES ON THE IRON AGE RADIOCARBON CHRONOLOGY OF SOUTHERN JORDAN

**T.E. Levy**, E. Ben-Yosef, T.F.G. Higham, M. Najjar, USA

12:00 THE 10TH C. DEBATE IN BIBLICAL ARCHAEOLOGY RESOLVED? DATES FROM KHIRBET QEIYafa AND THE TRADITIONAL CHRONOLOGY

**Y. Garfinkel**, K. Streit, Israel

12:20 CONTEXTS, SITE-FORMATION PROCESSES AND CHRONOLOGY: AN ATTEMPT TO IMPROVE THE IRON AGE 14C SEQUENCE FROM THE EASTERN MEDITERRANEAN

**M. Toffolo**, S. Weiner, I. Finkelstein, A. Fantalkin, A.M. Maeir, D.M. Master, E. Boaretto, Israel

12:40 RADIOCARBON DATING AS THE CHRONOLOGICAL BASIS IN DESERT ARCHAEOLOGY: A NEW EXCAVATION APPROACH AT HORVAT HALUQIM (CENTRAL NEGEV, ISRAEL)

**H.J. Bruins**, J. van der Plicht, M. Haiman, Israel

13:00 HIGH RESOLUTION RADIOCARBON DATING: THE NEED FOR A NEW CONTEXTUAL APPROACH

E. Boaretto, A. Gilboa, **I. Sharon**, A.J.T. Jull, J. Heinemeier, J. van der Plicht, E.M. Scott, Israel

13:20 *Lunch (included)*

### **MONDAY, APRIL 11, 2011 (continued)**

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14:40 – 16:40 Session III

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### **METHODS AND APPLICATIONS IN RADIOCARBON DATING OF OLD WORLD PREHISTORIC SITES**

Session Coordinator and Chair: **M. Chazan**, Canada

#### **Invited Lecture**

14:40 INTEGRATING NON DESTRUCTIVE ION BEAM ANALYSIS METHODS AND ACCELERATOR MASS SPECTROMETRY RADIOCARBON DATING FOR THE STUDY OF ITALIAN PREHISTORY

**G. Quarta**, L. Calcagnile, M. D'Elia, A. Caramia, V. Gaballo, Italy

15:00 NEW DATES FOR THE EARLY NATUFIAN OF EL-WAD TERRACE, MOUNT CARMEL, ISRAEL

**M. Weinstein-Evron**, R. Yeshurun, D. Kaufman, E. Boaretto, E. Eckmeier, Israel



15:20 RADIOCARBON DATING THE FAUNA AND HUMANS AT KFAR HAHORESH: THE CHALLENGES OF THE PRE-POTTERY NEOLITHIC

**N. Tuross**, N. Goring-Morris, USA

15:40 THE USE OF RADIOCARBON IN GEORACHAEOLOGICAL RESEARCH OF PREHISTORICAL TIMES IN CYRENAICA, LIBYA

**A. Antoniadou**, UK

16:00 NEW CHRONOLOGICAL DATA OF THE LATE UPPER PALAEOOLITHIC SITE DIVNOGOR'YE- 9

**N.D. Burova**, A.N. Bessudnov, A.A. Bessudnov, Russia

16:20 DIRECT RADIOCARBON DATING NEANDERTHAL SHOWS PRESENCE OF LATE MOUSTERIAN IN THE ITALIAN PENINSULA

**E. Boaretto**, L. Longo, D. Caramelli, S. Condemi, P. Giunti, M.A. Mannino, U. Thun Hohenstein, Israel

16:40 – 19:00 Poster Session I and refreshments

## TUESDAY, APRIL 12, 2011

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09:00 – 10:40 Session IV

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### RADIOCARBON RESEARCH IN THE 2nd MILLENNIUM BC

Session Coordinators: **M. Bietak**, Austria

**W. Kutschera**, Austria

Chair: **E. Boaretto**, Israel

09:00 ESTABLISHMENT OF AN ABSOLUTE CHRONOLOGY FOR THE 18th EGYPTIAN DYNASTY

**A. Quiles**, G. Pierrat-Bonnefois, C. Moreau, G. Andreu-Lanoë, E. Delqué-Kolic, D. Bavay, I. Caffy, C. Comby, J-P. Dumoulin, S. Ferkane, S. Hain, V. Setti, C. Souprayen, France

09:20 THE CHRONOLOGY OF TELL EL-DABA: A CRUCIAL MEETING POINT OF RADIOCARBON DATING, ARCHAEOLOGY, AND EGYPTOLOGY IN THE SECOND MILLENNIUM BC

**W. Kutschera**, M. Bietak, E.M. Wild, C. Bronk Ramsey, M.W. Dee, R. Golser, T.F.G. Higham, K. Kopetzky, P. Stadler, P. Steier, U. Tanheiser, F. Weninger, Austria

09:40 THE OFFSET BETWEEN RADIOCARBON- AND HISTORICAL CHRONOLOGY IN SOME PARTS OF THE SECOND MILLENNIUM BC: THE ARCHAEOLOGICAL POINT OF VIEW

**M. Bietak**, Austria

10:00 THERA, TELL EL-DABCA AND THE EGYPTIAN NEW KINGDOM TOWARDS A POSSIBLE SOLUTION?

**F. Höflmayer**, Germany

10:20 RADIOCARBON CHRONOLOGY FOR DYNASTIC EGYPT: A CRITIQUE

**G. Hagens**, Canada

10:40 *Coffee Break*

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11:10 – 13:20 Session V

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### ANCIENT CULTURES OF THE EURASIAN STEPPES: CHRONOLOGY, MIGRATIONS AND INTERACTION

Session Coordinator and Chair: **Y.V. Kuzmin**, Russia

**Invited lecture**



11:10 RADIOCARBON CHRONOLOGY OF PREHISTORIC COMPLEXES OF THE  
RUSSIAN FAR EAST: 15 YEARS LATER

**Y.V. Kuzmin**, Russia

**TUESDAY, APRIL 12, 2011 (continued)**

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11:10 – 13:20 Session V (continued)

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11:40 RADIOCARBON CHRONOLOGY FOR BURIAL GROUNDS OF THE  
ANDRONOVO PERIOD IN BARABA FOREST STEPPE (THE BRONZE AGE OF  
WESTERN SIBERIA)

V.I. Molodin, **Z.V. Marchenko**, A.E. Grishin, L.A. Orlova, Y.V. Kuzmin, M. Van  
Strydonck, Russia

12:00 CHRONOLOGICAL PROBLEMS WITH NEOLITHIZATION OF THE  
NORTHERN CASPIAN SEA REGION

**A.A. Vybornov**, G.I. Zaytseva, Russia

12:20 DOLMEN “KOLIKHO”: ISOTOPIC INVESTIGATION OF FUNERAL  
CUSTOM AND HUMAN MOBILITY IN THE WESTERN CAUCASUS

V.A. Trifonov, **G.I. Zaytseva**, J. van der Plicht, N.D. Bourova, E.S. Bogomolov, A.A.  
Sementsov, H. Jungner, E. Sonninen, Russia

12:40 PALEODIET AND RESERVOIR EFFECT: CASE STUDY OF THE CASPIAN  
AND LOWER DON STEPPES BRONZE AGE ARCHAEOLOGICAL CULTURES

**N. Shishlina**, E. Zazovskaya, V. Sevastyanov, J. van der Plicht, Russia

13:00 DYNAMIC INTERACTION OF THE ANIMAL STYLE IN EURASIA DURING  
THE IRON AGE

**K. Iwe**, Germany

13:20 *Time at leisure*

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16:30 – 20:50 Session VI

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**SPECIAL ARCHAEOLOGICAL MATERIALS AND TECHNIQUES FOR  
DATING**

Session Coordinators and Chairs: **G.M. Santos**, USA

**G.W. Hodgins**, USA

16:30 CORRELATING PLASTER RADIOCARBON DATES WITH INFRARED  
SPECTROSCOPY ANALYSES: CRYSTALLINITY AND DIAGENESIS

**K.M. Poduska**, L. Regev, E. Mintz, I. Milevski, H. Khalaily, S. Weiner, E. Boaretto,  
Canada

16:50 RADIOCARBON DATING OF ANCIENT IRON ALLOYS BY AMS

S. Leroy, P. Dillmann, E. Delqué-Kolic, **J-P. Dumoulin**, C. Moreau, France

17:10 SOLVING THE <sup>14</sup>C PHYTOLITH PUZZLE: HOW CAN CARBON FROM  
LIVING GRASS PHYTOLITH SAMPLES BE THOUSANDS OF YEARS OLD?

**G.M. Santos**, R. Corbineau, M.D. Whiteside, K.K. Treseder, J.R. Southon, A.  
Alexandre, P.E. Reyerson, USA

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**TUESDAY, APRIL 12, 2011 (continued)**

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16:30 – 20:50 Session VI (continued)

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17:30 CHARACTERIZATION OF DIFFERENT CHEMICAL TREATMENT PROCEDURES ON INHUMATED, CREMATED AND MODERN BONE SAMPLES AT CIRCE

**I. Passariello**, P. Simone, J. Tandoh, F. Marzaioli, M. Capano, F. Terrasi, Italy

17:50 CAN WOOD ASH BE USED FOR RADIOCARBON DATING?

**L. Regev**, E. Eckmeier, E. Mintz, S. Weiner, E. Boaretto, Israel

18:10 CARBON ISOTOPE EXCHANGE BETWEEN ATMOSPHERIC CO<sub>2</sub> AND BONE CARBONATE DURING CALCINATION: INSIGHTS FROM COMBUSTION EXPERIMENTS UNDER NATURAL CONDITIONS

**A. Zazzo**, J-F. Saliège, M. Lebon, S. Lepetz, C. Moreau, France

18:30 *Light Dinner (included)*

20:00 Venue proposal for the 7th International Symposium in 2014

**M. Van Strydonck**, Belgium

20:10 **Keynote Lecture**

STATISTICS, MODELS, UNCERTAINTIES- THE ARCHAEOLOGICAL REVOLUTION

**E.M. Scott**, UK

### WEDNESDAY, APRIL 13, 2011

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09:00 – 11:00 Session VII

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#### CALIBRATION, INTERCOMPARISON, MODELS AND OUTLIERS

Session Coordinators and Chairs: **P. Reimer**, UK

**E.M. Scott**, UK

09:00 BAYESIAN CHRONOLOGIES FOR ANGLO-SAXON MALE GRAVE ASSEMBLAGES: EXPLORING THE LIMITS OF ACCURACY IN RADIOCARBON DATING

**A. Bayliss**, N. Beavan, J. Hines, K. Høilund Nielsen, G. McCormac, UK

09:20 NEOLITHIC CERAMIC SEQUENCES IN EASTERN FENNOSCANDIA – A BAYESIAN APPROACH

**P. Pesonen**, M. Oinonen, C. Carpelan, P. Onkamo, Finland

09:40 THE CONTINUING PARADOX OF RADIOCARBON DATING AND ANCIENT EGYPT

**M.W. Dee**, D. Wengrow, A.J. Shortland, A. Stevenson, F. Brock, A.G.E. Hood, C. Bronk Ramsey, UK

10:00 REFINING THE INTERNATIONALLY- AGREED RADIOCARBON CALIBRATION CURVES: INTCAL09 AND BEYOND

**C.E. Buck**, UK

10:20 OUT OF ASIA: A NEW FRAMEWORK FOR DATING THE SPREAD OF AGRICULTURE IN EUROPE

**Q. Lv**, P.G. Blackwell, C.E. Buck, M. Charles, S. Colledge, A. Walker, UK

10:40 POTENTIAL IMPLICATIONS OF THE TERRESTRIAL RADIOCARBON CALIBRATION DATASET FROM LAKE SUIGETSU, JAPAN

**R. Staff**, C. Bronk Ramsey, F. Brock, C. Bryant, A. Brauer, H. Lamb, M. Marshall, G. Schlolaut, P. Tarasov, T. Nakagawa, Suigetsu 2006 Project Members, UK

11:00 *Coffee Break*

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11:30 – 13:20 Session VIII

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## **RADIOCARBON RESEARCH IN THE 3rd MILLENNIUM BC**

Session Coordinator: **M. Lebeau**, Belgium

### **Invited Lecture**

11:30 THE EUROPEAN SCIENCE FOUNDATION – ARCANE PROGRAMME  
(ASSOCIATED REGIONAL CHRONOLOGIES FOR THE ANCIENT NEAR EAST &  
THE EASTERN MEDITERRANEAN)

**M. Lebeau**, Belgium

## **WEDNESDAY, APRIL 13, 2011 (continued)**

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11:30 – 13:20 Session VIII (continued)

12:00 RADIOCARBON DATES FROM DENTAL REMAINS IN THE PREHISTORIC  
SOUSKIOU-LAONA CEMETERY IN CYPRUS

**G.T. Cook**, E. Dunbar, K. Lorentz, E. Peltenburg, UK

12:20 ERIMI-LAONIN TOU PORAKOU (LIMASSOL, CYPRUS): RADIOCARBON  
ANALYSES IN THE BRONZE AGE CEMETERY AND WORKSHOP COMPLEX

**C. Scirè Calabrisotto**, M. Fedi, L. Caforio, L. Bombardieri, Italy

12:40 EARLY BRONZE AGE CHRONOLOGY IN THE SOUTHERN LEVANT:  
MODELING OF <sup>14</sup>C DATES BASED ON ARCHAEOLOGICAL DATA

**J. Regev**, P. De Miroschedji, E. Boaretto, Israel

13:00 RADIOCARBON DATING OF THE EARLY BRONZE AGE CEMETERY AT  
ARANO, VERONA, NORTHERN ITALY

**E. Valzolgher**, P. Salzani, L. Salzani, Italy

13:20 *Lunch (included)*

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14:40 – 16:00 Session IX

## **HISTORICAL PERIODS**

Session Coordinator and Chair: **M. Van Strydonck**, Belgium

14:40 KEEPING THE SEA OUT: EARLY MEDIEVAL STRUCTURES AT CA'  
FOSCARI UNIVERSITY, VENICE

**J. Meadows**, N. Martinelli, O. Pignatelli, L. Fozzati, R. Cester, B. Kromer, Germany

15:00 EDIT REGINE CINERES HIC SARCOPHAGUS HABET: CONFIRMING THE  
IDENTITY OF QUEEN EDITHA, WIFE OF OTTO, THE FIRST GERMAN  
EMPEROR

**M-J. Nadeau**, P.M. Grootes, C.M. Hüls, B. Kromer, Germany

15:20 THE USE OF RADIOCARBON DATING FOR IDENTIFYING THE STAGES  
OF URBAN FORTIFICATION IN MEDIEVAL YAROSLAVL

**A.V. Engovatova**, G.I. Zaytseva, N.N. Kovalyuh, N.D. Burova, Russia

15:40 RADIOCARBON DATING THE VOYNICH MANUSCRIPT

**G.W.L. Hodgins**, J. Barabe, R. Zandbergen, K. Steindl, A. Sulzer, USA

16:00 *Coffee Break*

## **WEDNESDAY, APRIL 13, 2011 (continued)**

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16:30 – 17:50 Session X

## **RESERVOIR AGE IN ARCHAEOLOGY**

Session Coordinators and Chairs: **F. Petchey**, New Zealand **P.L. Ascough**, UK

16:30 RADIOCARBON DATING MARINE SHELLS: AN INVESTIGATION OF  $\delta_{13}C$  IN THE PACIFIC AND PROBLEMS ENCOUNTERED

**F. Petchey**, G. Clark, S. Ulm, New Zealand

16:50 FISHY CHRONOLOGIES

**R. Fernandes**, M-J. Nadeau, P.M. Grootes, C.M. Hüls, Germany

17:10 IMPROVING THE RADIOCARBON DATING OF MARINE SHELLS FROM CANARY ISLANDS TOWARDS THE CONSTRUCTION OF RELIABLE AND ACCURATE CHRONOLOGIES

**J.M. Matos Martins**, A. Mederos Martín, P. Portela, A.M. Monge Soares, Portugal

17:30 OBTAINING ACCURATE AGES FROM SAMPLES AFFECTED BY RADIOCARBON RESERVOIR EFFECTS: PROBLEMS AND PROSPECTS

**P.L. Ascough**, G.T. Cook, M.J. Church, Á. Einarsson, T. McGovern, A. Dugmore, UK

17:50 – 19:30 Poster Session II and refreshments

## THURSDAY, APRIL 14, 2011

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09:00 – 10:40 Session XI

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### PREHISTORICAL PERIODS

Session Coordinator and Chair: **J. van der Plicht**, The Netherlands

09:00 TELL SABI ADYAD, SYRIA: RADIOCARBON CHRONOLOGY AND STABLE ISOTOPES DURING THE 7TH MILLENNIUM BC

**J. van der Plicht**, P.M.M.G. Akkermans, O. Nieuwenhuys, A. Kaneda, A. Russell, H. Buitenhuis, The Netherlands

09:20 SOCIETAL IMPACT OF RAPID CLIMATE CHANGE (RCC) DURING THE HOLOCENE IN THE EASTERN MEDITERRANEAN

**B. Weninger**, Germany

09:40 CLIMATE VULNERABILITY AND EARLY HOLOCENE CULTURAL CYCLES IN ANATOLIA AND THE NEAR EAST

**L. Clare**, Germany

10:00 METHODOLOGICAL IMPLICATIONS OF NEW RADIOCARBON DATES FROM THE EARLY HOLOCENE SITE OF KÖRTIK TEPE, SOUTHEAST ANATOLIA

**M. Benz**, A. Coskun, I. Hajdas, B. Weninger, K. Deckers, K.W. Alt, V. Özkaya, Germany

10:20 LATE NEOLITHIC SETTLEMENTS IN AN EASTERN SAHARA OASIS: MODELING ABSOLUTE CHRONOLOGY

**M. Wuttmann**, M. Mahran, B. Midant-Reynes, F. Briois, T. Dachy, Egypt

10:40 *Coffee Break*

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11:10 – 13:20 Session XII

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### 14C SAMPLES PRESERVATION, SITE FORMATION AND NORDIC ARCHAEOLOGY

Session Coordinators and Chairs: **J. Heinemeier**, Denmark **Á.E. Sveinbjörnsdóttir**, Iceland

#### Invited Lecture

11:10 NORSE COLONIES IN SOUTH GREENLAND – SETTLEMENT AT THE EDGE OF THE WORLD, RADIOCARBON DATES AND ISOTOPES

**J. Arneborg**, J. Heinemeier, Á.E. Sveinbjörnsdóttir, N. Lynnerup, Denmark

11:40 14C AND STABLE ISOTOPE TECHNIQUES APPLIED TO DIETARY RECONSTRUCTION AND RESERVOIR CORRECTION: GREENLAND NORSE AND OTHER EXAMPLES

**J. Heinemeier**, Á.E. Sveinbjörnsdóttir, J. Arneborg, Denmark

**THURSDAY, APRIL 14, 2011 (continued)**

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11:10 – 13:25 Session XII (continued)

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12:00 RADIOCARBON CHRONOLOGY OF MULTI-LAYER ARCHAEOLOGICAL PEAT SITES IN THE MIDDLE URAL (SHIGIR AND GORBUNOVO PEAT BOGS CASE STUDY)

**N.E. Zaretskaya**, S. Hartz, T. Terberger, M.G. Zhilin, Russia

12:20 THE CONTROVERSY OF THE SETTLEMENT TIME OF ICELAND

**Á.E. Sveinbjörnsdóttir**, J. Heinemeier, Iceland

12:40 HUNTER-GATHERER POTTERY AND FOODCRUST DATING: NEW RESULTS ON THE SPREADING OF FIRST CERAMICS IN THE NORTH EURASIAN FOREST ZONE

S. Hartz, **H. Piezonka**, T. Terberger, N. Tsydenova, M.G. Zhilin, Germany

13:00 ON THE RESOLUTION OF 14C ARCHAEOLOGICAL DATING ANOMALIES: CASE STUDIES

**R.E. Taylor**, J. Southon, USA

13:20 CLOSING REMARKS AND ADJOURNMENT

**E. Boaretto**, Symposium Chair, Israel

13:25 *Lunch (included)*

15:00 *Depart for tour (included), followed by farewell dinner (optional)*

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**POSTER PRESENTATIONS - MONDAY, APRIL 11, 2011**

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Board No.

**DENDROCHRONOLOGY AND BOTANICAL REMAINS**

1. CHRONOMETRIC DATING OF ST. GEORGE'S CHURCH IN KOSTOLANY POD TRIBECOM, WEST SLOVAKIA

**P. Barta**, M. Bóna, Slovakia

2. AMS RADIOCARBON DATING RESULTS FROM SHORT LIVING SAMPLES FROM THE ARCHAEOLOGICAL SITE OF MERSIN-YUMUKTEPE, TURKEY

**I. Caneva**, O. AYTEK, L. Calcagnile, G. Quarta, M. D'Elia, Italy

3. ABSOLUTE DATING (14C and OSL) OF THE FORMATION OF COVERS AND RIDGES OCCUPIED BY PREHISTORIC MAN IN NW BELGIUM

P. Crombé, **M. Van Strydonck**, M. Boudin, T. Van den Brande, C. Derese, D.A.G. Vandenberghe, P. Van den haute, M. Court-Picon, J. Verniers, J.A.A. Bos, F. Verbruggen, M. Bats, J. De Reu, Belgium

**RADIOCARBON RESEARCH IN THE 1ST MILLENNIUM BC**

4. SPACE-TIME ANALYSIS IN ARCHAEOLOGY: STUDY OF THE EVOLUTION TOWARDS THE IRON AGE IN NORTHWESTERN MEDITERRANEAN

**G. Capuzzo**, Spain

5. FORMATION PROCESSES IN ARCHAEOLOGICAL PHILISTINE HEARTHES FROM TELL ES-SAFI/GATH (ISRAEL) REVEALED USING AN EXPERIMENTAL APPROACH: CONTEXT UNDERSTANDING FOR RADIOCARBON DATING

**S. Gur-Arieh**, E. Boaretto, A.M. Maeir, R. Shahack-Gross, Israel

## **RADIOCARBON RESEARCH IN THE 2ND MILLENNIUM BC**

### **6. PROBLEMS OF CALIBRATION, INTERCOMPARISON, MODELS AND OUTLIERS**

**M.H. Wiener**, USA

### **ANCIENT CULTURES OF THE EURASIAN STEPPES: CHRONOLOGY, MIGRATIONS AND INTERACTION**

#### **7. APPEARANCE AGE OF DOMESTICATED PIG IN KOREA**

**H.S. Kim**, T. Nishimoto, Japan

#### **8. RADIOCARBON DATING OF ARCHAEOLOGICAL REMAINS FROM GOCHON SITE, BUSAN, KOREA**

**M. Sakamoto**, H.S. Kim, M. Nagashima, S.Y. Min, Japan

#### **9. EURASIAN STEPPE BELT: RADIOCARBON CHRONOLOGY AND METALLURGICAL PROVINCES**

**E.N. Chernykh**, Russia

#### **10. COMPARISON OF POTTERY AND OTHER MATERIALS 14\_ DATING FOR FOREST NEOLITHIC POVOLZHYE**

**A.A. Vybornov**, S.A. Kondratiev, N.N. Kovalyuh, V.V. Skripkin, Russia

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## **POSTER PRESENTATIONS - MONDAY, APRIL 11, 2011 (continued)**

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Board No.

### **ANCIENT CULTURES OF THE EURASIAN STEPPES: CHRONOLOGY, MIGRATIONS AND INTERACTION (continued)**

#### **11. THE CULTURAL-CHRONOLOGICAL COMPARISON OF THE EARLY NEOLITHIC SITES LOCATED IN THE FOREST-STEPPE POVOLZHYE**

**G.I. Zaytseva**, A.A. Vybornov, N.N. Kovalyuh, V.V. Skripkin, Russia

#### **SPECIAL ARCHAEOLOGICAL MATERIALS AND TECHNIQUES FOR DATING**

#### **12. RADIOCARBON DATING OF LIME AND ORGANIC INCLUSIONS OF PLASTER AND MORTAR SAMPLES FROM SOUTHERN JORDAN**

**K. Al-Bashaireh**, Jordan

#### **13. TOOTH ENAMEL PRESERVATION USING FTIR AND GRINDING CURVES**

**Y. Asscher**, S. Weiner, E. Boaretto, Israel

#### **14. THE RELIABILITY OF PRE-SCREENING BONES FOR NITROGEN CONTENT (%N) AS AN INDICATOR OF COLLAGEN PRESERVATION SUITABLE FOR RADIOCARBON DATING**

**F. Brock**, R. Wood, T.F.G. Higham, P. Ditchfield, A. Bayliss, C. Bronk Ramsey, UK

#### **15. THE INFLUENCE OF DIFFERENT ABOX COMBUSTION CONDITIONS ON RADIOCARBON AGE AND CHARCOAL STRUCTURE**

**F. Brock**, R. Wood, T.F.G. Higham, C. Bronk Ramsey, UK

#### **16. RADIOCARBON DATING OF THE PALAEOOLITHIC: COMPARISONS OF CHARCOAL ABOX-SC AND BONE ULTRAFILTRATION AT THE GROTTA DI FUMANE, ITALY**

T.F.G. Higham, **F. Brock**, M. Peresani, R. Wood, K. Douka, A. Broglio, C. Bronk Ramsey, UK

#### **17. CHEMICAL PROCEDURES TO REMOVE THE RESTORATION MATERIALS FROM THE WOODEN CARVINGS OF MEPHITIS GODDESS SANCTUARY (AVELLINO - ITALY)**

**M. Capano**, F. Marzaioli, I. Passariello, O. Pignatelli, N. Martinelli, S. Gigli, F. Terrasi, Italy



18. OF OLD BONES AND YOUNG DATES

**P.M. Grootes**, M-J. Nadeau, C.M. Hüls, Germany

19. 14C DATING OF FIRE DAMAGED MORTARS FROM MEDIEVAL FINLAND

**A. Lindroos**, Å. Ringbom, J. Heinemeier, G.W.L. Hodgins, F. Brock, Finland

20. SELECTIVE PROCEDURE FOR POLLEN EXTRACTION FROM THE DEAD SEA (ISRAEL) FOR RADIOCARBON AMS DATING

D. Langgut, **E. Mintz**, E. Boaretto, Israel

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**POSTER PRESENTATIONS - MONDAY, APRIL 11, 2011** (continued)

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Board No.

**SPECIAL ARCHAEOLOGICAL MATERIALS AND TECHNIQUES FOR DATING**

(continued)

21. ASSESSMENT OF INFINITE-AGE BONES FROM THE UPPER THAMES VALLEY, UK, AS 14C BACKGROUND STANDARDS

G.T. Cook, T.F.G. Higham, F. Brock, **P. Naysmith**, S.P.H.T. Freeman, A. Bayliss, UK

22. IDENTIFICATION AND EXTRACTION OF RELIABLE SAMPLES OF LIME FOR THE 14C DATING OF PLASTERS AND MORTARS WITH THE METHOD OF “PURE LIME LUMPS”

**G.L.A. Pesce**, R.J. Ball, G. Quarta, L. Calcagnile, UK

23. NOT ONE SIZE FITS ALL: TOWARDS SAMPLE-SPECIFIC CONTAMINATION REMOVAL PRE-TREATMENTS

**N. Rebollo**, E. Mintz, E. Eckmeier, A. Snir, E. Weiss, D. Nadel, M. Zeder, O. Bar-Yosef, E. Boaretto, Israel

24. RADIOCARBON CONTENT AND CRYSTALLINE ORDER IN MODERN AND MEDIEVAL PLASTER BINDERS

**L. Regev**, A. Lindroos, V. Chu, E. Mintz, S. Weiner, E. Boaretto, Israel

25. CAN HUMIC SUBSTANCES, ADSORBED ON CHARRED MATERIAL, BE USED AS AN INDICATOR OF EXPOSURE TO HEAT?

**A. Snir**, E. Mintz, N. Rebollo, D. Nadel, E. Weiss, E. Boaretto, Israel

26. RADIOCARBON DATING PROTEIN OF THE TOOTH ENAMEL

**S.V. Svyatko**, P.J. Reimer, UK

27. MONITORING THE PRESENCE OF HUMIC SUBSTANCES IN WOOL AND SILK BY THE USE OF NON-DESTRUCTIVE FLUORESCENCE SPECTROSCOPY: QUALITY CONTROL FOR 14C DATING OF WOOL AND SILK

M. Boudin, M. Van Strydonck, **T. Van den Brande**, P. Boeckx, P. Vandenabeele, S. Mitschke, Belgium

28. RADIOCARBON DATING OF POTTERY: CHEMICAL COMPOSITION OF THE ORGANIC FRACTION AND THE RELIABILITY OF 14C DATES (PRELIMINARY RESULTS)

**G.I. Zaytseva**, E.D. Skakovskii, G. Possnert, Russia

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**POSTER PRESENTATIONS - MONDAY, APRIL 11, 2011** (continued)

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Board No.

**PREHISTORICAL PERIODS**

29. AMS RADIOCARBON DATING THE FREQUENTATION PHASES AND THE FUNERAL PRACTICES IN THE NEOLITHIC NECROPOLIS IN SERRA CICORA, NARDÒ, LECCE, SOUTHERN ITALY

- L. Calcagnile**, G. Quarta, M. D'Elia, I. Tiberi, E. Ingravallo, Italy  
30. INFLUENCE OF SEDIMENTARY CONTEXT ON THE PRESERVATION OF EARLY NATUFIAN CHARCOAL AND BONE COLLAGEN OF EL-WAD TERRACE, ISRAEL
- E. Eckmeier**, R. Yeshurun, E. Mintz, M. Weinstein-Evron, E. Boaretto, Israel  
31. INTERPRETING RADIOCARBON DATES FROM NEOLITHIC HALAI, GREECE
- Y. Facorellis**, J.E. Coleman, Greece  
32. NEOLITHIC DISPERSAL IN THE FAR NORTH-EAST OF EUROPE: WAYS AND CHRONOLOGY
- V.N. Karmanov**, N.E. Zaretskaya, Russia  
33. CHRONOLOGY OF LATE PLEISTOCENE HUMANS IN EURASIA: RESULTS AND PERSPECTIVES
- S.G. Keates**, Y.V. Kuzmin, G.S. Burr, UK  
34. THE ABSOLUTE DATING OF THE EARLIEST SETTLEMENTS IN NORTH GREECE WITH RADIOCARBON AND THE DURATION OF THE SUBSEQUENT CULTURAL PHASES
- Y. Maniatis**, Greece  
35. THE START OF THE NEOLITHIC IN THE BALKAN PENINSULA: MODELS VERSUS DATA
- M. Spataro, **J. Meadows**, Germany  
36. RADIOCARBON DATES AND MAJOR ELEMENT COMPOSITION OF GLASS SHARDS FOR LATE PLEISTOCENE TEPHRAS ON TANEGASHIMA ISLAND, SW JAPAN
- M. Okuno**, M. Torii, H. Naruo, T. Kobayashi, Japan  
37. AN AMS DATE OF THE CAFÉ-AU-LAIT (NAHSHOLIM HORIZON) IN THE SHARON COASTAL PLAIN
- A. Ronen**, Israel  
38. RADIOCARBON DATING AND TRACE ELEMENT CONTENT AS THE INDICATORS OF FORMER HUMAN ACTIVITY (ON SELECTED EXAMPLES FROM POLAND)
- P. Szwarczewski**, Poland

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#### POSTER PRESENTATIONS - WEDNESDAY, APRIL 13, 2011

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Board No.

#### CALIBRATION, INTERCOMPARISON, MODELS AND OUTLIERS

1. SPATIAL STATISTICS AND <sup>14</sup>C-DATES: MODELLING INTRA-SITE SPATIAL DYNAMICS OF URNFIELD CEMETERIES IN BELGIUM  
**J. de Reu**, G. De Mulder, M. Van Strydonck M. Boudin, Belgium
2. WIGGLE-MATCH DATING WITH  $\pm 1$  YEAR LEVELS FOR A SMALL SAMPLE  
**M. Imamura**, E. Niu, S. Itoh, M. Ozaki, H. Fujine, K. Kobayashi, Japan
3. RADIOCARBON DATING POSSIBILITIES FOR THE IMPROVEMENT OF THE CALIBRATION CURVE: LOCAL CALIBRATIONS AND COMPLICATIONS OF RESERVOIR EFFECTS  
**A.J.T. Jull**, G.S. Burr, G.W.L. Hodgins, UK
4. TRAPEZOID PRIOR MODEL FOR ARCHAEOLOGICAL CHRONOLOGIES  
**S. Lee**, C. Bronk Ramsey, UK
5. BAYESIAN SPATIO-TEMPORAL ANALYSIS OF RADIOCARBON DATING FROM FENNOSCANDIA



J. Kammonen, E. Moltchanova, **P. Onkamo**, M. Oinonen, P. Pesonen, M. Haimila, T. Sundell, Finland

6. CONTINUING IMPROVEMENT IN 14C PRECISION AND ACCURACY

**E.M. Scott, P. Naysmith**, G.T. Cook, UK

7. DATING OF LATE PLEISTOCENE TREES FROM JAPAN

**J. van der Plicht**, M. Imamura, M. Sakamoto, The Netherlands

**RADIOCARBON RESEARCH IN THE 3RD MILLENNIUM BC**

8. RADIOCARBON AGE AND ENVIRONMENT OF BRONZE AGE KURGANS IN THE NORTH CAUCASUS STEPPE

**A.L. Alexandrovskiy**, J. van der Plicht, Y. Ryskov, Russia

9. AN AMS RADIOCARBON DATE FOR THE BELL BEAKER GRAVE AT CA' DI MARCO DI FIESSE, BRESCIA, NORTHERN ITALY

**E. Valzolgher**, J. Tirabassi, T.F.G. Higham, D.E. Angelucci, Italy

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**POSTER PRESENTATIONS - WEDNESDAY, APRIL 13, 2011 (continued)**

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Board No.

**HISTORICAL PERIODS**

10. RADIOCARBON DATING AN IRON GIRDER FROM THE CAROLINGIAN PALACE CHAPEL, AACHEN

**C.M. Hüls**, H. Maintz, M-J. Nadeau, P.M. Grootes, Germany

11. RADIOCARBON DATING OF HUMAN SKELETONS OF MEDIEVAL ARCHAEOLOGICAL SITES IN KAMAKURA, JAPAN: DEAD BY THE FALL OF KAMAKURA IN 1333 AD?

**M. Minami**, T. Nakamura, T. Nagaoka, K. Hirata, Japan

12. RADIOCARBON DATING OF THE FORTY YEAR TEPHRA ON ADAK ISLAND IN THE WEST CENTRAL ALEUTIAN ISLANDS, ALASKA, USA

**M. Okuno**, T. Nakamura, L. Gualtieri, B. Sarata, D. West, K. Wada, M. Torii, Japan

13. TEXTURAL FEATURES OF THE SEDIMENTS FILLING THE RIVER VALLEY BOTTOM AS THE RECORD OF PREHISTORIC AND HISTORIC HUMAN ACTIVITY (A CASE STUDY OF BRUDZEN DUZY, MAZOVIAN LOWLAND, CENTRAL POLAND)

**P. Szwarczewski**, E. Smolska, J. Mazeika, Poland

14. A MEROVINGIAN SURPRISE: EARLY MEDIEVAL RADIOCARBON DATES ON CREMATED BONE

G. De Mulder, **M. Van Strydonck**, R. Annaert, M. Boudin, Belgium

15. RADIOCARBON AGE OF HABITATION DEPOSITS OF BRONZE-NEOLITHIC AGE SETTLEMENT PESOCHNOE-1

**K.V. Voronin**, A.L. Alexandrovskiy, N.N. Kovalukh, V.V. Skripkin, V.V. Dolgikh, A.V. Dolgikh, Russia

16. DATING THE BEGINNINGS OF THE NABATEAN PRESENCE IN PETRA, JORDAN

C. Hatté, **A. Zazzo**, C. Gauthier, J-F. Saliège, B. Beckers, M. Mouton, France

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**POSTER PRESENTATIONS - WEDNESDAY, APRIL 13, 2011 (continued)**

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Board No.

**RESERVOIR AGE IN ARCHAEOLOGY**

17. RESERVOIR EFFECTS IN RADIOCARBON DATING OF FOOD CRUSTS ON POTTERY

B. Philippsen, **J. Heinemeier**, Denmark

18. MUSSELS WITH MEAT

**R. Fernandes**, A. Rakowski, M-J. Nadeau, P.M. Grootes, C.M. Hüls, Germany

19. RADIOCARBON AGE OF MOLLUSCAN SHELLS AND ITS APPLICATION

**Y. Miyata**, M. Minami, T. Nishimoto, H. Matsuzaki, T. Nakamura, Japan

20. DIETARY RECONSTRUCTION OF ARCHAEOLOGICAL REMAINS AT THE LATE JOMON PERIOD FROM REBUN ISLAND IN JAPAN AND ITS ENVIRONMENTAL APPLICATION IN THE 2ND MILLENNIUM BC: INSIGHT FROM APPARENT RADIOCARBON AGE DIFFERENCES, LIPID ANALYSIS AND STABLE ISOTOPE ANALYSIS

**Y. Miyata**, A. Horiuchi, L. Cramp, R.P. Evershed, M. Kondo, K. Yoshida, S. Onbe, M. Minami, T. Nakamura, Japan

21. FEATURES OF THE RESERVOIR EFFECT FORMATION IN FLUVIAL ECOSYSTEMS OF THE PRIPYAT' AND DNIEPER RIVERS (UKRAINE)

E.V. Glavatskaya, N.N. Kovalyuh, **V.V. Skripkin**, Ukraine

22. RADIOCARBON AGE OF HUMAN BONES FROM THE SPASO-ANDRONIKOV MONASTERY (MOSCOW, RUSSIA) AND RESERVOIR EFFECT

E.V. Glavatskaya, N.N. Kovalyuh, **V.V. Skripkin**, A.L. Alexandrovskiy, E.I. Alexandrovskaya, J. van der Plicht, Ukraine

**14C SAMPLES PRESERVATION, SITE FORMATION AND NORDIC ARCHAEOLOGY**

23. ABSOLUTE DATING OF THE BRONZE-AGE DEFENSIVE SETTLEMENT IN HORODNIANKA (NE POLAND)

**M. Krapiec**, M. Bolka, J. Brzozowski, Poland

24. CHRONOLOGY OF NEOLITHIC – EARLY METAL AGE PEOPLE OCCUPATION AT THE MOUTH OF THE OKHTA RIVER (ST. PETERSBURG)

**M.A. Kulkova**, T.M. Gusentsova, E.M. Nesterov, P.E. Sorokin, Russia

25. RADIOCARBON CHRONOLOGY OF THE EARLY HOLOCENE ARCHAEOLOGICAL SITES WITHIN THE KAMA REGION (CIS-URAL): PROBLEMS AND PERSPECTIVES

**E.L. Lychagina**, N.E. Zaretskaya, Russia

26. A NEW DATA FROM ŠVENTOJI NEOLITHIC SITES, W. LITHUANIA: INTEGRATING ARCHAEOLOGICAL DATA, CHRONOLOGICAL FRAMEWORK AND ENVIRONMENTAL HISTORY

G. Piliciauskas, **J. Mažeika**, A. Gaidamavicius, G. Vaikutienė, A. Bitinas, M. Stancikaitė, Ž. Skuratovic, Lithuania

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#### POSTER PRESENTATIONS - WEDNESDAY, APRIL 13, 2011 (continued)

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Board No.

**14C SAMPLES PRESERVATION, SITE FORMATION AND NORDIC ARCHAEOLOGY** (continued)

27. ARCHAEOLOGICAL AND 14C RECORDS FROM THE CULTURAL LAYERS OF KLAIPEDA, WESTERN LITHUANIA: HISTORY OF THE TOWN AND ENVIRONMENT

**M. Stancikaitė**, D. Kisieliene, J. Mažeika, I. Masiulienė, Lithuania

28. RADIOCARBON CHRONOLOGY OF THE BURIAL MOUND CREMATION COMPLEX (THE VIKING TIMES, MIDDLE OKA)

**A.S. Syrovatko**, N.E. Zaretskaya, Russia

**SPECIAL ARCHAEOLOGICAL MATERIALS AND TECHNIQUES FOR DATING**

29. ROMAN RUINS AS AN EXPERIMENTAL GROUND FOR RADIOCARBON DATING OF MORTAR

**I. Hajdas**, J. Trumm, G. Bonani, M. Maurer, L. Wacker, Switzerland

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## **AEGEAN SEMINAR, CROATIA, 12 APRIL 2011, PROF. STELIOS ANDREOU**

The next Aegean Seminar in Croatia will take place on 12 April 2011 at 18.00, at the Conference Hall, Library of the Faculty of Humanities and Social Sciences, Zagreb. It will host Prof. Stelios Andreou (Aristotle University, Thessaloniki) with a lecture titled “The Northern Aegean during the 3<sup>rd</sup> and 2<sup>nd</sup> millennia BC”.

An additional lecture by Prof. Andreou will be delivered on 14 April 2011 at 11.00, at the main lecture hall of the Department of Archaeology at the same faculty, the title is “Thessaloniki Toumba: A 2<sup>nd</sup> millennium BC tell settlement on the Aegean and Balkan interface”.

For any further information, please contact Helena Tomas on [htomas@ffzg.hr](mailto:htomas@ffzg.hr).

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## **WORKSHOP ON THE ARCHAEOLOGY OF LEAD, SILVER, ZINC AND THE GANGUE MINERALS, 10 APRIL 2011, MATLOCK BATH, DERBYSHIRE**

NAMHO (The National Association of Mining History Organisations) will be holding a workshop on the archaeology of lead, silver, zinc and the gangue minerals, as part of their Research Framework for the Archaeology of the Extractive Industries in England, on Sunday 10 April at the Peak District Mining Museum, in Matlock Bath, Derbyshire - starting at 10:30.

It will be a working meeting to explore current knowledge of the archaeology - what has been done in the way of archaeological investigation, has it been published, if not, where are the results held?

If you can contribute to the discussion, please come to the workshop - but let us know you are coming (it helps in organising the catering).

Contact either Peter Cloughton [P.F.Claughton@exeter.ac.uk](mailto:P.F.Claughton@exeter.ac.uk) or David Williams [davew@TIDZA.DEMON.CO.UK](mailto:davew@TIDZA.DEMON.CO.UK)

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Co-owner - mining-history e-mail discussion list.  
See <http://www.jiscmail.ac.uk/files/mining-history/> for details.

Mining History Pages - <http://www.people.exeter.ac.uk/pfclaugh/mhinf/>

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**WORKSHOP ON CERAMICS FROM  
NORTHERN AND CENTRAL ANATOLIA  
BETWEEN 4TH CENT. B.C. AND 8TH  
CENT. A.D., MAY 9-10, 2011 / IZMIR,  
TURKEY, FIRST CIRCULAR - CALL FOR  
PAPERS**

Dear Colleagues,

We are glad to inform you that an international workshop on the ceramics from Northern and Central Anatolia dating from the Hellenistic (4th cent. B.C.) to Early Byzantine (8th cent. A.D.) periods will take place on May 9th-10th, 2011 at the Faculty of Letters of Dokuz Eylul University in Izmir, Turkey. We warmly invite contributions by scholars and graduate students from a variety of disciplines related to this subject. Intended to bring together Turkish, European, Mediterranean, and North American scholars to discuss a range of issues concerning Hellenistic, Roman and Early Byzantine ceramics of Northern and Central Anatolia, this conference should be an excellent opportunity to increase our knowledge of this material. It also aims to encourage dialogue among Turkish and European scholars in classical archaeology of Turkey. Both the excavated finds as well as museum pieces are the subject of this workshop that is offering a firm base for the support of future research in Northern and Central Anatolia concerning pottery studies. Therefore pottery experts as well as museum curators from these landscapes in Turkey are kindly welcome. This two-day workshop will contain both lectures of 20 min. as well as poster presentations.

The aim of this meeting is to report on the state of research concerning the Hellenistic, Roman and Early Byzantine ceramics from Northern and Central Anatolia between the 4th B.C. to 8th century A.D., or thereabouts. The geographical areas concerned are Northern and Central Turkey and its close environs. The quantities of later ceramics which have come to light on numerous sites in Turkish Black Sea as well as Central Anatolian Plateau, as well as recent research on the various collections from the geographical area concerned, now permit us to make significant additions to the archaeological evidence, thanks to progress in Hellenistic and Roman pottery research in Greece in the last two decades. The workshop has the main intention to present extensively the less well-known Hellenistic and Roman ceramics from neglected parts of Anatolia.

Concentrating on unpublished finds or collections from Northern and Central Anatolia, the colloquium aims to tackle a series of questions which can be grouped as five principal interlinked and overlapping themes: production, trade-distribution, function, decoration and chronology.

All approaches and methods likely to enhance our knowledge on these themes and questions are of course very welcome: archaeology, archaeometry, history of art,

philology, cultural anthropology, industrial history etc. Most welcome are papers from excavations in Northern and Central Asia Minor producing Hellenistic, Roman and Early Byzantine ceramics and other stratified finds (small finds, coins etc.) that will help us to build up a more precise chronology.

Papers and oral presentations can be given in English, French, German, Italian or Turkish, but English will be the preferred language for oral presentations. We would be delighted if you could consider contributing to this workshop. If you wish to participate, please submit a title for your talk before May 1, 2011 by e-mail (if possible) to: [<gulserenkan@hotmail.com>](mailto:gulserenkan@hotmail.com), or by fax to: +90.232.453 90 93.

Entry to the workshop is free of charge for all; accommodation and travel expenses will be paid by the participants, who should also arrange their own accommodation as necessary. The proceedings of the workshop is planned to be published in 2012.

The organizers seek to widen participation at this conference, and would like to encourage colleagues from all parts of the world to attend. The organizing committee kindly requests that you alert any persons within your research community who would be interested in participating at this conference, either by forwarding our e-mail, or by printing this circular and displaying it in your institution.

We hope that you will be able to join us at the Dokuz Eylul University and look forward to seeing you in Izmir!

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Contact Addresses for the Workshop  
Ceramics of Northern and Central Anatolia Workshop  
Dokuz Eylul Universitesi  
Edebiyat Fakultesi  
Arkeoloji Bolumu  
Oda No: A-418  
Tınaztepe/Kaynaklar Yerleskesi  
Buca  
TR-35160 Izmir, TURKEY.  
Mobile Phone: +90.544.938 54 64.  
Fax: +90.232.453 90 93.  
E-mail: [gulserenkan@hotmail.com](mailto:gulserenkan@hotmail.com)

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## **2ND INTERNATIONAL CONFERENCE** **ON: BIOMEDICAL SCIENCES AND** **METHODS IN ARCHEOLOGY,** **KUSADASI, EFESUS, TURKEY, 15-18** **SEPTEMBER 2011, 1ST CIRCULAR**

The Department of the History of Medicine (University of Crete), and the Faculty of Health Sciences (Yeni Yüzyıl University) are organizing the 2nd International Conference on:

### **Biomedical Sciences and Methods in Archeology**

Kusadasi, Efesus, Turkey

15-18 September 2011

This Conference aims to highlight numerous new trends in bioarchaeology research that are made possible by the rapid development of current biomedical science and technology. These innovative approaches will shed new light on the mystery of human skeletal remains within their archaeological and historical contexts. Interesting debate on the use of bioarchaeological data as primary sources for the construction of the history of health and disease is expected during this conference. Researchers and scholars in the fields of medicine, history of medicine, bioarchaeology, medical and molecular genetics, paleopathology, physical anthropology, archaeology, and related disciplines are invited to participate.

### **Conference Topics**

Bioarchaeological studies

History of Medicine

Biomolecular methods in archaeology Paleoradiology Paleohistology Paleoepidemiology

Reconstruction of dietary patterns Paleopathology

Paleoanthropology

### **Languages**

The languages of the Conference are English.

### **Abstracts**

Extended abstracts for podium and poster presentations of about 300 words should be submitted by June 12 th. The abstracts must detail the theme and aim of the presentation.

### **Presentations**

Presentations will be limited to 20 minutes, followed by 10 minutes discussion.

### **Conference Proceedings**

The conference proceedings will be published. Extended versions of papers accepted for presentation can be submitted for publication.



### **Important dates**

Submission of abstracts: 12 th June 2011

Notification of acceptance: 4th July 2011

Conference: 15-18 September 2011

### **Organizing Committee**

#### **Presidents:**

Abaci-Kalfoglou Ersi, TR

Trompoukis Constantinos, GR

#### **Secretary:**

Ozcan S. Sebnem, TR

#### **Members:**

Akinci Ebrar, TR Bourbou Chryssi, GR Chhem Rethy, DE

Christodoulou Demetrios, GR Kosmidis Hlias, GR

Papadakis Marios, GR Petridis Gabriel, TR

### **Scientific Committee**

#### **Presidents:**

Chhem Rethy, DE

Trompoukis Constantinos, GR

#### **Members:**

Abaci-Kalfoglou Ersi, TR

Bourbou Chryssi, GR Brown Terry, UK

Dutour Olivier, FR Fox Sherry, US Geroulanos Stefanos, GR

Gursoy Akile, TR

Michaelides Demetrios, GR

Mitchell Piers, UK

Ortner Donald, US

Ozgan Christine, TR Richards Mike, DE Roberts Charlotte, UK

Sarlak Eva, TR Touwaide Alain, US

Zoras Odysseas, GR

### **Further Information**

For more information regarding the conference:

web: <http://bioarchaeology-congress.com>

E-mail: [bioarchaeology2011@yeniuyuzuil.edu.tr](mailto:bioarchaeology2011@yeniuyuzuil.edu.tr)

Tel: +90 532 473 0921

Fax: +90 212 2456717

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## **2011 AMPHIBIOUS ARCHAEOLOGICAL FIELD SCHOOL - ISRAEL**

Dear all,

Expressions of interest and applications are invited for the University of Rhode Island - Israel Coast Exploration project field school taking place in Akko, Israel, this Summer (July 1-22). We will begin finalizing our team after April 1<sup>st</sup> so applications are appreciated before that deadline. Please see <http://www.akkoarchaeology.org/URI/URI-ice.htm> for further information and contact details, and links to images from our pilot season in 2010. Contact Krieger or Buxton for more information and program costs. Qualified students may be eligible for financial aid.

The old city of Akko (medieval Acre) is a UNESCO world heritage site and one of the oldest continuously inhabited port towns in the Near East, with an extraordinarily rich history and archaeology influenced by many ancient Mediterranean civilizations.

Project co-directors Dr. William Krieger (URI), Dr. Bridget Buxton (URI), Dr. John Hale (University of Louisville, Kentucky), and Dr. Jacob Sharvit (Israel Antiquities Authority) will be leading a small international team in exploration and excavation of the submerged and buried Akko port structures and surrounding area, both terrestrial and maritime. The project is also a field school offering 8 URI Honors program credits (undergraduate), and we aim to have participants experience multiple aspects of an archaeological project, from basic manual site recording and excavation to geophysical survey and pottery restoration. In addition to a small terrestrial team, we will be selecting a core dive team of up to six experienced scuba divers who must have AAUS certification or AAUS diver-in-training status by June 2010.

Bridget

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Bridget Buxton, PhD.  
Department of History  
University of Rhode Island  
80 Upper College Rd, Kingston, RI 02881  
ph. 401 874 4085  
fx. 401 874 2595  
[babuxton@mail.uri.edu](mailto:babuxton@mail.uri.edu)

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**ΘΕΣΕΙΣ ΕΡΓΑΣΙΑΣ/ΥΠΟΤΡΟΦΙΕΣ –  
JOB VACANCIES/FELLOWSHIPS**

**POSTGRADUATE PROGRAM IN  
MEDITERRANEAN ARCHAEOLOGY:  
FROM PREHISTORY TO LATE  
ANTIQUITY, UNIVERSITY OF CYPRUS,  
DEPARTMENT OF HISTORY AND  
ARCHAEOLOGY**

The Department of History and Archaeology and the Archaeological Research Unit of the University of Cyprus encourage applications for the postgraduate program in *Mediterranean Archaeology: From Prehistory to Late Antiquity*.

The postgraduate program in Mediterranean Archaeology, at the University of Cyprus, is designed to meet the needs of a wide range of graduate students coming from different research fields, such as Archaeology, and the related fields of History of Art, Architecture, Anthropology, and other subjects that have applications in Archaeology, such as Geology, Physics and Chemistry.

A variety of cross-disciplinary courses related to Mediterranean Prehistoric and Protohistoric Archaeology, Archaeology of the Geometric, Archaic and Classical Periods, Hellenistic and Roman Archaeology, Ancient History and Epigraphy, Environmental Archaeology and Archaeometry, Underwater Archaeology, and Pre-Industrial Technology, are offered in a highly-academic, well-equipped as well as friendly environment. They are currently taught in Greek but if there is an interest the courses can also be offered in English for international students. The MA and PhD degrees in Mediterranean Archaeology are available either full-time or part-time and commence in early September. Masters and Doctoral theses may be submitted for a PhD award in a European language other than Greek in agreement with the appointed supervisor.

The closing date for applications is the **15<sup>th</sup> of April 2011**.

For more information about the postgraduate program in Mediterranean Archaeology and admission requirements please visit the following link: <http://www.ucy.ac.cy/goto/hiarch/en-US/Postgraduate.aspx> or contact the course coordinator Assistant professor Giorgos Papasavvas email: [georgep@ucy.ac.cy](mailto:georgep@ucy.ac.cy)

We would appreciate if you would circulate this announcement amongst your students and graduates who may want to pursue their studies to a graduate level.

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Vasiliki Kassianidou  
Associate Professor  
Archaeological Research Unit - Department of History and Archaeology  
University of Cyprus  
P.O. Box 20537  
CY-1678 Nicosia, CYPRUS  
tel. +357 22 893564, FAX. +357 22 674101  
<http://www.ucy.ac.cy/~arkasian.aspx>

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**POSITION ANNOUNCEMENT, CENTER**  
**FOR APPLIED ISOTOPE STUDIES**  
**UNIVERSITY OF GEORGIA, ATHENS,**  
**GA 30602-4702, ASSOCIATE**  
**DIRECTOR/SENIOR RESEARCH**  
**SCIENTIST**

The Center for Applied Isotope Studies (CAIS) at the University of Georgia (UGA) seeks applicants for an Associate Director/Senior Research Scientist to aid the CAIS Director in administrative activities. Responsibilities include development and oversight of the operating budget, campus outreach/cooperative programs, and management of the Center's nuclear programs. Pursuit of individual research interests within the CAIS mission is expected.

The candidate should have a Ph.D. in one of the physical sciences. He or she should have clearly demonstrated administrative experience within the scientific community, including the management of scientific programs and laboratory personnel, the development of grant and project proposals, and the preparation and oversight of laboratory and program budgets. The candidate should also have a strong background in the operation of nuclear instrumentation, and a research interest in the field of applied nuclear sciences. A special interest in nuclear programs related to health physics, biomedicine, environmental sciences or marine sciences is desirable.

Estimated start date is July 1, 2011; however, the position will be open until filled. Salary will be commensurate with the level of the applicant's qualifications.

Interested individuals should send a curriculum vita and a letter of application that includes a statement of research interests, along with names, addresses, and email contact information for three references, to Dr. John E. Noakes, Director, Center for Applied Isotope Studies, 120 Riverbend Road, Athens, GA 30602-4702 (Tel 706 542-1395; Fax 706 542-6106; Email jenoakes@uga.edu; <http://www.cais.uga.edu/>). To receive full consideration, applications should be received by April 30, 2011.

The University of Georgia is an Equal Opportunity/Affirmative Action Institution.

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**NARNIA, NEW ARCHAEOLOGICAL  
RESEARCH NETWORK FOR  
INTEGRATING APPROACHES TO  
ANCIENT MATERIAL STUDIES, TITLE  
OF RESEARCH PROJECT “ANCIENT  
URBAN METALLURGY IN THE  
EASTERN MEDITERRANEAN”**

**A Marie Curie Initial Training Network  
FP7-PEOPLE-2010-ITN  
Early Stage Researcher Fellowship Announcement**

**Fellowship Title and ID code**

Marie Curie Trainee (ESR04) at the UCL Institute of Archaeology.

**Fellowship Description**

This research fellowship (equivalent to PhD research) focuses on a study of the technology of processing of copper-based alloys to produce, repair and recycle artefacts, from the Bronze Age to the Medieval Period in the eastern Mediterranean.

The project is part of a wider focus of the archaeometallurgy team at the UCL Institute of Archaeology on technological reconstructions, combining analytical approaches based primarily on optical and electron microscopy with energy-dispersive spectrometry with methods of interpretation rooted in earth or materials sciences, process technology as well as anthropological approaches to the study of technology in society.

Within the very broad chronological and geographical frame of this project it is expected that the successful applicant will focus only on one segment of time and / or space. The application should reflect this in the research proposal (see below), and explain why the focus is on this segment. It is important to explain which specific archaeological assemblage the applicant is expecting to use for their analytical work, or whether they hope to work on material provided by the UCL Institute of Archaeology or one of its partner institutions.

**Academic Requirements**

Eligible applicants for this Fellowship (equivalent to a PhD position) must by the start of the fellowship (1 October 2011) be in possession of a Master degree (MA/MSc) or equivalent in the field of archaeometallurgy, or archaeology, or materials science, or chemistry, or geology. UCL expects that all incoming PhD students have a Masters' degree at Distinction level or equivalent, and all eligible applicants will be interviewed, either in person or over the 'phone.

*Eligibility criteria set by the European Union for Marie Curie fellowships require that the applicants have no more than 4 years research experience prior to the envisaged starting date.*

### **Marie Curie ITN programs mobility requirement**

At the time of the selection, applicants must not have resided or carried out their main activity (work, studies, etc.) in the UK for more than 12 months in the 3 years immediately prior to the starting date of the fellowship.

### **Duration of fellowship**

3 years – starting from 1 October 2011.

### **How to apply**

#### ***Deadline for Fellowship application: 31 May 2011***

Applications are based on the existing UCL application form for Postgraduate (Research) degrees (<http://www.ucl.ac.uk/prospective-students/graduate-study/application-admission/downloadable-applications/graduateforms.pdf>), and should include:

- I. The applicant's Curriculum Vitae
- II. A covering letter including a statement concerning their eligibility for this fellowship (see below)
- III. Transcripts of relevant studies and – where appropriate – a letter from their course coordinator predicting the expected degree result (for those who still have to complete their current Master's programme)
- IV. Two reference letters. ***Reference letters should be sent directly by the referees to [th.rehren@ucl.ac.uk](mailto:th.rehren@ucl.ac.uk), and NOT through the UCL application system.***
- V. A research proposal, for which the following guidance is given (potential applicants are encouraged to discuss their proposal with Professor Thilo Rehren or Dr Martínon-Torres at the UCL Institute of Archaeology prior to formally submitting):

In order to gain a place to undertake a research degree at the Institute you are required to provide a clear statement of your proposed project which should be 1500 words in length (excluding Key References). Particular emphasis will be placed on the quality of your proposal as part of the admissions process.

**Your proposal must describe your research project under the following subheadings (suggested word lengths for each section are an approximate guide):**

#### **Research Questions (c. 700 words)**

Please provide an outline of the research questions to be addressed, showing their originality and significance within the general field of the research topic referring to key publications. You should identify the key thematic and theoretical aspects of your project as you currently conceive them and then list further specific lines of enquiry that you intend to pursue. You may find it useful to number your specific questions (see Sources, Data and Methods below).

#### **Sources, Data and Methods (c. 350 words)**

Describe the sources of information/data that the research will draw upon and identify any ethical considerations. If possible, please identify which sources you intend to use to address your research questions. If your project will involve field, laboratory-based or museums work please state: (1) where and why; (2) how you propose to access these sources; (3) what permissions are required (identifying any likely difficulties or

sensitivities); (4) how the research work is to be funded (expenses other than UCL fees, living costs, etc.).

### **Research Skills (c. 350 words)**

Give an account of the knowledge and expertise that you already have which is relevant to the proposed research and, most significantly, any training you will need to acquire to undertake your project (for example, GIS skills, use of analytical instruments, statistical methods). Please bear in mind that certain analytical methods and techniques require considerable time and effort to acquire, so please pay particular attention to the appropriateness and feasibility of your research methods.

### **Timeliness and Impact (c. 100 words)**

Please conclude your Research Proposal with a consideration of why it is important to undertake the research at the present time and how the potential outcomes of your project might impact both on specialists in the given field and the wider academic community.

### **Key References**

Please list up to 12 key references with a brief note (one or two sentences) of their significance to your proposed research topic.

### **Submission of application**

All application documents should be sent in hard copy to *Lisa Daniel, UCL Institute of Archaeology, 31-34 Gordon Square, London WC1H 0PY, UK*, with the indication **NARNIA ESR04** written on the envelope. Please do NOT submit the application via the UCL admissions portal, since this will unnecessarily delay the receipt of your application.

### **Financial regime**

The fellowship covers UK/EU tuition fees and a monthly salary for three years in line with the FP7-PEOPLE2010-ITN. The annual salary is approximately £25,000 per year before tax and national insurance deductions. A higher rate is payable for fellows with dependent children. A currency exchange rate adjustment will be done at the end of the fellowship. For more information see:

[http://ec.europa.eu/research/fp7/understanding/marie-curieinbrief/home\\_en.html](http://ec.europa.eu/research/fp7/understanding/marie-curieinbrief/home_en.html).

### **More information on NARNIA**

Visit the following link: <http://www.narnia-itn.eu> or contact the project's manager Maria Dikomitou (email: [m.dikom@ucy.ac.cy](mailto:m.dikom@ucy.ac.cy), tel. 00357-22893574).

### **More information about the UCL Institute of Archaeology:**

<http://www.ucl.ac.uk/archaeology/>

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**NARNIA, NEW ARCHAEOLOGICAL  
RESEARCH NETWORK FOR  
INTEGRATING APPROACHES TO  
ANCIENT MATERIAL STUDIES, TITLE  
OF RESEARCH PROJECT “A STUDY OF  
THE USE OF COPPER ALLOYS  
THROUGH TIME IN THE EASTERN  
MEDITERRANEAN”**

**A Marie Curie Initial Training Network**  
FP7-PEOPLE-2010-ITN  
**Early Stage Researcher Fellowship Announcement**

**Fellowship Title and ID code**

Marie Curie Trainee (ESR05) at the UCL Institute of Archaeology.

**Fellowship Description**

This research fellowship (equivalent to PhD research) focuses on identifying and interpreting patterns in copper alloy composition used from the Bronze Age up to the Medieval period in the eastern Mediterranean, looking at geographical preferences as well as changes over time.

The project builds on the successful work of earlier research on copper-based artefacts, making extensive use of published analytical data, expanding the existing technological and typological interpretation of alloy preferences into a wider overarching picture across time and space. It is expected that as part of this research targeted additional analyses will be conducted to supplement existing data sets in strategically relevant regions and periods.

Within the very broad outline of this project it is expected that the successful applicant will focus only on one segment of time and / or space; the application should reflect this in the research outline (see below), and explain why the focus is on the chosen segment, and what additional analytical work is expected to be done, including a statement concerning the possibility of access for sampling to such material.

**Academic Requirements**

Eligible applicants for this Fellowship (equivalent to a PhD position) must be highly numerate and, at the start of the fellowship (1 October 2011), be in possession of a Master degree (MA/MSc) or equivalent in the field of archaeometallurgy, or archaeology, or an otherwise appropriate subject area (maths, geology, materials science). UCL expects that all incoming PhD students have a Masters' degree at Distinction level or equivalent, and all eligible applicants will be interviewed, either in person or over the 'phone.

*Eligibility criteria set by the European Union for Marie Curie fellowships require that the applicants have no more than 4 years research experience prior to the envisaged starting date.*

### **Marie Curie ITN programs mobility requirement**

At the time of the selection, applicants must not have resided or carried out their main activity (work, studies, etc.) in the UK for more than 12 months in the 3 years immediately prior to the starting date of the fellowship.

### **Duration of fellowship**

3 years – starting from 1 October 2011.

### **How to apply**

#### ***Deadline for Fellowship application: 31 May 2011***

Applications are based on the existing UCL application form for Postgraduate (Research) degrees (<http://www.ucl.ac.uk/prospective-students/graduate-study/application-admission/downloadable-applications/graduateforms.pdf>), and should include:

- I. The applicant's Curriculum Vitae
- II. A covering letter including a statement concerning their eligibility for this fellowship (see below)
- III. Transcripts of relevant studies and – where appropriate – a letter from their course coordinator predicting the expected degree result (for those who still have to complete their current Master's programme)
- IV. Two reference letters. ***Reference letters should be sent directly by the referees to [th.rehren@ucl.ac.uk](mailto:th.rehren@ucl.ac.uk), and NOT through the UCL application system.***
- V. A research proposal, for which the following guidance is given (potential applicants are encouraged to discuss their proposal with Professor Thilo Rehren or Dr Martínon-Torres at the UCL Institute of Archaeology prior to formally submitting):

In order to gain a place to undertake a research degree at the Institute you are required to provide a clear statement of your proposed project which should be 1500 words in length (excluding Key References). Particular emphasis will be placed on the quality of your proposal as part of the admissions process.

**Your proposal must describe your research project under the following subheadings (suggested word lengths for each section are an approximate guide):**

#### **Research Questions (c. 700 words)**

Please provide an outline of the research questions to be addressed, showing their originality and significance within the general field of the research topic referring to key publications. You should identify the key thematic and theoretical aspects of your project as you currently conceive them and then list further specific lines of enquiry that you intend to pursue. You may find it useful to number your specific questions (see Sources, Data and Methods below).

#### **Sources, Data and Methods (c. 350 words)**

Describe the sources of information/data that the research will draw upon and identify any ethical considerations. If possible, please identify which sources you intend to use to

address your research questions. If your project will involve field, laboratory-based or museums work please state: (1) where and why; (2) how you propose to access these sources; (3) what permissions are required (identifying any likely difficulties or sensitivities); (4) how the research work is to be funded (expenses other than UCL fees, living costs, etc.).

### **Research Skills (c. 350 words)**

Give an account of the knowledge and expertise that you already have which is relevant to the proposed research and, most significantly, any training you will need to acquire to undertake your project (for example, GIS skills, use of analytical instruments, statistical methods). Please bear in mind that certain analytical methods and techniques require considerable time and effort to acquire, so please pay particular attention to the appropriateness and feasibility of your research methods.

### **Timeliness and Impact (c. 100 words)**

Please conclude your Research Proposal with a consideration of why it is important to undertake the research at the present time and how the potential outcomes of your project might impact both on specialists in the given field and the wider academic community.

### **Key References**

Please list up to 12 key references with a brief note (one or two sentences) of their significance to your proposed research topic.

### **Submission of application**

All application documents should be sent in hard copy to *Lisa Daniel, UCL Institute of Archaeology, 31-34 Gordon Square, London WC1H 0PY, UK*, with the indication **NARNIA ESR05** written on the envelope. Please do NOT submit the application via the UCL admissions portal, since this will unnecessarily delay the receipt of your application.

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[http://ec.europa.eu/research/fp7/understanding/marie-curieinbrief/home\\_en.html](http://ec.europa.eu/research/fp7/understanding/marie-curieinbrief/home_en.html).

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<http://www.ucl.ac.uk/archaeology/>

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Maria Dikomitou

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**READER/PROFESSOR OF**  
**ARCHAEOLOGICAL MATERIALS AND**  
**TECHNOLOGIES, - REF:1180163, UCL**  
**DEPARTMENT / DIVISION, INSTITUTE**  
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**Grades**

9 - Professorial

**Hours**

Full Time

**Salary**

**(inclusive of London allowance)**

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**Key Requirements**

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**Further Details**

Informal enquiries should be made to Professor Stephen Shennan, tel +44 (0)20 769 7483, email [ioa-director@ucl.ac.uk](mailto:ioa-director@ucl.ac.uk) or Professor Thilo Rehren, tel +44 (0)20 769 4757, email [th.rehren@ucl.ac.uk](mailto:th.rehren@ucl.ac.uk). Queries regarding the application process should be addressed to Nick McGhee, tel +44 (0)20 7679 8878, email [n.mcgree@ucl.ac.uk](mailto:n.mcgree@ucl.ac.uk)

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Professor Thilo Rehren  
Chair, Archaeological Materials and Technologies  
UCL Institute of Archaeology  
31-34 Gordon Square  
London WC1H 0PY

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**Location is negotiable**

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English Heritage is the nation's leading conservation body, with the role of championing and caring for the historic environment. Scientific dating is a core ingredient in the better understanding of the heritage, allowing it to be better valued, cared for, and appreciated.

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We are unable to accept CVs.**

**Please attach a list of your publications to the application form.**

**Closing date: 3<sup>rd</sup> April 2011.**

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Αγαπητοί φίλοι,

Το αρχαιολογικό υλικό από το Σπήλαιο Δράκαινα συνεχίζει να μας αποκαλύπτει μυστικά ... χιλιετιών! Η προσεκτική ανασκαφική πρακτική & η μετέπειτα ερευνητική μεθοδολογία οδήγησαν στην αναγνώριση -στο μικροσκόπιο- ενός πολύ σπάνιου ευρήματος: ένα καμένο νήμα, μήκους μόλις 1 χιλ., ηλικίας περ. 7.000 χρόνων! Χαρείτε μαζί μας την πρώτη ανακοίνωσή του:

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Γεωργία Στρατούλη

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***ΝΕΕΣ ΕΚΔΟΣΕΙΣ – NEW PUBLICATIONS***

***THE CHRYSOKAMINO METALLURGY***

***WORKSHOP AND ITS TERRITORY***

**[HESPERIA SUPPLEMENT 36], PHILIP P.  
BETANCOURT (ED.), 2006, PRINCETON,  
NEW JERSEY: AMERICAN SCHOOL OF  
CLASSICAL STUDIES AT ATHENS**

Soft cover, xxii & 462 σ., 28x21.5 cm, ISBN: 978-0-87661-536-2

The present monograph marks the first comprehensive publication of a systematically excavated prehistoric metal production workshop in the Aegean. Although other broadly contemporaneous slag heaps are known in this region, the site of Chrysokamino in north-eastern Crete represents a particularly interesting, in many ways distinctive, example. It is presently the only known relatively large copper smelting (production of metal from its ores) workshop on the island; there are no copper ores in its vicinity suggesting transportation of these raw materials by sea from long distances; smelting was carried out using intriguing perforated chimneys, with parallels at other sites beyond Crete, and bellows, so far unique for the Aegean Early Bronze Age; while finally an arsenical-nickel copper alloy was produced already in the smelting stage. The Chrysokamino Project was not, however, simply an archaeometallurgical project, and this volume fully reflects this. A survey of the broader territory was undertaken, incorporating a study of two other nearby prehistoric sites, a small farmstead and a cave, while a range of field and laboratory techniques and data were incorporated into building a landscape-integrated narrative of this rural part of northern Crete that focuses, but is not limited, to the Bronze Age periods. The book is divided into three parts followed by numerous appendices. The editorial work, as well as much of the writing, was undertaken by Philip Betancourt, with significant contributions by a long list of specialists.

Part I sets the background in two chapters. First, the topography of the ‘Chrysokamino territory’ is introduced, including a very interesting discussion of local toponyms. Earlier work in this region is summarised, highlighting problems and confusion with previous interpretations of the metallurgical workshop. In Chapter 2 a comprehensive treatment of the natural environment of the region is laid out in terms of climate, geology, and natural resources, all aspects considered in relation to the function of a metallurgical workshop in the area. The absence of copper ore in the region is convincingly argued, while the consideration of raw materials does not stop at the copper ore, as resources for clays, fluxes, lithics, and fuel, all important raw materials for smelting, are thoroughly considered. Furthermore, the discussion extends beyond the immediate needs of a metallurgical workshop to include those for building materials, pottery, and diet.

Part II deals with the excavation and study of the metallurgy workshop. It includes an outline of excavation methodology, a discussion of the excavated apsidal structure and

the main types of finds recovered (e.g. pottery, stone tools, furnace chimney and bellow fragments, and slags). This part is tied with several of the appendices, which provide primarily relevant analytical data (e.g. Appendices A, B, C, D, E, F, M, N). Prior to excavation all that could be observed of the metallurgy workshop on the surface was essentially a deposit of slag and ceramic chimney fragments, as is the case with most known prehistoric Aegean smelting sites (e.g. Gale *et al.* 1985; Bassiakos & Philaniotou 2007). The remains of an apsidal structure were revealed in the southwest part of the site during excavation and Chapter 4 describes it and considers several interpretations for its purpose. The arguments against its direct use for metallurgical activities seem very convincing. An interesting proposal, based on the results of the analyses of organic residues from vases recovered, is its use as an apothecary for healing symptoms associated with the use of fire and/ or arsenical minerals.

Particularly important for resolving the chronology of the metallurgy workshop is the presentation of the pottery from the excavation, given separately for the slag pile and the apsidal building, with clear illustrations of all the sherds (Chapter 5). The majority of pottery dates to the EMIII-MMIA period, but fourteen sherds from the slag pile, representing 10-14 vessels are earlier, dating to the Final Neolithic (11 sherds), EMI-IIA (1 sherd), EMIIIB (1 sherd), EMII-III (1 sherd). All of the pottery from the apsidal building is of EMIII-MMIA date, with the exception of a single Final Neolithic sherd (which based on the plan, however, appears to have been recovered at the edges or just outside the limits of the building). One EMII sherd is also catalogued under the apsidal building finds (No 73), however this is not discussed in the text and based on the trench number given (S-20) appears to be from the northernmost edge of the excavated area, clearly outside the building. This should probably therefore be added to the pre-EMIII sherds from the slag pile. Final Neolithic sherds were recovered from surface layers as well as deeper layers highlighting the inherent difficulties in untangling the exact chronology and stratigraphy of slag heaps when dealing with relatively shallow deposits without clear architectural features and with little pottery present. What is clear is that the apsidal building itself dates to the EMIII-MMIA period. The earlier pottery, it is argued in this chapter, is evidence that the metallurgical activities on the site also predate the apsidal building. Unfortunately, the lack of clear stratigraphy means that the extent of such earlier activities cannot be deduced, while the analytical examination of metallurgical remains from different passes (Appendix F) did not reveal any differences suggestive of technological changes. Beyond chronology, it is noteworthy that the majority of pottery is local to this region both in terms of typologies and fabrics.

Chapter 6 presents the stone tools, the majority made of limestone, probably recovered from the nearby Agriomandra beach. Undoubtedly, among the most impressive finds of the workshop are the characteristic perforated furnace chimney fragments, with similar (although not identical) finds in other Aegean EBA smelting sites (e.g. Bassiakos & Philaniotou 2007; Philaniotou *et al.* in press), and the bellow fragments, which represent the earliest example of such devices on Crete and probably throughout the Aegean. Their reconstruction and use is discussed in Chapters 7 and 8 respectively. An interesting observation that highlights the plethora of evidence incorporated in this project is the evidence for the use of chaff in the fabric of the chimney fragments connected to the harvest season, and that in turn to the presence of the strong northern winds (meltemia) at the end of summer, strengthening the proposal for the seasonality of the metallurgical activities. Further ceramics (including a single tuyere fragment), other metallurgical

remains (e.g. slags, ore fragments, prills), and environmental data are given in Chapters 9 to 12.

Part II of the book concludes with two broader treatises. Muhly (Chapter 13) places Chrysokamino within the context of metallurgical innovations and traditions in the wider Aegean, the Balkans and the Near East, focusing on the introduction of metallurgy in the Aegean during the Late and Final Neolithic, as well as the earliest use and production of arsenical copper and tin bronze alloys. His critical review of the range of available evidence touches on many of the most challenging themes in the study of early metals in this region. In Chapter 14 Betancourt draws from all the previously presented evidence in proposing a model for the organization of the workshop as well as a reconstruction of the smelting process as undertaken at Chrysokamino. Various aspects are highlighted including the complexities associated with the importation of ore and other logistics of the metal production sequence, the absence of a clearly associated settlement, and the evidence for the smelters' identity. There is, however, one point worth noting here that concerns this as well as many other chapters in the book and is relevant to the discussions on the origin of the ore. It is clear that ore is imported to Chrysokamino. However, the ease with which lead isotope data are often accepted as positively pointing to a source in the Cyclades is in contrast to the clear evidence for fluxing and overall mixing demonstrated by the technological study, particularly as it is proposed that fluxes may have been local. Would this mixing not affect the lead isotope signature and what does this picture mean about our ability to discriminate intra-Aegean sources on the basis of the current lead isotope database (Georgakopoulou in press)?

Part III of the book is devoted to a surface survey undertaken with the aim of placing the metallurgical workshop, nearby small habitation site, and burial cave within their natural and cultural landscape context, as well as to clarify numerous aspects relating to the diachronic habitation and/ or exploitation of the region's resources. A multifaceted survey methodology specific to the needs of this project was developed and the results of the different approaches taken are presented in Chapters 15 to 17 and many of the appendices. A brief summary of the excavations at the primarily Late Minoan habitation site of Chrysokamino-Chomatas (the full results will be published separately) is included. These varied data are complemented by a report on the previously unpublished early 20<sup>th</sup> Century small-scale excavation by Edith Hall at the Theriospelio Cave (Chapter 18) and a very helpful succinct summary of Bronze Age settlement patterns in the Kavousi region drawn from the results of the intensive surface survey carried out by Donald Haggis between 1989-1991. His summary of the significant changes noted during the EMIII-MMIA period provide essential, easily comprehended background, in which the metallurgy workshop's main period of activity can be evaluated even by the non-Aegean specialist. The next two chapters offer thought-provoking analyses on the territorial boundaries of the Chrysokamino farmstead through different periods (Chapter 20) and on the diverse surrounding land types and potential associated activities (Chapter 21). The final synthesis of the survey data (Chapter 22) focuses, but is not limited to the prehistoric periods concerned, and closes with a succinct commentary contrasting the nature and intensity of exploitation of the Chrysokamino territory diachronically.

The appendices occupy approximately one third of the volume and include mostly the analytical/ laboratory or other specialized studies. The metallurgical remains were studied from a range of different specialists applying a range of techniques, some only as small test case-studies. Some of the appendices are, however, more comprehensive

treatises and could have been included within the main part of the volume, directly reflecting the, in any case, inherent integration of scientific data within the design, implementation and conclusions of the Chrysokamino Project.

By reading the present publication one often envies the diversity of evidence brought forward and incorporated in the Chrysokamino Project. At the start of the review I stressed, partly due to personal bias, the importance of the Chrysokamino metallurgy workshop within prehistoric Aegean metallurgy. I hope the review presented here illustrates that the rich contents of this volume far surpass this specialised field and that both scholars of early metallurgy in other parts of the world as well as Aegean prehistorians in general should find it a rewarding read.

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Fitch Laboratory  
British School at Athens

Please visit the site: <http://www.aegeussociety.org/gr/index.php/aegean-book-reviews/the-chrysokamino-metallurgy-workshop-and-its-territory-review-by-georgakopoulou/>

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**LATE ANTIQUE/EARLY BYZANTINE GLASS**  
**IN THE EASTERN MEDITERRANEAN,**  
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**DIVISION FOR MEDIEVAL ARCHAEOLOGY,**  
**PUBLICATION SERIES, NO. 1, LAFLI E. (ED.),**  
**IZMIR, HÜRRIYET MATBAASI 2009**

ISBN 978-605-61525-0-4.

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Atik Ş., Late Roman/Early Byzantine Glass Finds from the Marmaray Rescue Excavation at Yenikapı in Istanbul. pp.1-16.

Canav Özgümüş Ü., Late Roman/Early Byzantine Glass from the Marmaray Rescue Excavations at Sirkeci. pp.17-24.

Kanyak S., Late Roman/Early Byzantine Window Glass from the Marmaray Rescue Excavations at Sirkeci. pp. 25-47.

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# **"ΜΕΤΑΛΛΕΙΑ ΚΑΙ ΜΑΝΤΕΙΑ ΣΤΗΝ ΑΡΧΑΙΟΤΗΤΑ: ΣΥΜΒΟΛΗ ΣΤΗΝ ΙΣΤΟΡΙΑ ΤΗΣ ΑΡΧΑΙΑΣ ΜΕΤΑΛΛΕΙΑΣ", ΙΩΑΝΝΗΣ ΛΕΟΝΑΡΔΟΣ**

Διατριβή που εκπονήθηκε στο Ε.Μ.Π. (Σχολή Μηχανικών Μεταλλείων-Μεταλλουργών) και υποστηρίχθηκε στις 16/12/2011.

## **ΠΕΡΙΛΗΨΗ**

Η μαντεία στην αρχαία Ελλάδα άσκησε έντονη επιρροή σε ποικίλες πτυχές της θρησκευτικής, κοινωνικής αλλά και οικονομικής ζωής. Σε αυτό το πλαίσιο διερευνάται η επίδραση των μάντεων και των μαντείων στην εκμετάλλευση του ορυκτού πλούτου, από το στάδιο της εξόρυξης του μεταλλεύματος έως αυτό της εμπορικής προώθησης των προϊόντων των μεταλλοτεχνιτών.

Η έρευνα στηρίζεται στις σχετικές μαρτυρίες των αρχαίων συγγραφέων, οι οποίες επιβεβαιώνονται ως επί το πλείστον και από αρχαιολογικά ευρήματα. Τα γεγονότα στα οποία αυτές αναφέρονται είναι ταξινομημένα βάσει της χρονολογικής σειράς τους αλλά και του θέματός τους. Στο πρώτο κεφάλαιο εξετάζεται η επιρροή της μαντείας κατά την Εποχή του Χαλκού, οπότε ανακαλύφθηκαν τα μέταλλα και ξεκίνησε η επεξεργασία τους. Οι μυθολογικές παραδόσεις για τις θεότητες της μεταλλουργίας περιέχουν συγκαλυμμένες πληροφορίες για την οργάνωση των πρώτων μεταλλουργών, τη θρησκευτική δομή των ομοτεχνιών τους αλλά και την άσκηση της μαντείας. Στο τέλος της Εποχής του Χαλκού σημειώθηκαν οι εκστρατείες και οι αποικισμοί των Μυκηναίων από τη μητροπολιτική Ελλάδα προς διάφορες περιοχές της Μεσογείου, όπως η Αργοναυτική και η Τρωική Εκστρατεία, οι αποικισμοί της Κύπρου και της Μιλήτου. Η σχέση αυτών των ανακατατάξεων με τα μέταλλα και η συμβολή της μαντείας είναι το αντικείμενο του δεύτερου κεφαλαίου. Το επόμενο κεφάλαιο αναφέρεται στη σχέση των μαντείων και των μάντεων με τη μεταλλεία κατά την Αρχαϊκή και την Κλασική Περίοδο. Δίνεται ιδιαίτερη έμφαση στις σχετικές φιλολογικές και αρχαιολογικές ενδείξεις από το Λαύριο, στα μολύβδινα ελάσματα από το μαντείο της Δωδώνης, καθώς και στην μαρτυρία του Ηροδότου για την προσφυγή των Σιφνίων στους Δελφούς, που συνδεόταν με την παραγωγή τους σε χρυσό και άργυρο. Στο τελευταίο κεφάλαιο εξετάζεται η σχέση της μαντείας με τη μεταλλουργία κατά την Αρχαϊκή και την Κλασική Περίοδο μέσα από τα ελάσματα της Δωδώνης και τη διήγηση του Ηροδότου για χρησμό των Δελφών που παρέπεμπε σε ένα σιδηρουργείο.

Ως προς τη διάρθρωση του υλικού, επιχειρείται η διαστρωμάτωση των παρεχόμενων πληροφοριών. Στο κείμενο αναπτύσσεται το αντικείμενο της έρευνας, ενώ οι υποσημειώσεις είναι αναλυτικές για λόγους ολοκληρωμένης τεκμηρίωσης και χρηστικότητας. Οι άμεσες μαρτυρίες παρατίθενται στο κομμάτι των υποσημειώσεων, ενώ οι παράλληλες μαρτυρίες τίθενται ως αναφορές. Το σύνολο των χρησιμοποιούμενων πηγών, στο πρωτότυπο και σε μετάφραση του γράφοντος, συγκεντρώνεται στο Παράρτημα.

Το γενικό συμπέρασμα που προκύπτει από την έρευνα είναι ότι η μαντεία επηρέαζε σε μεγάλο βαθμό την παραγωγή μετάλλων έχοντας ρόλο υποστηρικτικό. Παρείχε δηλαδή το

αίσθημα ασφάλειας στους ανθρώπους μέσω της θεϊκής εύνουιας ώστε να προχωρήσουν σε δύσκολα εγχειρήματα, χωρίς το ρίσκο να λειτουργεί ως ανασταλτικός παράγοντας.

**Το πλήρες κείμενο βρίσκεται δημοσιευμένο στη διεύθυνση:**  
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## ΕΙΔΗΣΕΙΣ - NEWS RELEASE

# «ΠΑΤΕΡΕΣ» ΤΟΥ ΗΛΙΑΚΟΥ ΗΜΕΡΟΛΟΓΙΟΥ ΟΙ ΜΙΝΩΪΤΕΣ, ΑΡΘΡΟ ΤΟΥ ΜΑΝΟΛΗ ΚΟΚΟΛΑΚΗ

Δεκαεννέα αιώνες πριν από τους Βαβυλώνιους είχαν ανακαλύψει το ηλιακό ημερολόγιο οι Μινωίτες, όπως αποκαλύπτει στο «Εθνος» ο καθηγητής Μηνάς Τσικριτζής.



Αποτύπωση ηλιακού ημερολογίου σε μινωικό σφραγιστικό εύρημα, κατασκευασμένο από δόντι ιπποποτάμου. «Οι 12 κοιλότητες που φέρει το σφράγισμα είναι συμβολισμοί σελήνης, είναι ο χρόνος, οι 12 μήνες».

Ο Κρητικός ερευνητής, ύστερα από πολύχρονη μελέτη και διασταύρωση στοιχείων, εκφράζει τη βεβαιότητα ότι «διάβασε» ένα μέρος των ιερογλυφικών των Μινωιτών και φέρνει στο φως νέα δεδομένα για το πρώτο μινωικό ηλιακό ημερολόγιο της 3ης χιλιετίας π.Χ.

Παράλληλα καταρρίπτει την πρώτη μέχρι σήμερα προσέγγιση που είχε γίνει το 538 π.Χ. από τον Βαβυλώνιο αστρονόμο Ναμπού ? Ριμανού, ότι οι Βαβυλώνιοι ήταν εκείνοι που είχαν ανακαλύψει το ηλιακό ημερολόγιο.

Η «πυξίδα» που οδήγησε στην αποκαλυπτική έρευνα του κ. Τσικριτζή ήταν ένα σπάνιο μινωικό σφραγιστικό εύρημα του 2200 π.Χ., το οποίο και αποτέλεσε, όπως λέει ο ίδιος, το κλειδί της ανακάλυψης για το πρώτο μινωικό ηλιακό ημερολόγιο.

Η ανακάλυψη του Κρητικού ερευνητή καταγράφεται σε υπό έκδοση ερευνητικό βιβλίο, που αναφέρεται στην αστρονομία του κρητομυκηναϊκού πολιτισμού και αναμένεται να κυκλοφορήσει στις αρχές του 2011. Στο ίδιο βιβλίο πέρα από το ηλιακό ημερολόγιο γίνεται αναφορά στο σεληνιακό και το σεληνοηλιακό ημερολόγιο και στις ιδιαιτερότητές τους, όπως επίσης και στο μηνολόγιο-εορτολόγιο.

Το μινωικό σφραγιστικό εύρημα είναι, όπως αναφέρεται, κυλινδρικό και κατασκευασμένο από δόντι ιπποπόταμου. Ο αρχαιολόγος Σακελαράκης κατά την εύρεσή

του πριν από 40 χρόνια στις Αρχάνες, στην ευρύτερη περιοχή της Κνωσού, το είχε περιγράψει «ως ένα ασυνήθιστο σφραγιστικό θέμα κοιλοτήτων».

Ομως από τη σύγχρονη έρευνα-μελέτη του ευρήματος ο Μηνάς Τσικριτζής υποστηρίζει ότι «οι 12 κοιλοότητες που φέρει το σφράγισμα είναι συμβολισμοί σελήνης, είναι ο χρόνος, οι 12 μήνες».

Όπως ο ίδιος εξηγεί, στο σφράγισμα καταγράφονται οι ημέρες με χαραγμένες κάθετες γραμμές, ενώ στο κέντρο υπάρχει μια απεικόνιση που το σχήμα της θυμίζει με μια απλή ματιά αυτό της Κρήτης.

### **Αριθμητικές πράξεις**

«Το σφράγισμα αποτυπώνει το νησί των Μινωιτών στο κέντρο και το πλήθος των ημερών που περνά γύρω γύρω τους. Πιστεύουμε ότι οι αριθμητικές πράξεις επαληθεύουν το αποτέλεσμα των 365,3 ημερών και αποδεικνύει ότι οι Μινωίτες είχαν από την παλαιοανακτορική περίοδο ένα σύγχρονο ηλιακό ημερολόγιο το οποίο προηγήθηκε των Βαβυλωνίων 19 αιώνες» αναφέρει στο «Εθνος» ο κ. Τσικριτζής.

Μάλιστα παραθέτει μαθηματική πράξη με βάση τα σύμβολα της Σελήνης, του μήνες και τις παρεμβλλόμενες ημέρες, επισημαίνοντας ότι «οι Μινωίτες παρατηρώντας το χειμερινό ηλιοστάσιο τη φάση της σελήνης και καταγράφοντας κάθε ημέρα που πενούσε, θα διαπίστωναν μετά από 365,3 ημέρες ότι ο ήλιος είχε την ίδια ακριβή θέση στην ανατολή του σταματώντας την πορεία μετατόπισής του στον ουρανό». Ο κ. Μ. Τσικριτζής, ένθερμος οπαδός του Πυθαγόρα και του Ευκλείδη, ερευνά συστηματικά τα τελευταία 20 χρόνια τον μινωικό πολιτισμό, ενώ έχει εκδώσει το βιβλίο «Ο Δίσκος της Φαιστού: οδηγός στην αποκρυπτογράφησή του».

Πριν από δύο χρόνια αποκάλυψε μια άγνωστη επιγραφή, η οποία, όπως είπε, φέρει κλασματικά σύμβολα της γραμμικής Α' και θα αποτελέσει πιθανότατα τον «μπούσουλα» για τη λύση του μυστικού.

Η επιγραφή αποκαλύφθηκε σε έπαυλη πλησίον του αρχαίου ανακτόρου της Φαιστού και αποτελεί φαινόμενο στην παγκόσμια ιστορία των μαθηματικών.

**Επισκεφθείτε τον δικτυακό τόπο:**

<http://www.ethnos.gr/article.asp?catid=11386&subid=2&pubid=48852950#>

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## **A SEISMOGRAPH FOR ANCIENT EARTHQUAKES**

Earthquakes are one of the world’s biggest enigmas — impossible to predict and able to wreak untold damage within seconds. Now, a new tool from Tel Aviv University may be able to learn from earthquakes of the ancient past to better predict earthquakes of the future.

Prof. Shmuel Marco of Tel Aviv University’s Department of Geophysics and Planetary Sciences in the Raymond and Beverly Sackler Faculty of Exact Sciences and his colleagues have invented a new tool which he describes as a “fossil seismograph,” to help geophysicists and other researchers understand patterns of seismic activity in the past.

Inspired by a strange “wave” phenomenon he studied in disturbed sediment in the Dead Sea region, Prof. Marco says the new tool, developed with input from geologists and physicists, is relevant to areas where earthquakes affect bodies of water, like the West Coast of the United States. It also can help engineers understand what’s at risk when they plan new hydroelectric power plants. The new research was published in the journal *Geology*.

### **A geophysical yardstick for centuries past**

“Current seismographical data on earthquakes only reaches back a century or so,” says Prof. Marco. “Our new approach investigates wave patterns of heavy sediment that penetrates into the light sediments that lie directly on top of them. This helps us to understand the intensity of earthquakes in bygone eras — it’s a yardstick for measuring the impact factor of earthquakes from the past.”

Prof. Marco, his departmental colleague Prof. Eyal Hefetz, and doctoral student Nadav Wetzler took a highly technical look at layers of mud at the Dead Sea. The layers were originally stratified in a very stable manner, but now heavier sediment appears to have been pulled up into the lighter sediment.

The researchers propose that the physics governing the sediment patterns is similar to a phenomenon found in clouds and sea waves but in the case of rocks it was the earthquake shaking (rather than wind) that triggered the formation of waves. The scientists call it the “Kelvin-Helmholtz Instability,” which describes a theory of turbulence in fluids. The Tel Aviv University team applied this theory to analyze the deformation of sediment caused by past earthquakes.

Earthquakes cause deformation in rocks and sediment. Using the basic principles of friction, the researchers considered the geometry of the shapes they found in the Dead Sea sediment and combined it with a number of other parameters found in physical science to calculate how earthquakes from the past were distributed in scale, time and place.

### **The bigger geological picture**



Prof. Marco and his colleagues found that the deformation begins as moderate wave-like folds, evolves into complex recumbent folds, and finally exhibit instability and fragmentation. The deformation process advances depending on the earthquake size — the stronger the earthquake, the more intense the deformation.

The seismological record for fault lines like those near Jerusalem and Los Angeles simply isn't old enough to predict when the next quake might strike. "We've expanded the window of observation beyond 100 years, to create, if you will, a 'fossil seismograph,'" says Prof. Marco. He adds that the tool is only relevant in earthquake zones that intersect with bodies of water such as lakes or the sea.

But it could be very relevant to geologists studying earthquake patterns in areas like the Salton Sea in Colorado. The Salton Sea, only 100 years old, is located directly on the San Andreas Fault in California's Border Region.

Please visit the site: <http://scienceblog.com/43694/a-seismograph-for-ancient-earthquakes/>

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## **MORE ANTIQUITIES REVEALED BY THESSALONIKI METRO**

(ANA-MPA) -- A 4th-century A.D. chapel that may be the oldest Christian place of worship in Thessaloniki was discovered by archaeologists beneath an early Christian basilica, itself unearthed during construction of the Sintrivani metro station in the northern port city.

Among the highlights of the find is a mosaic floor uncovered when structures of the later basilica were removed. This was showed a white field with a clematis theme, dominated by a phoenix with a halo and 13 rays in the centre. On either side are a number of birds, of which seven still survive, two of the right and five on the left.

Archaeologists surmise that there were originally 12 birds, six on either side of the phoenix, and that the picture allegorically represents Christ and the 12 Apostles. The mosaic is unique in Thessaloniki and is dated sometime toward the end of the 4th and start of the 5th centuries A.D.

The small, one-room church was converted into a larger basilica in the 5th century, paved in marble, its naves separated by colonades and its walls decorated with marble panels and murals. In the 7th century the church suffered extensive damage and was poorly renovated, while it was finally abandoned in the 8th to 9th century.

According to archaeologist Melina Paisidou, who announced the find at the 24th session for archaeological work in Macedonia and Thrace, the chapel's position and its presence in the early Christian period, as well as its duration and renovations, place it among the most important Early Christian churches of the metropolis, while its foundation may well be linked with one of the city's martyrs. She said that a site north of the school of theology was being considered in order to transfer the monument.

Other finds unearthed during construction of the metro include a richly carved Roman-era marble sarcophagus and the base of what was probably a storage area.

**Please visit the site:**

**<http://www.ana-mpa.gr/anaweb/user/showplain?maindoc=9699879&maindocimg=9699436&service=144&showLink=true>**

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## **BURIED WITH SECRETS: SKELETONS LIKELY VICTIMS OF CHEMICAL WEAPON, BY STEPHANIE PAPPAS**

Almost 2,000 years ago, 19 Roman soldiers rushed into a cramped underground tunnel, prepared to defend the Roman-held Syrian city of Dura-Europos from an army of Persians digging to undermine the city's mudbrick walls. But instead of Persian soldiers, the Romans met with a wall of noxious black smoke that turned to acid in their lungs. Their crystal-pommeled swords were no match for this weapon; the Romans choked and died in moments, many with their last pay of coins still slung in purses on their belts.

Nearby, a Persian soldier — perhaps the one who started the toxic underground fire — suffered his own death throes, grasping desperately at his chain mail shirt as he choked. [Image of skeleton of Persian soldier1]

These 20 men, who died in A.D. 256, may be the first victims of chemical warfare to leave any archeological evidence of their passing, according to a new investigation. The case is a cold one, with little physical evidence left behind beyond drawings and archaeological excavation notes from the 1930s. But a new analysis of those materials published in January in the *American Journal of Archaeology* finds that the soldiers likely did not die by the sword<sup>2</sup> as the original excavator believed. Instead, they were gassed.

### **Where there's smoke**

In the 250s, the Persian Sasanian Empire set its sights on taking the Syrian city of Dura from Rome. The city, which backs up against the Euphrates River, was by this time a Roman military base, well-fortified with meters-thick walls.

The Persians set about tunneling underneath those walls in an effort to bring them down so troops could rush into the city. They likely started their excavations 130 feet (40 meters) away from the city, in a tomb in Dura's underground necropolis<sup>3</sup>. Meanwhile, the Roman defenders dug their own countermines in hopes of intercepting the tunneling Persians.

The outlines of this underground cat-and-mouse game was first sketched out by French archaeologist Robert du Mesnil du Buisson, who first excavated these siege tunnels in the 1920s and 30s. Du Mesnil also found the piled bodies of at least 19 Roman soldiers and one lone Persian in the tunnels beneath the city walls. He envisioned fierce hand-to-hand combat underground, during which the Persians drove back the Romans and then set fire to the Roman tunnel. Crystals of sulfur and bitumen, a naturally occurring, tar-like petrochemical<sup>4</sup>, were found in the tunnel, suggesting that the Persians made the fire fast and hot.

Something about that scenario didn't make sense to Simon James, an archaeologist and historian from the University of Leicester in England. For one thing, it would have been difficult to engage in hand-to-hand combat in the tunnels, which could barely

accommodate a man standing upright. For another, the position of the bodies on du Mesnil's sketches didn't match a scenario in which the Romans were run through or burned to death.

"This wasn't a pile of people who had been crowded into a small space and collapsed where they stood," James told LiveScience. "This was a deliberate pile of bodies."

Using old reports and sketches, James reconstructed the events in the tunnel on that deadly day. At first, he said, he thought the Romans had trampled each other while trying to escape the tunnel. But when he suggested that idea to his colleagues, one suggested an alternative:

What about smoke?

### **Fumes of hell**

Chemical warfare was well established by the time the Persians besieged Dura, said Adrienne Mayor, a historian at Stanford University and author of "Greek Fire, Poison Arrows & Scorpion Bombs: Biological and Chemical Warfare in the Ancient World" (Overlook Press, 2003).

"There was a lot of chemical warfare [in the ancient world]," Mayor, who was not involved in the study, told LiveScience. "Few people are aware of how much there is documented in the ancient historians about this."

One of the earliest examples, Mayor said, was a battle in 189 B.C., when Greeks burnt chicken feathers and used bellows to blow the smoke into Roman invaders' siege tunnels. Petrochemical fires were a common tool in the Middle East, where flammable naphtha and oily bitumen were easy to find. Ancient militaries were endlessly creative: When Alexander the Great attacked the Phoenician city of Tyre in the fourth century B.C., Phoenician defenders had a surprise waiting for him.

"They heated fine grains of sand in shields, heated it until it was red-hot, and then catapulted it down onto Alexander's army," Mayor said. "These tiny pieces of red-hot sand went right under their armor and a couple inches into their skin, burning them."

So the idea that the Persians had learned how to make toxic smoke is, "totally plausible," Mayor said.

"I think [James] really figured out what happened," she said.

In the new interpretation of the clash in the tunnels of Dura, the Romans heard the Persians working beneath the ground and steered their tunnel to intercept their enemies. The Roman tunnel was shallower than the Persian one, so the Romans planned to break in on the Persians from above. But there was no element of surprise for either side: The Persians could also hear the Romans coming.

So the Persians set a trap. Just as the Romans broke through, James said, they lit a fire in their own tunnel. Perhaps they had a bellows to direct the smoke, or perhaps they relied on the natural chimney effect of the shaft between the two tunnels. Either way, they threw sulfur and bitumen on the flames. One of the Persian soldiers was overcome and

died, a victim of his own side's weapon. The Romans met with the choking gas, which turned to sulfuric acid in their lungs.

"It would have almost been literally the fumes of hell coming out of the Roman tunnel," James said.

Any Roman soldiers<sup>6</sup> waiting to enter the tunnels would have hesitated, seeing the smoke and hearing their fellow soldiers dying, James said.

Meanwhile, the Persians waited for the tunnel to clear, and then hurried to collapse the Roman tunnel. They dragged the bodies into the stacked position in which du Mesnil would later find them. With no time to ransack the corpses, they left coins, armor and weapons untouched.

### **Horrors of war**

After du Mesnil finished excavations, he had the tunnels filled in.

Presumably, the skeletons of the soldiers remain where he found them.

That makes proving the chemical warfare theory difficult, if not impossible, James said.

"It's a circumstantial case," he said. "But what it does do is it doesn't invent anything. We've got the actual stuff [the sulfur and bitumen] on the ground. It's an established technique."

If the Persians were using chemical warfare at this time, it shows that their military operations were extremely sophisticated, James said.

"They were as smart and clever as the Romans and were doing the same things they were," he said.

The story also brings home the reality of ancient warfare<sup>7</sup>, James said.

"It's easy to regard this very clinically and look at this as artifacts ... Here at Dura you really have got this incredibly vivid evidence of the horrors of ancient warfare," he said. "It was horrendously dangerous, brutal, and one hardly has words for it, really."

**Please visit the site:**

<http://www.livescience.com/13113-ancient-chemical-warfare-romans-persians.html>

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## **SCANNING ANTIQUITY UNDERFOOT**

TAU researcher develops geological tool to see what's below the ground's surface

According to rough estimates, there are some 20,000 undiscovered archaeological sites in Israel waiting to be explored. Currently buried under highways or beneath cities, some could reveal historic monuments from the biblical past and give us clues to the expansion and settlement of modern man as he made his way through the Fertile Crescent.

But where to begin? Who decides which sites should be "dug" — at considerable financial cost — and which should remain unexplored until a later date? A new tool from Prof. Lev Eppelbaum of Tel Aviv University's Department of Geophysics and Planetary Sciences at the Raymond and Beverly Sackler Faculty of Exact Sciences may provide the answer.

Prof. Eppelbaum's new tool combines advanced analyses from many geophysical methods and provides the most conclusive evidence ever produced about what's below the ground's surface. His tool is already being applied at many archaeological sites in Israel — and it's ready to be used in the United States and at other sites around the world.

### **An overland use for nuclear submarines**

Reported recently in the journal *Advances of Geosciences*, Prof. Eppelbaum's new tool gathers data from a number of sources — including radio transmitters used to communicate with nuclear submarines and detailed magnetic field observations — and applies an original algorithmic approach to the measurements to make sense of what lies below the earth's surface at depths of up to several dozen yards. His tool can help people "see" meaningful objects, artefacts or civilizations — and lay them out in a four-dimensional chart.

While methods exist for scanning sites of potential archaeological and geological importance, such tools produce significant background noise or inconclusive readings, Prof. Eppelbaum says.

"Inspired by Israel, where we have so many archaeological records underfoot, my tool can also help Americans locate old native burial grounds, and determine minerals and elements several yards below the surface," he continues.

### **A faster road into the past**

His tool can be used to evaluate the possible archaeological significance of any given area under scrutiny. Providing rapid results within days or even hours, the algorithm can "read" extensive data before any digging or exploration begins. Financially, technically and ecologically, this tool offers an optimal way to localize and classify ancient buried objects and estimate the potential of the further archaeological investigations, he says.

Prof. Eppelbaum's solution is called the "multi-PAM," which stands for "physical – archaeological models." The tool first interprets what it "sees" by recognizing image

targets; then the interpretation can be used to develop a four-dimensional model which can be presented to archaeologists hoping to explore a particular region.

Placed in a small unmanned airplane hovering several yards off the ground and scanning wide tracts of land along the earth's surface, Prof. Eppelbaum says, the tool can reveal unexplored sites of historical and archaeological significance.

Prof. Eppelbaum's work currently receives grants from USAID, NATO and Framework 7 in the EU.

**Please visit the site: <http://www.aftau.org/site/News2?page=NewsArticle&id=14094>**

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## **POMPEII COUPLE REUNITED IN MARBLE INSCRIPTION, BY ROSSELLA LORENZI**

The eruption of Mount Vesuvius broke apart a tomb inscription for a husband and wife. Now the names have been joined again.

A married couple from Pompeii have been reunited with the recovery of a missing piece of a 2000-year-old marble puzzle made of several inscribed fragments.

Broken apart and buried during the eruption of Mount Vesuvius in 79 A.D., the pieces belonged to a tomb inscription.

They were unearthed in 1813 along the Via dei Sepolcri in Pompeii near a burial tomb known as "Tomb of the Marble Door."

Still under construction at the time of the eruption, the tomb featured a door made of a single piece of marble, but carved to resemble the sort of folding wooden doors typical in Pompeian houses.

Although unfinished, the tomb had already been used for a number of burials.

"Most likely, the inscription had been displayed in some temporary fashion to be later embedded in the face of the tomb once the structure was completed," Peter Kruschwitz and Virginia Campbell at the University of Reading wrote in the journal *Tyche*.

But it never made it there. Smashed to pieces by the eruption, the inscription, or what remained of it, was stored in the huge deposits of the National Archaeological Museum of Naples.

Later reassembled by piecing together six fragments, it read:

"L(ucius) Caltilius L(uci) l(ibertus) Coll(ina tribu) [P]amphilus [...]ae uxori [...]mo."

While four pieces referred to "Lucius Caltilius Pamphilus, freedman of Lucius, member of the Collinian tribe," two fragments contained the Latin word "uxori," indicating a wife.

Kruschwitz and Campbell identified the missing spouse by scrutinizing photographs of various fragments of inscriptions stored at the Naples museum.

"According to the original excavation report, the fragmentary inscription consisted of seven pieces of marble. The missing piece was in the same museum, but until now, has not been recognized as part of the same inscription," Campbell told *Discovery News*.

Containing nothing but the name of a female -- Servilia -- and the first part of a phrase, the fragment reads: "Seruiliae [...] amico anim [o ...]."

Although there are some other small pieces missing, the inscription is now legible and reads: "Lucius Catilius Pamphilus, freedman of Lucius, member of the Collinian tribe, for his wife Servilia, in a loving spirit."

After spending nearly 2,000 years apart, Lucius Catilius Pamphilus and Servilia were finally reunited.

"What makes the story so beautiful is the way the inscription was fragmented, with the name of the wife separated of that of the man, and the 'in a loving spirit' bit left with the wife's fragment," Kruschwitz told Discovery News.

Clearly an outsider to the Pompeian establishment, Caltilius Pamphilus was a former slave who took great pride in his status.

"You can see this by the way he displays his tribal affiliation in the inscription," Kruschwitz said.

The Caltilii family became fairly powerful at a slightly later phase of Pompeii, under the rule of Nero. It has been alleged that a man, Quintus Coelius Caltilius Iustus, a duovir of 52/53 A.D. (someone who embarked on a political career and became member of the governing body of the city) was indeed an offspring of this couple.

Giuseppe Camodeca, professor of Roman history and Latin epigraphy at the University of Naples "L'Orientale," agrees that the piece with the Servilia's name is the right one.

"I'm totally convinced about the juxtaposition," said Camodeca, who several years ago physically reassembled the first six fragments at the museum in Naples.

Please visit the site: <http://news.discovery.com/archaeology/pompeii-vesuvius-inscription-110307.html>

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## THE COLOR ‘TECHELET’, BY JONAH MANDEL

New research reveals original midnight blue hue of biblical dye, establishes its sea-snail source.

Not quite azure, more of a midnight blue. That is apparently the actual color of the biblical techelet, according to Prof. Zvi Koren, who spoke this week at the Shenkar College’s International Edelstein Color Symposium.

Techelet is the color that was used to dye the coat of the high priests in the time of the temples, as well as the strings attached to the corners of men’s garments “so that they may be seen and remind you of God’s commands,” as the Torah states. In modern Hebrew usage, techelet is the color of a clear sky in the daytime.

But the analysis of a small piece of dyed fabric that archeologist Yigal Yadin found at Masada in the 1960s, dated to the first century BCE, was what Koren recently used to determine not only the true hue of techelet, but also the chemical breakdown that allowed him to establish irrevocably that the source of this ancient dye was indeed the murex trunculus snail.

However, Koren stressed that there were different types of murex trunculus.

The type used for techelet, he told The Jerusalem Post on Thursday, must be one that “not only has indigo, but is rich in it.”

As a professor at the department of chemical engineering at the Shenkar College of Engineering and Design in Ramat Gan and director of its Edelstein Center for the Analysis of Ancient Artifacts, Koren revealed over 15 years ago the origins of the biblical purplish color argaman. The techelet discovery thus completes the historic and archeological picture of the origins of the three ancient colors most important in Judaism – the crimson shani, extracted from bugs, being the third.

Even as far back as the late 19th century, scholars “have supposed and theorized that the source is murex trunculus,” Koren said. “But this never had been proven to be true.

Only now we have authenticated that the source is murex trunculus.”

The Talmud states the techelet is from a hilazon – a sea snail – and does not elaborate.

“We know most of the Jewish authorities call it bluish, lets say even with some green” – as in the case of 11th-century commentator Rashi – “but most say some kind of shade of blue,” Koren noted.

For over 20 years now, the Ptil Tekhelet association for the promotion and distribution of techelet-dyed fringes has been producing its color from the same snail. But the chemical

process necessary for mass production results in a slightly lighter hue, with fewer purple overtones.

According to Assaf Stein, who is in charge of dyeing and mechanical development for the association, the difference in shade is more a matter of taste than anything else, and certainly not a halachic setback for the validity of the group's dye.

“We try to reach a dark shade of blue, but not too dark,” he said. “It is hard to determine what the Torah meant, and seems that a singular shade of techelet wasn't specified.

One can strive for any kind of blue that is beautiful and durable,”  
produced from the correct snails.

“Most people prefer the lighter blue fringes,” he added. “I myself like the darker ones.”

And since both the dye and the fabric are from natural products, and the dyeing process influenced by the temperature, quality of materials and concentration of snails, no two batches will be identical, Stein noted.

“You can actually go into a store and choose a shade of techelet you like from a variety,” he said.

Koren, who made aliya from New York 20 years ago and wears a colorful knitted kippa, stressed that he didn't pursue this enigma from the halachic perspective. “I'm a chemist, a scientist interested in archeology, trying to find the original product,” he said. “But of course, if it has halachic applications, all the better.”

Koren, who reconstructed the ancient process of producing the dye, said his find needn't cast tekhelet production methods in a problematic light. “I'm not a rabbi,” he said.

“But I believe that because it is so difficult and time-consuming to do a dyeing using [the technique of] natural reduction, it can be compared to the etrog citron fruit, where there are different degrees of glorifying the command, but they are all kosher.”

Koren's take on techelet does not change the original Hebrew concept of it being a color of the sky – just what time you look up.

“This is the color of the sky, but not in daytime, rather midnight,” he said at the conference. “A midnight blue, a blue-purple. Because that's when you reach out and feel powerless. All your senses are defenseless. That is when you see and hear the music of the night.”

**Please visit the site:**

<http://www.jpost.com/JewishWorld/JewishNews/Article.aspx?id=210753>

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## **ALTAR OF THE TWELVE GODS SEES THE LIGHT, ARCHAEOLOGISTS HOPE TO PERSUADE ISAP TO STOP RENOVATION WORK THAT MAY COMPROMISE ANCIENT MONUMENT**

Renovation work on the aged Piraeus-Kifissia electric railway (ISAP) on the stretch between the central Athenian neighborhoods of Monastiraki and Thisseio have brought to light one of the most exciting archaeological discoveries of recent years.

Archaeologists believe that remnants found during construction in the area of the Ancient Agora, on the northwestern slope of the Acropolis, belong to the famed Altar of the Twelve Gods, one of Athens's most ancient monuments and a landmark that marked the very center of ancient city, from which all distances were measured -- like an ancient Syntagma Square, which marks the starting point in terms of street numbers.

The find has created a lot of excitement among Greek archaeologists, who believe that it will change the map of Ancient Athens as we know it. "Thucydides mentions only a handful of monuments in his historical works," explained archaeologist Androniki Makri. "Of these, even fewer have actually been found and they are located in the archaeological sites surrounded by the mass of this densely built city. If I had to say what kind of attitude we, all Greeks, should have toward these monuments, I would obviously answer that we should be guarding and protecting them, promoting them and showing them off in any way possible."

The Altar of the Twelve Gods (a small section of which is visible in the Ancient Agora) is almost completely buried under the lines of the ISAP train. ISAP is not willing to give archaeologists the time they need to collect evidence from the new find or to draw up a plan about how to handle it. According to the archaeologists they are 100 percent sure about the identity of the find, because the altar is one of the Athenian monuments that have been described the best in the relevant literature.

"The significance of the altar from an archaeological perspective regarding the history of the Agora and coupled with new evidence from excavation is obvious to the scientists," said Angelos Matthaïou, secretary of the Hellenic Epigraphical Society.

"All of the new evidence that has arisen has not yet been completely understood and cannot be in such a short period time; this is also obvious to the experts. It takes a lot more thought and study, not just into the history of the altar itself, but also into its significance as far as the Agora's early history is concerned," added Matthaïou.

According to Thucydides, the Altar of the Twelve Gods was founded during the tyranny of Peisistratus by his grandson of the same and son of the tyrant Hippias in 522-521 BC. It marked the very center of the ancient city.

Archaeologist Sophia Aliferi also said that “Pindar, obviously in reference to the altar in his dithyramb for the Athenians, called on the gods of Olympus to dance near the fragrant, much-frequented navel of the holy city of Athens, the renowned and exquisitely adorned Agora.”

### **Persian War**

The Altar of the Twelve Gods was partially destroyed during a Persian raid in the 480-479 BC period and was not rebuilt until several decades later, as evidence found during the excavation of the Ancient Agora, including worn stones and seashells believed to date to the fourth quarter of the 5th century BC, suggest.

Closer to modern times, in 1891, when the Athens-Piraeus electric railway was being constructed, only a very small part of the Agora has been excavated and very few of its monuments were brought to light. At the time, neither archaeologists nor the contractors had any idea which relics were at risk of being destroyed in the process of construction and so they failed to take any measures to prevent any damage.

Nevertheless, archaeologists today say that despite the extent of the work that was carried out at the time, very little damage was caused as contractors built the rails on this particular stretch just a little bit higher up than where the altar is located.

The evidence the archaeologists give is enlightening: the excavation of trenches to support the walls flanking this section of the railway tracks in 1891 destroyed the area around the altar and brought small sections of the actual altar to light.

Later, excavations by archaeologists in 1934 at the Ancient Agora began revealing more parts of the altar as well as the peribolos, or courtyard, which helped archaeologists identify it for what it was.

Their findings were confirmed even more recently by the discovery of a statue base with an ancient epigraph suggesting that the statue was commissioned by the Ancient Athenian aristocrat Leagros to the sculptor Glaukos to honor the 12 gods of Olympus.

Many questions continue to eat away at experts, who are hoping that new excavations at the site will reveal all. Their hopes, however, may be short-lived if ISAP goes ahead with its renovation work as planned.

This discovery has reignited the issue of jurisdiction, which has been the bane of many a construction project in Greece and has also sealed the fate of many areas of historical interest.

On the one hand, ISAP is eager to complete construction work and to open this section of the railway to beleaguered commuters without further delay.

On the other, archaeologists insist that further excavations in the area may contribute significantly to more discoveries about the topography of and life in Ancient Athens. They are suggesting that the tracks be elevated or diverted over a bridge, or even that the altar be dug up and moved.

They believe that if the Altar of the Twelve Gods is allowed to be buried again it will not only set a precedent but also form a black mark against Greek society and the attitude it takes toward its ancient heritage.

“We have a duty to ourselves, to our children and to the rest of the world, and especially to western civilizations, whose roots we like to brag lay here,” said Androniki Makri, an archaeologist.

If the Altar of the Twelve Gods is buried under the tracks again, added Angelos Matthaïou, “it is tantamount to admitting, as a society, that we have failed to do our duty, that we have allowed others to dictate how we manage our ancient legacy and have given in to those who have sold their consciences in exchange for material goods.”

**Please visit the site:**

[http://www.ekathimerini.com/4Dcgi/4dcgi/ w\\_articles\\_wsite4\\_1\\_17/02/2011\\_379147](http://www.ekathimerini.com/4Dcgi/4dcgi/ w_articles_wsite4_1_17/02/2011_379147)

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## **CONSTANTINOPLE - VISUALIZING THE ANCIENT CITY**

A new archaeological research project at the University of Kent will reconstruct urban life in cities such as Constantinople during a period of history that has long remained hidden from view.

Reconstructions of daily life in ancient Roman cities such as Pompeii are plentiful, thanks to centuries of archaeological research. But that is not the case for the later Roman or ‘late antique’ period (AD 300-650) that saw the long transition from the Roman Empire to the Middle Ages.

This is set to change now, thanks to three-year project that will see the University’s Dr Luke Lavan, a lecturer in archaeology, leading a team studying artwork, excavated artefacts and the ruins of ancient cities from around the Mediterranean. The project, ‘Visualising the Late Antique City’, is being funded by a £180k Research Project Grant from the Leverhulme Trust. Although Constantinople is now obscured by modern development within what is now Istanbul, other sites in Turkey, Tunisia, and Italy are expected to reveal much of the urban landscape of the period.

‘Few films or TV programmes seek to visualize everyday life in late antiquity. Most people simply cannot imagine the Mediterranean cities of this period, such as Carthage as known to Augustine, Jerusalem as known to Mohammed, or Constantinople as known to Justinian,’ said Dr Lavan.

‘This was a critical period in the development of European civilization, yet it is remarkable how little is known about the daily rhythms of city life. When most people close their eyes they can probably imagine urban life from earlier periods, in places like Rome or Pompeii, but that is not the case for late antiquity.

‘We’ll be looking particularly at how people made use of the urban public space. We hope to reconstruct not just architecture, but a more vivid image of daily life in Constantinople, with lawyers, clergy, urchins and prostitutes going about their business.’

Dr Lavan, of the Department of Classical and Archaeological Studies at the University’s School of European Culture and Languages, said that in many cases excavations of late antique sites revealed well-preserved evidence. This is because the period formed the final layer on most sites before they were abandoned.

‘Buildings often survive intact to their roof-line, with internal fittings such as ovens, cupboards and shop-counters. Statue bases can also survive in situ on public squares, while pavement markings, along with graffiti and minor official notices, reveal the locations of market stalls or political meetings,’ he added.

It is expected that the research, which will be published as both a scholarly tome and an illustrated catalogue, will help film-makers, popular authors and museums produce better reconstructions of city life in late antiquity, and thus make the period more accessible to a wider public.



**Please visit the site:**

**<http://www.medievalists.net/2011/03/14/visualising-the-late-antique-city-project-receives-funding/>**

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## **8,000-YEAR-OLD REMAINS OF EARLY ANATOLIANS DISCOVERED IN ISTANBUL**

Two skeletons dating back 8,500 years, making them the oldest ever found in what is now Turkey, have been discovered during archaeological excavations in Istanbul's Yenikapı area. "Such remains have not been discovered during the excavation before; these are the oldest graves in Anatolia," said Dr. Yasemin Yılmaz, an expert on anthropology and prehistory, who expressed excitement about the find.

According to Yılmaz, the use of wooden blocks – preserved to this day – to cover the coffins makes them distinctive from other finds. Since the excavations around Yenikapı, the site of the ongoing construction on the Marmaray tunnel underneath the Marmara Sea, started in 2004, many shipwrecks, amphoras, cemeteries and around 40,000 artifacts have been uncovered in the area.

Several archaeologists have collaborated with some 200 workers to carefully excavate a 60,000-square-meter area where many traces of human history have been discovered 16 meters below ground and nine meters below sea level. The two ancient coffins were found 40 days ago but only revealed recently by the excavation team.

The find was the first time a coffin was found together with its wooden cover within the city walls, said Sırrı Çömlekçi, who is leading the Marmaray excavations. Typically, cut wood decays in around 15 to 20 years, but these samples have lasted for more than eight millennia thanks to a black clay material that has preserved them to the present day, said the archaeologist.

"We can clearly say that the artifacts found next to the graves date back to 6500 B.C. These coffins also date back to the same period. Their exact age will be revealed using carbon-14 dating. After DNA tests are applied, we will find out from where these people came to Anatolia and learn information about their roots," Çömlekçi said.

Work in the excavation area, covered with white tents, is being conducted with major and fastidious research. Archaeologists sitting beneath a huge tree use cotton buds to clean the clay and mud from a skeleton.

"Istanbul is said to have a 2,500-year-old history. With the Marmaray excavations, we have revealed that Istanbul has an 8,000-year-old history," Çömlekçi said. "This is the biggest open-air excavation. There is no such research in any other place. The artifacts being found here illustrate the richness of the history of Istanbul and Anatolia.

**Please visit the site: <http://www.hurriyetdailynews.com/n.php?n=the-oldest-people-of-anatolia-were-discovered-2011-03-28>**

## **JORDAN BATTLES TO REGAIN** **'PRICELESS' CHRISTIAN RELICS, BY** **ROBERT PIGOTT**

They could be the earliest Christian writing in existence, surviving almost 2,000 years in a Jordanian cave. They could, just possibly, change our understanding of how Jesus was crucified and resurrected, and how Christianity was born.

A group of 70 or so "books", each with between five and 15 lead leaves bound by lead rings, was apparently discovered in a remote arid valley in northern Jordan somewhere between 2005 and 2007.

A flash flood had exposed two niches inside the cave, one of them marked with a menorah or candlestick, the ancient Jewish religious symbol.

A Jordanian Bedouin opened these plugs, and what he found inside might constitute extremely rare relics of early Christianity.

That is certainly the view of the Jordanian government, which claims they were smuggled into Israel by another Bedouin.

The Israeli Bedouin who currently holds the books has denied smuggling them out of Jordan, and claims they have been in his family for 100 years.

Jordan says it will "exert all efforts at every level" to get the relics repatriated. Incredible claims

The director of the Jordan's Department of Antiquities, Ziad al-Saad, says the books might have been made by followers of Jesus in the few decades immediately following his crucifixion.

"They will really match, and perhaps be more significant than, the Dead Sea Scrolls," says Mr Saad.

"Maybe it will lead to further interpretation and authenticity checks of the material, but the initial information is very encouraging, and it seems that we are looking at a very important and significant discovery, maybe the most important discovery in the history of archaeology."

They seem almost incredible claims - so what is the evidence?

The books, or "codices", were apparently cast in lead, before being bound by lead rings.

Their leaves - which are mostly about the size of a credit card - contain text in Ancient Hebrew, most of which is in code.

If the relics are of early Christian origin rather than Jewish, then they are of huge significance.

One of the few people to see the collection is David Elkington, a scholar of ancient religious archaeology who is heading a British team trying to get the lead books safely into a Jordanian museum.

He says they could be "the major discovery of Christian history", adding: "It's a breathtaking thought that we have held these objects that might have been held by the early saints of the Church."

He believes the most telling evidence for an early Christian origin lies in the images decorating the covers of the books and some of the pages of those which have so far been opened.

Mr Elkington says the relics feature signs that early Christians would have interpreted as indicating Jesus, shown side-by-side with others they would have regarded as representing the presence of God.

"It's talking about the coming of the messiah," he says.

"In the upper square [of one of the book covers] we have the seven-branch menorah, which Jews were utterly forbidden to represent because it resided in the holiest place in the Temple in the presence of God.

"So we have the coming of the messiah to approach the holy of holies, in other words to get legitimacy from God."

Location clues

Philip Davies, Emeritus Professor of Old Testament Studies at Sheffield University, says the most powerful evidence for a Christian origin lies in plates cast into a picture map of the holy city of Jerusalem.

"As soon as I saw that, I was dumbstruck. That struck me as so obviously a Christian image," he says.

"There is a cross in the foreground, and behind it is what has to be the tomb [of Jesus], a small building with an opening, and behind that the walls of the city. There are walls depicted on other pages of these books too and they almost certainly refer to Jerusalem."

It is the cross that is the most telling feature, in the shape of a capital T, as the crosses used by Romans for crucifixion were.

"It is a Christian crucifixion taking place outside the city walls," says Mr Davies.

Margaret Barker, an authority on New Testament history, points to the location of the reported discovery as evidence of Christian, rather than purely Jewish, origin.

"We do know that on two occasions groups of refugees from the troubles in Jerusalem fled east, they crossed the Jordan near Jericho and then they fled east to very approximately where these books were said to have been found," she says.

"[Another] one of the things that is most likely pointing towards a Christian provenance, is that these are not scrolls but books. The Christians were particularly associated with writing in a book form rather than scroll form, and sealed books in particular as part of the secret tradition of early Christianity."

The Book of Revelation refers to such sealed texts.

Another potential link with the Bible is contained in one of the few fragments of text from the collection to have been translated.

It appears with the image of the menorah and reads "I shall walk uprightly", a sentence that also appears in the Book of Revelation.

While it could be simply a sentiment common in Judaism, it could here be designed to refer to the resurrection.

It is by no means certain that all of the artefacts in the collection are from the same period.

But tests by metallurgists on the badly corroded lead suggest that the books were not made recently.

The archaeology of early Christianity is particularly sparse.

Little is known of the movement after Jesus' crucifixion until the letters of Paul several decades later, and they illuminate the westward spread of Christianity outside the Jewish world.

Never has there been a discovery of relics on this scale from the early Christian movement, in its homeland and so early in its history.

**Please visit the site: <http://www.bbc.co.uk/news/world-middle-east-12888421> [Go there for pix]**

## **THE PRE-NEOLITHIC IN THE TROODOS MOUNTAINS OF CYPRUS**

Archaeologists working at the pre-Neolithic site of Rhoudias, situated in the south foothills of the Troodos Mountains next to the Xenos river in Cyprus have recently revealed that this site was repeatedly visited by groups of hunter-gatherers.

The field season was conducted in late November 2010 by a group of postgraduate students from the University of Thessaloniki along with other Cypriot archaeologists and researchers. The director, Professor Nikolaos Efstratiou said the site was part of a route from the coast to the mountains and vice-versa where hunter-gatherers would stay for short periods of time on the journey.

The 2010 excavation was aimed at exploring the environmental dynamics and the geomorphology of the Xeros River terrace on which the site is situated. Professor Efstratiou explained that these factors must have greatly affected the decisions made by the hunter-gatherer groups who seem to have visited this area frequently throughout the island's early prehistory. The lithic assemblages recovered from the excavations shows the site was used between 10,000–6,000BC.

### **Exploring the past environment**

A geoarchaeological investigation confirmed the initial observations on the site's stratigraphy concerning the relationship between the presence of tools and the existence of defined depositional episodes (e.g. palaeosols) which then led to the identification of palaeosurfaces and consequently to the reconstruction of the site's palaeoenvironmental history. Excavation trench showing the stratigraphy. Image: Republic of Cyprus Department of Antiquities Fitting Cyprus into the wider picture

The Cyprus Department of Antiquities confirmed that the hundreds of finds consisted mainly of lithic tools dated to the pre-Neolithic phase of Roudhias, however they cautioned that absolute dating from the Roudhias site was still pending.

The 2010 excavation confirmed the initial assessments of the project coordinators concerning the role that the mountainous hinterland played in the processes taking place at the end of the Pleistocene and the beginning of the Holocene, shortly before 10,000BC.

The Department added that the activity at this site should be viewed in relation to the wider archaeological picture of the Middle East at the time, with more evidence of closer contact with the Levant and the Neolithic technologies and concepts they brought.

Please visit the site: <http://www.pasthorizons.com/index.php/archives/03/2011/the-pre-neolithic-in-the-troodos-mountains-of-cyprus> [Go there for pix]

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## **WAS LOST CITY OF ATLANTIS FOUND IN SPANISH MARSH?**

Crime solvers follow the money, but experts searching for the lost city of Atlantis? In archaeology, "you should follow the stones," Richard Freund said.

Freund, a University of Hartford professor, believes he and his research team have found the legendary island-city described by Plato in about 360 B.C. as having "in a single day and night ... disappeared into the depths of the sea."

Using satellite photography, ground-penetrating radar, underwater technology and some old-fashioned reasoning, Freund said his team pinpointed the city in a vast marsh in southern Spain that dries out one month a year. Their findings are featured in a National Geographic special premiering tonight, "Finding Atlantis."

"Follow the stones' means that you have to find the artifacts," he told AOL News in a telephone interview today. "And certain types of stones give you clues about where certain types of things came from."

His team's search began in 2008 with a space satellite photograph showing what looked to be a submerged city in Spain's Dona Ana Park. In 2009 and 2010, Freund's researchers worked with Spanish archaeologists and geologists to explore beneath the mud flats using radar and imaging.

The discovery was clinched, Freund said, with the later find of "standing stones" and a series of memorial cities in central Spain built in the image of Atlantis.

"We found something that no one else has ever seen before, which gives it a layer of credibility, especially for archaeology, that makes a lot more sense," Freund told Reuters.

The memorial sites are significant to Freund's theory because refugees from the lost city would have built smaller-scale versions in tribute. And so when a Spanish scientist led him to ancient sites surrounded by concentric moats -- and a museum featuring standing stones with a symbol similar to Plato's drawing of Atlantis -- Freund was convinced these were commemorations of the destroyed city.

"There are more than 100 of them, and they come from all different places in the area," Freund told AOL's local news site Canton Patch.

"In crime, you follow the money," he told Patch. "In archaeology, you follow the stones."

His team also found ancient wood dating back to 440 B.C. A core sample taken at the marsh showed a layer of methane -- an indication to Freund that a lot of living things all died at once.

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"Finding this one layer of methane is a very telltale sign of a society that is destroyed in one fell swoop," he told the Hartford Courant. "This was in the middle of nowhere, and there was no methane layer found in the area except where we were working."

Explorers looking for Atlantis previously have focused on the Mediterranean Sea as well as the Atlantic, Pacific and Indian oceans. The lost city has been "found" many times over the years, including by Russian scientists who pinpointed a ruined town in the Black Sea; an American who found man-made walls a mile deep in the Mediterranean; and Swedish researchers who found it in the North Sea.

The lost city even was proclaimed found when people searching Google Earth spotted lines resembling a city street grid in the ocean off the coast of Africa. Google squelched the revelation when it explained the lines actually were left by a boat collecting data.

Researchers plan more excavations at the Spanish site, and Freund agreed his current findings won't put a definitive end to the debate.

"It's never like finding the Titanic. It's never like finding Tutankhamun's tomb. That's the way, in the best of all circumstances, that you find something intact," Freund told the Courant.

"You'll not be able to convince all the people all the time," he said.

**Please visit the site: <http://www.aolnews.com/2011/03/13/has-lost-city-of-atlantis-been-found-in-spanish-marsh/> [Go there for link to Video]**

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